

i) Competitive Situation

The Indian industry is in its infancy with local production expected to be approximately US\$ 200 million in 1990. Most of the technologies exploited commercially have been developed indigenously. This is apparent in solar thermal applications where only low temperature devices are being commercially manufactured; wind, where domestic technology is limited to the manufacture of wind pumps and SPVs, where the production is largely based on local technology. Indigenous technologies have not met the requirements for significant commercial success either due to high costs or inefficiencies.

Domestic manufacture of renewable energy equipment is limited to solar thermal devices including solar cookers, hot water systems, driers, wind pumps. There are over 100 manufacturers comprised largely of established companies which have diversified into renewable energy equipment. These firms continue to retain other lines as their mainstay. Some examples of solar photovoltaic manufacturing systems are those of Central Electronics Ltd., Bharat Heavy Electricals Ltd., and Rajasthan Electronics and Instruments Ltd., all public sector companies.

The nascent state of the domestic industry and the lack of adequate know-how in manufacturing specialized equipment, particularly for power generation from solar thermal and wind energy, provide considerable potential for direct sales to Indian end-users by foreign suppliers. There have been significant imports of wind turbines, specialized solar collectors, power generating equipment and raw materials such as silicon wafers, selective coatings and controls.

The value of imports in 1989 was estimated at US\$26 million. Imports from Denmark constituted 32.5% of the total value of imports. This is followed by the U.S. and West Germany with 18% each. Brazil's share was 10%. Denmark's dominance is due mainly to its monopoly in the supply of wind powered electric generators and solar thermal controls. Selective coatings were imported from Canada and the U.S.; solar thermal power generation equipment was imported mainly from the U.S.; silicon wafers from West Germany and Brazil. Brazil has captured a major portion of the market for silicon wafers due to consistent quality and competitive pricing.

Dutch firms are making a concerted effort to enter the Indian market. Windpower Holland BV, a leading Dutch manufacturer of wind generators, is negotiating a turnkey project with the Uttar Pradesh Energy Development Agency for electrification and water pumping. Windpower Holland is also negotiating the sale of wind powered electric generators in the range of 25-80 KW with the Gujarat Energy Development Agency. Other Dutch firms seeking opportunities in wind energy in India are LMW and Sotrk and Polymerin BV.

Projections through 1990 indicate that Danish dominance will erode in favour of the U.S. and Japan. This is due to the relative decline in the importance of wind energy in comparison to solar photovoltaics.

Quality, price and soft payment options are the main factors which determine the choice of suppliers. India, like most developing countries, faces a continuing financial crunch. Easy payment schedules, soft loans and aid programs strongly influence the selection of suppliers. Imports of wind electric generators from Denmark were heavily influenced by a creative Danish financing package.