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TITLE: MARKET STUDY OF INTERNATIONAL NEEDS FOR NEW ELECTRIC GENERATING CAPACI

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## MARKET STUDY OF INTERNATIONAL NEEDS FOR NEW ELECTRIC GENERATING CAPACITY

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A market study of international needs for new electric generating capacity by using simple extrapolation of population and energy consumption to the year 2000 finds that a worldwide requirement for new generating capacity of 1000 to 1300 GWe is needed. Data used are consistent with World Bank projections of dramatically greater rates of increase in both population and energy consumption in the lesser developed countries (LDCs) by comparison with the developed countries. As such, 400-450 GWe of the increase is attributable to those LDCs that can support annual capacity additions of 100-1000 MWe. Because subjective factors such as public acceptance and time-dependent political ties determine the fraction of capacity attributable to nuclear power, this market is impossible to predict. However, it is unlikely that the complete demand for new generating stations can be met with fossil energy alone, which implies either a market share for nuclear or a shortfall in capacity that would increase the disparity between the LDCs and developed countries.

The majority of projections by others have aggregated the countries of the world into areas of either geographic or political similarity. This study started from the construction of a computerized data base for each of the 188 countries of the world; the base contained data on population, growth rate, gross national product, installed electrical capacity, petroleum production and consumption, political ties, etc. Quantities were derived by simple extrapolations using historical data for rates and changes in rates. Where results could be compared, remarkable agreement was shown between the results derived with

this simple model and those from considerably more complex models. An advantage of the present data base is the ability to estimate the increase in installed generating capacity by country using varying assumptions.

From a set of input projections, countries were sorted, ordered, and correlated to identify trends that would pinpoint potential markets for new baseload capacity. In one analysis, the spectrum of new capacity was generated for the LDCs assuming that a logical unit addition to capacity would be equal to 15% of the total capacity projected for the year 2000. The resulting distribution showed a significant peak in the 100-200 MWe range. A second sort assuming capacity additions would equal two years growth gave the same result (hardly surprising as the annual growth in capacity for the LDCs came out to be about 7%).

Although the estimated growth in capacity for the LDCs is large, it is consistent with a large population growth rate, an inertia in population, and the expectation that per capita consumption of electricity would tend toward that of the developed countries. A large increase in capacity is also predicted for the developed countries. Although the rates of increase of population and per capita consumption are small, the base for the projections is so large even small percentage increases have large absolute effects. The most likely international markets for new baseload power plants exist in the larger, more rapidly developing, LDCs, because of the size, number of units involved, and economic base. Although significant demand for new capacity exists in the developed countries, their projected rates of growth are slower, and they are more likely to construct their own generating capacity, indeed, even becoming competitors in the world market.

The data base allows identification of markets by country for any set of assumptions based on the statistical, economic, or political factors. For

example, in one evaluation, the power plants shown in the table are required between 1984 and 2000.

Following several projections based on different assumptions, we conclude that significant additions to electrical generating capacity are inevitable over the next 20 years. The most likely markets for US products exist in the larger developing countries. Although unit sizes up to a nominal 1000 MWe will be required, a large market exists for smaller units in the 200-400 MWe range. The necessity to alleviate reliance on oil, the difficulty to find suitable replacements without substituting a reliance on imported coal or gas, environmental concerns over acid rain and CO<sub>2</sub> emissions, and the necessity to diversify the sources of electrical energy will overcome public resistance to nuclear energy. The necessity to increase electrical generating capacity to more equitably distribute the world's wealth cannot be ignored.

TABLE 1. World Requirements for Power Plants by Size  
for the Years 1983-2000

<u>Nominal Plant Size (MWe)</u>	<u>Number of Units<sup>a</sup></u>
10	100
25	62
50	118
100	146
250	53
500	87
1000	1144

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<sup>a</sup>It is assumed that the unit addition to capacity equals 15% of current capacity.