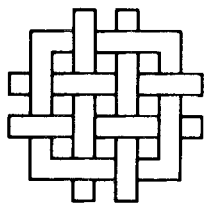

ENERGY FOR DEVELOPMENT

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Foreword

Over the next century, 95 percent of all the projected population growth on the planet will take place in the developing world. Moreover, there are imperatives to alleviate the poverty and suffering that are the lot of so many in the developing countries today. The standard of living must be raised considerably.

The implications of these simple assertions for global energy use are enormous. Either the developing countries must adopt energy use strategies to fuel their economic growth which are far more efficient than present or past energy use in the industrialized world, or overall global energy demand must climb steeply. The record of the past half decade (1980–85) suggests the magnitude of the trend. In these five short years, commercial fuel use in the developing countries rose by 22 percent: nuclear power increased 348 percent from a small base, hydroelectricity rose 37.5 percent, natural gas 39 percent, coal 27 percent, and oil 6 percent. By comparison, during this same period, commercial energy use *declined* by one percent in the OECD nations, reflecting in part dramatic improvements in energy efficiency.

Such growth in energy use comes at a high price: air and water pollution; land disturbance, nuclear proliferation, and global climate change. For the majority of countries, which must import oil and coal, it also means a continuing heavy burden of foreign debt: one that already threatens not merely the economic futures of the nations themselves, but also the stability of

the international banking system, and through it, the industrialized economies as well.

In addition to the heavy demand for foreign exchange, traditional energy supply investments are highly capital intensive and provide relatively few jobs. This is the reverse of what most developing countries need. By 2025 the working age population in the less developed countries alone will be greater than the world's current *total* population. Modern labor intensive investments are what most less developed countries must concentrate on.

Finally, energy import needs can also severely limit countries' political freedom of action, forcing governments into international postures they would not otherwise adopt.

For all of these reasons, the developing countries' long term energy strategies assume extraordinary importance for themselves and for the rest of the world. In this context, the message of this study is an enormously hopeful one. The end-use analysis that is described in these pages shows that developing nations have an almost universally unrecognized potential to raise living standards—up to about the level of Western Europe today—with only a modest 30 percent increase in per capita energy consumption. The strategy demands a widespread shift from inefficiently used non-commercial fuels to efficiently used modern energy technologies, but it does not depend on exotic or yet-to-be-developed schemes. Instead the End Use Global Energy Project (EUGEP) authors have

conservatively assumed only commercially available or near commercial technologies.

Together with its companion study *Energy for a Sustainable World*, *Energy for Development* points the way toward a global energy need in 2020—when two billion additional people are expected on the planet—only 10 percent higher than it is today, a stark contrast to conventional projections which show an increase of more than 100 percent. The potential benefits of this alternative growth path to the global environment, economic growth, and political stability can hardly be over-estimated.

The work carried out by the authors of this study is closely tied to the research conducted at WRI since 1983. WRI has studied the role of bioenergy in development and industry, staged an international conference on the same theme and investigated the impacts of energy subsidies in promoting inefficient energy use in both industrialized and developing countries. WRI's scientific and policy work on the greenhouse effect, on the depletion of the earth's ozone shield, and on acid rain, tropospheric ozone, and other air pollutants, also ties in directly with the recommendations of this study on how to satisfy economic goals with-

out running up against severe environmental constraints.

WRI is pleased to have worked closely with José Goldemberg (Brazil), Thomas B. Johansson (Sweden), Amulya K.N. Reddy (India), and Robert H. Williams (U.S.)—the EUGEP authors—in supporting their work and in making the results of their research available. Their effort is an excellent example of collaborative research at the international level on an issue of global importance.

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James Gustave Speth
President
World Resources Institute

German Development Cooperation in the Energy Sector. Huge challenges lie ahead of us in the next few years. We need to overcome global poverty and hunger, and protect our natural resource base – the whole of creation. In the food sector, too, energy means crucial progress. Water pumps or irrigation facilities, machines and special agricultural equipment increase the size of the harvest, which is then stored, transported and distributed – using energy.