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Energy and Development: Understanding the Risks

It is no secret that highly industrialized nations such as Great Britain, the United States, and Japan depend heavily on the oil-rich nations of the Middle East — and increasingly Latin America — for the petroleum products to fuel their economies. On the other hand, this demand has produced sudden enormous wealth in these regions, a situation which inevitably brings political and social, as well as economic, strains. Understanding the interplay of the volatile energy market with the politics, economics, and growth in these areas are thus of vital importance both for the developing areas and the countries with which they do business.

To help monitor, understand, and forecast the changes and risks associated with these critical areas, a group of MIT researchers drawn from several disciplines have combined their expertise in a series of projects under the auspices of the Energy and Development Research Program. And members of the group have developed new and unique methods for producing comprehensive analyses of the economic and political issues in these areas.

Central to the group's success is a set of analytical tools which represent and simulate changes in the world oil market. The International Petroleum Exchange Model, for example, is a comprehensive simulation of the international market, and of the economic causes and consequences of changes of the prices of crude oil. In addition to use at MIT, this package has found application in projects undertaken for such groups as the U.S. Department of Energy, the California Energy Commission, and a major international oil company. The group has also compiled a computerized database of market indicators as well as of political indicators which could affect the market.

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Armed with such analytical aids and backgrounds in fields ranging through economics, management, engineering, and political science, the MIT group has undertaken several studies of the dynamics of the world oil market and the political factors which influence the pricing of crude oil in exporting countries. They are also examining the influence of energy on development in specific regions of the world.

Many of their efforts have, for example, focused on the complex and turbulent Middle East. Professor Nazli Choucri of the Department of Political Science has identified several emerging trends which will shape the future of the Middle East. As a result of the tumultuous political and economic changes in recent years, the Arab states are beginning to accommodate the needs and demands of their neighbors in a new spirit of cooperation. Long term economic planning, she notes, will require that these nations take into account the region's manpower, management, and energy resources as a whole. Despite recent declines in world oil prices, planning in the context of greater wealth will set the agenda for the next decade.

More recently, the MIT researchers have focused their attention on Latin America, which is emerging as a strong force in the international energy market. Not only are there major reserves of oil in such nations as Venezuela and Mexico, but nations such as Brazil have enormous potential to develop alternative sources, including hydroelectric power and fuels derived from vegetable matter.

This burgeoning and potentially inexhaustible energy resource is attracting growing interest from the international business community. Not only are there opportunities for investment in developing these resources, but these countries are also expanding their infrastructures, building new industries, and exploring new technologies. And the availability of labor coupled with today's lower energy prices is making the region attractive for manufacturing operations.

Professor Choucri has identified seven trends that will shape the energy environment in Latin America for the remainder of the decade:

- State-controlled energy enterprises are emerging as the dominant managers and decision makers in the energy field.
- Governments are beginning to regulate the price and quantities of conventional fuels in order to help control inflation and promote long-term economic stability.
- Greater effort has been going into oil exploration and development in oil to strengthen national position in the world oil market.

- Almost all countries in the region are wooing foreign investment in energy development. The search for capital and for expertise to develop the region's oil resources has taken a sharp upward swing since the first price hikes in 1973.

- Collaborative efforts among countries in the region to develop resources, while still in their infancy, are likely to grow in coming years.



Professor Nazli Choucri explains that the subtle interplay of social, political, and economic forces in the Middle East and Latin America will have a profound effect on the future of the international market.

- Technology transfer in the energy sector is becoming a vehicle for energy cooperation both within the region and with other countries. In Brazil, for example, Petrobras signed an agreement with a consortium of U.S. companies in May of 1982 to export a technology for extracting oil from shale.

- Conscious efforts to take energy into account in economic development decisions or investment programs is more evident.

The persistent inflation and balance of payments problems in most of these countries have been exacerbated by the skyrocketing oil prices of the previous decade. Dr. Choucri predicts that today's declining oil prices may ease these problems in such oil-importing countries as Chile and Columbia. The oil exporters, however, are likely to face even more troubled times.

Political and social strains are another consequence of the shifting energy scene in the region. Governments, for example, are struggling to deal with changes in the market by implementing new policies and regulations that often cause social strains. Attempts to curb oil production in Mexico, for example, were extremely unpopular. And the Brazilian government's first set of policies on tolls, taxes, and increases in oil prices sparked riots in some cities.

In addition, over the last decade, new investment patterns have created new social strains. In Mexico, for example, expansion of investments in the oil sector accentuated shortages of skilled labor and helped weaken agriculture as farm labor migrated to the new sector. A weakened agricultural system could not then respond as well as it should have to the demand for food boosted, in part, by higher birth rates.

Power relations in the societies have also changed as new groups have grown wealthy and others have grown poorer. State enterprises, for example, are now major actors in the political arena, deriving power from control over sources of economic wealth. Bureaucracies have blossomed as well, and the major political decisions have become tied to oil production policies, investments in exploration and development, and allocation of oil revenues.

While Latin America's current energy profile is based largely on petroleum, Dr. Choucri stresses that the region has good prospects for developing alternatives. But the countries in the region must overcome four main obstacles in order to develop these resources. They must raise the required capital in the face of declining oil revenues, gain access to new technologies, resolve possible environmental problems that develop with increasing resource exploitation, and recruit able managers to implement plans for developing both old and new energy technologies.

In the long term, Dr. Choucri explains, Latin America's economic and political outlook will be influenced not only by the price of oil, but by its investments in oil exploration and development as well as investments in alternatives. Today's prices have considerably reduced incentives in alternatives, and they have even made it unlikely that these nations will launch a major push for investments in conventional fuels. Thus, today's lower prices are limiting the prospects for the alternatives that could lead to substantial changes in patterns of energy consumption.

—David R. Lampe