

rations claim that it is only a matter of time before the U.S. puts quotas on imports, and so they must be guaranteed an exclusive in their field. Accordingly, St. Kitts might get one sporting goods manufacturer but, by contract, it cannot have two.

Naturally, investors are jockeying for the most favorable terms possible, and few are above playing one nation off another: "If country A won't meet our demands, maybe country B will." In the absence of regional solidarity, it is likely that investors will very nearly dictate terms. If this happens, the entire Caribbean Basin Initiative may become just one more good intention leading—not to hell, perhaps, but certainly not out of it.

John Tessitore is Editor of Worldview.

EXCURSUS 2

Thomas Land on SPYING FOR FOOD

Eighteen Asia-Pacific countries representing a vast combined land area have launched a cooperative program to share their space-communications skills for the remote sensing of their natural resources, a program likely to lead to significant improvement in crop yields. Virtually the entire Asia-Pacific region will be covered this year by satellite ground stations in Bangladesh, India, and Thailand, together with existing stations in Australia and Japan. China is about to erect twenty-six ground stations, and other stations are planned in Indonesia and Pakistan. The program will make use of the United States' Landstat satellites and France's second-generation Spot satellite due to be launched early in 1985.

Member countries intend to improve their capacity to use satellite imagery by pooling their scientific resources in joint trading schemes, research and pilot projects, and a liberal exchange of information. This represents an important new departure from existing policy. Only a year ago a group of developing countries, including India, sought—with emphatic Soviet support—to introduce stringent global regulations to outlaw the launching of powerful civilian satellites—such as the Spot—with potential military capabilities. Pictures of the earth taken from space can provide accurate crop forecasts halfway through the growing season, give early warning of diseases spreading through cereal fields and forests, and identify minerals, water, and other resources. Military satellites—until now the exclusive domain of the two superpowers—can also detect troop movements and missile installations anywhere. The arrival of the Spot, the world's most powerful commercial satellite, will blur the line of distinction between military and civilian space surveillance by making a wealth of hitherto sensitive intelligence widely available.

The Asia-Pacific program of educational and scientific collaboration has therefore brought together such hostile neighbors as India and Pakistan, China and Vietnam, joined in a mutual desire to spy on each other from space. But

their endeavor will also improve nutritional standards in one of the poorest and most populous regions of the earth. China's satellite earth station building program, for example, to be carried out by Spar Aerospace of Canada under a recently announced large contract, is part of an immense national effort to approach a measure of self-sufficiency in cereal production.

This accounts for the backing for the project by several global development agencies such as the United Nations Food and Agriculture Organization. The U.N. Development Program has raised \$1.8 million for the higher-education component of the program, which has already led to fifteen fellowships at the Asian Institute of Technology near Bangkok. The first specialist training program held at the institute's Remote Sensing Centre concerned the application of sky-spy technology to vegetation mapping and mangrove ecosystems.

Most of the countries participating in the program have already entered commercial agreements to receive remote-sensing data either from various Asian ground stations or directly from the U.S. space authorities. Data from the French system are to be marketed through Spot Image, which has already mounted a convincing "simulation campaign" using high-flying aircraft to demonstrate the abilities of its space sensors. Said a specialist in charge of the Asia-Pacific collaboration program: "The difference between having the satellite imagery and deriving its full benefits is what the project is all about."

Thomas Land writes from Europe on global affairs.

EXCURSUS 3

Christopher Flavin on SMALL-SCALE POWER

Electric power has largely supplanted oil as the most controversial energy issue of the 1980s. Soaring costs, high interest rates, and environmental damage caused by large power plants have wreaked havoc on the once booming electricity industry. In most countries, electricity prices have risen faster than the general rate of inflation since the mid-'70s. Nuclear reactors, once expected to be the main source of power in the 1980s and beyond, have been plagued by technical breakdowns and staggering cost overruns.

Coal also faces serious hurdles. Coal-fired power plants are a major cause of air pollution and are implicated in the predominant environmental issue of the decade: acid rain. There is growing evidence that acid rain is damaging the world's forests, and this has sparked efforts to limit coal-related air pollution. Technologies are being developed for cleaner coal combustion, but the uncertainty and cost of these solutions clouds the future of coal as a power source.

Third World nations now spend over \$40 billion each year on electricity projects, making this the third largest investment after agriculture and transportation. A portion of these funds is supplied by loans and grants from international aid agencies. The World Bank loaned \$18.7 billion for 413 elec-

tric power projects between 1948 and 1982, and since 1982 it has lent \$2-\$3 billion per year for such projects. Electric power development has been a World Bank priority since the 1960s, when it absorbed more than a quarter of total lending. That figure has fallen to about 17 per cent in recent years. All electric utilities in developing countries are virtually government-owned, but because nationwide grids are still rare, countries often have dozens of largely separate power systems.

Amid the confusion and hand-wringing, many energy planners have missed the most important development of the early '80s: Large central power plants no longer entirely dominate electricity planning. Since 1980, cancellations of nuclear and coal plants in the United States have far outrun new orders. In other countries plant orders have slowed to a trickle. Meanwhile, 785 small-scale power projects, with a total generating capacity of 14,000 megawatts, have been registered with the U.S. Federal Energy Regulatory Commission. Most will begin generating power within a few years. These projects will provide enough power to supply 4 million homes or to satisfy two years of growth in U.S. power demand. The new sources include a mix of cogeneration, biomass, small hydropower, wind power, and geothermal energy.

This rush to small-scale power production is not being led by utilities. Leading the way instead are large industrial companies that build their own power systems and small firms that were created to tap such new energy sources as wind power and geothermal energy. Utilities buy power from the "small producers" and distribute it to customers. Behind much of this activity is legislation passed in the late '70s and court rulings of the early '80s that have ended the utilities' monopoly on power generation in the United States. Federal and state tax incentives have also encouraged development of some of the new technologies. The resulting boom in small-scale power production is a good example of what can happen when rapid advances in technology are joined by entrepreneurial capitalism. The cost of the new power sources is falling steadily. Some are already less expensive than recent coal and nuclear plants, and others soon will be.

The electricity business is in need of fundamental structural change. Utility monopoly of power generation hinders research on new technologies and development of small-scale electricity sources. Advances in energy efficiency have been slowed because investments in efficiency rarely get the subsidies and tax breaks that many countries give to new power plants. The electricity industry's roots lie in the efforts of Thomas Edison and other early inventors and entrepreneurs. A similar spirit of innovation is badly needed today. In short, the utility industry must become more competitive and market-oriented, while still providing the reliable, affordable service for which it is known.

The blossoming of small-scale power generation has not only been largely ignored but actively obstructed by the utility industry. The Edison Electric Institute, an association of private U.S. utilities, excludes new energy sources from its power generation statistics and assumes that future energy needs will be met by large coal and nuclear plants. Many utilities offer only 2-4¢ per kilowatt-hour for this power while spending over 10¢ per kilowatt-hour to harness power on their own. Yet a few utilities, particularly those in California, have encouraged small-scale power production and with impressive results. Based on recent trends, California may get 20 per cent of its power from these energy sources by 1990. In California and elsewhere, encouragement from state regulatory commissions has been a prerequisite to such a shift.

Because most countries have rigid, centralized utility systems, small-scale power generation has barely caught on outside the United States. In many countries a single state utility or a few large private utilities have exclusive rights to generate power, and these bureaucracies have concentrated on large power plants. But rapid advances under way in a wide range of small-scale generating technologies may soon encourage changes worldwide. Research programs are widespread, and international developments are closely followed.

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