

Report No. 9672-IND

# Indonesia

## A Strategy for Infrastructure Development

June 22, 1992

Country Operations Division  
Country Department III  
East Asia and Pacific Region

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CURRENCY EQUIVALENTS

Before November 15, 1978 US\$1.00 = Rp.415

Annual Average 1979-88

|      |                               |
|------|-------------------------------|
| 1979 | US\$1.00 = Rp.623             |
| 1980 | US\$1.00 = Rp.627             |
| 1981 | US\$1.00 = Rp.632             |
| 1982 | US\$1.00 = Rp.661             |
| 1983 | US\$1.00 = Rp.909 <u>a/</u>   |
| 1984 | US\$1.00 = Rp.1,026           |
| 1985 | US\$1.00 = Rp.1,111           |
| 1986 | US\$1.00 = Rp.1,283 <u>b/</u> |
| 1987 | US\$1.00 = Rp.1,644           |
| 1988 | US\$1.00 = Rp.1,686           |
| 1989 | US\$1.00 = Rp.1,770           |
| 1990 | US\$1.00 = Rp.1,843           |
| 1991 | US\$1.00 = Rp.1,950           |

May 26, 1992

US\$1.00 = Rp.2,025

FISCAL YEAR

|                |   |                          |
|----------------|---|--------------------------|
| Government     | - | April 1 to March 31      |
| Bank Indonesia | - | April 1 to March 31      |
| State Banks    | - | January 1 to December 31 |

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a/ On March 30, 1983, the Rupiah was devalued from US\$1.00 = Rp.703 to US\$1.00 = Rp.970.

b/ On September 12, 1986, the Rupiah was devalued from US\$1.00 = Rp.1,134 to US\$1.00 = Rp.1,644.

INDONESIAA STRATEGY FOR INFRASTRUCTURE DEVELOPMENTTable of Contents

|   | <u>Page No.</u> |
|---|-----------------|
| SUMMARY AND CONCLUSIONS . . . . .   | vii-xviii       |
| <b>CHAPTER 1: <u>ROLE OF ECONOMIC INFRASTRUCTURE IN INDONESIA'S DEVELOPMENT</u></b>           |                 |
| A. Introduction . . . . .   | 1               |
| Background . . . . .  | 1               |
| B. Role of Economic Infrastructure . . . . .  | 2               |
| C. Infrastructure Developments in Indonesia . . . . .   | 4               |
| D. Infrastructure Challenges for the 1990s . . . . .  | 7               |
| Infrastructure Development Needs . . . . .  | 7               |
| Elements of a Strategy for Efficient<br>Infrastructure Development: The Tasks Ahead . . . . . | 11              |
| <b>CHAPTER 2: <u>MACROECONOMIC FRAMEWORK FOR PUBLIC INFRASTRUCTURE INVESTMENT</u></b>         |                 |
| A. Introduction . . . . .   | 15              |
| B. Macroeconomic Framework for Growth with Stability . . . . .                                | 15              |
| Overview . . . . .  | 15              |
| A Macroeconomic Policy Framework for the 1990s . . . . .                                      | 16              |
| Medium-Term Prospects . . . . .   | 17              |
| External Borrowing and Debt Management . . . . .  | 21              |
| C. Uncertainties in Prospects . . . . .   | 22              |
| Adverse External Environment . . . . .  | 22              |
| Implications for Managing the Public<br>Investment Program . . . . .                          | 24              |

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This report was prepared by a team led by Sadiq Ahmed. The principal authors were Sadiq Ahmed, Dipak Dasgupta, Kyle Peters and Zia Qureshi. Other major contributors were Don Hanna, Nicholas Prescott, Cyrus Talati and Vatsal Thakor. The report draws heavily from background papers prepared by Jean-Charles Crochet, Ben Fisher, Swati Ghosh, David Hawes, Kyu Sik Lee, Samuel Lieberman, Andres Liebenenthal, Aftab Raza, A. Shanmugarajah, Vinaya Swaroop, Stuart Whitehead and Dennis Whittle. The report was completed in green cover in June 1991. Discussions with the Government, however, were not possible until February 1992. The final report reflects Government comments and also updates the analysis to reflect recent developments.

**CHAPTER 2: MACROECONOMIC FRAMEWORK FOR PUBLIC INFRASTRUCTURE INVESTMENT (Cont'd)**

|  |    |
|--|----|
| D. Investment Requirements and Financing Options for Public Infrastructure . . . . . | 26 |
| Indicative Allocations for Public Infrastructure . . . . .                           | 27 |
| Financing Options at the Sectoral Level . . . . .                                    | 29 |

**CHAPTER 3: PROMOTING EFFICIENT USE OF INFRASTRUCTURE**

|   |    |
|---|----|
| A. Introduction . . . . .   | 37 |
| B. Pricing of Economic Infrastructure . . . . .                   | 37 |
| A Framework for Infrastructure Pricing . . . . .                  | 37 |
| Pricing Policies in Major Infrastructure Sectors . . . . .        | 39 |
| Pricing Policies and Private Provision . . . . .                  | 49 |
| C. Improving O&M of Infrastructure: Issues and Strategy . . . . . | 50 |
| Recent Improvements in O&M Policies . . . . .                     | 50 |
| The Future Policy Agenda . . . . .                                | 51 |

**CHAPTER 4: THE PRIVATE PROVISION OF INFRASTRUCTURE SERVICES**

|   |    |
|---|----|
| A. Introduction . . . . .   | 59 |
| B. Private Participation in Infrastructure in Indonesia --The Current Situation . . . . .                 | 59 |
| C. The Objectives and Rationale for Private Provision of Infrastructure Services . . . . .                | 61 |
| D. The Policy Framework for Private Provision . . . . .   | 65 |
| Encouraging Private Entry in Potentially Competitive Markets . . . . .                                    | 65 |
| Private Participation in Natural Monopoly Sectors . . . . .   | 68 |
| Managing the Trade-Offs Between Efficiency and Financing Objectives in Natural Monopoly Sectors . . . . . | 73 |

**CHAPTER 5: IMPROVING THE EFFICIENCY OF PUBLIC PROVISION OF INFRASTRUCTURE**

|  |    |
|--|----|
| A. Introduction . . . . .  | 77 |
| B. Improving Public Sector Management . . . . .                        | 77 |
| Reform of Public Enterprises (PEs) . . . . .                           | 78 |
| Decentralization . . . . .   | 80 |
| Improving Program Management at the Central Government Level . . . . . | 82 |

**CHAPTER 5: IMPROVING THE EFFICIENCY OF PUBLIC PROVISION OF INFRASTRUCTURE (Cont'd)**

|    |  |     |
|----|--|-----|
| C. | Enhancing Project Implementation Capacity . . . . .                                  | 85  |
|    | Recent Trends in Project Implementation . . . . .                                    | 86  |
|    | Implementation Planning and Management . . . . .                                     | 87  |
|    | Budget and Finance Procedures . . . . .  | 87  |
|    | Land Acquisition Problems . . . . .  | 88  |
|    | Procurement . . . . .  | 89  |
|    | Consultant Services . . . . .  | 92  |
|    | Construction Industry . . . . .  | 93  |
| D. | Infrastructure and Environmental Management . . . . .                                | 93  |
|    | How Infrastructure Affects the Environment . . . . .                                 | 93  |
|    | Objectives and Instruments of Environmental Policy . . . . .                         | 96  |
| E. | Location Aspects of Infrastructure Development . . . . .                             | 99  |
|    | Regional Balance in Economic Growth and the Availability of Infrastructure . . . . . | 99  |
|    | Regulatory Approaches to Urban Deconcentration . . . . .                             | 100 |
|    | Factors Underlying Efficient Infrastructure Location Decisions . . . . .             | 102 |

**CHAPTER 6: PUBLIC INVESTMENT IN INFRASTRUCTURE--SECTORAL PRIORITIES**

|    |   |     |
|----|---|-----|
| A. | Introduction . . . . .  | 105 |
| B. | Power Sector . . . . .  | 105 |
|    | The Demand for Electricity . . . . .                                    | 105 |
|    | Power Generation Requirements . . . . .                                 | 106 |
|    | Investment Requirements for the Power Sector . . . . .                  | 108 |
|    | Key Issues in the Power Sector and PLN's Development Program . . . . .  | 108 |
| C. | Telecommunications . . . . .  | 110 |
|    | Background . . . . .  | 110 |
|    | Demand for Services . . . . .   | 111 |
|    | Key Elements of a Strategy for Telecommunications Development . . . . . | 112 |
|    | Investment Requirements . . . . .                                       | 114 |
| D. | Transport . . . . .   | 116 |
|    | Background . . . . .  | 116 |
|    | Investment Priorities . . . . .   | 117 |
| E. | Water Resources Development . . . . .                                   | 119 |
|    | Demand-Supply Balance . . . . .   | 119 |
|    | Investment Priorities . . . . .   | 121 |

|                             |          |
|-----------------------------|----------|
| STATISTICAL ANNEX . . . . . | .127-139 |
|-----------------------------|----------|

Text Tables

| <u>Table No.</u> |  | <u>Page No.</u> |
|------------------|--|-----------------|
| <u>CHAPTER 1</u> |  |                 |
| 1.1              | Indicators of Development of Economic<br>Infrastructure, 1970-90 . . . . .                     | 5               |
| 1.2              | Selected Rates of Expansion of Economic<br>Infrastructure, 1970-90 . . . . .                   | 5               |
| 1.3              | Government Expenditure on Economic<br>Infrastructure Development . . . . .                     | 6               |
| <u>CHAPTER 2</u> |  |                 |
| 2.1              | Recent Development and Future Outlook . . . . .  | 18              |
| 2.2              | Savings-Investment Balances, 1981-2000 . . . . .   | 21              |
| 2.3              | External Capital Requirements and Sources . . . . .  | 23              |
| 2.4              | Prudent Levels of Public Investment . . . . .  | 26              |
| 2.5              | GOI Sectoral Investment Priorities . . . . .   | 27              |
| 2.6              | Investment Requirements and Indicative<br>Financing Plan for PLN, 1989/90-1998/99 . . . . .    | 31              |
| 2.7              | Investment Requirements and Indicative<br>Financing Plan for TELKOM, 1989/90-1998/99 . . . . . | 33              |
| 2.8              | Investment Requirements and Indicative<br>Financing Plan for Transport Sector . . . . .        | 35              |
| 2.9              | Investment Requirements and Indicative<br>Financing Plan for Water Sector . . . . .            | 36              |
| <u>CHAPTER 5</u> |  |                 |
| 5.1              | Indonesia's Disbursement Performance . . . . .   | 86              |
| 5.2              | Provincial Growth Rates Per Capita, 1971-87 . . . . .  | 100             |
| 5.3              | Infrastructure Access: A Regional<br>Perspective . . . . .                                     | 101             |
| <u>CHAPTER 6</u> |  |                 |
| 6.1              | PLN's Sales Forecast 1991/92 - 1998/99 . . . . .   | 106             |
| 6.2              | PLN's Generating Capacity (1990/91) . . . . .  | 106             |
| 6.3              | Generating Capacity in Java - Bali . . . . .   | 107             |
| 6.4              | Investment Requirements for Power Generation . . . . .   | 108             |
| 6.5              | Investment Requirements for Transmission<br>and Distribution Facilities . . . . .              | 109             |
| 6.6              | Indicative Public Sector Investment Program<br>for the Power Sector . . . . .                  | 111             |
| 6.7              | Demand Estimates for Telephone Lines . . . . .   | 112             |
| 6.8              | Summary Targets, 1988/89 - 1998/99 . . . . .   | 112             |
| 6.9              | TELKOM's Medium-Term Development<br>Plan, 1989/90 - 1998/99 . . . . .                          | 114             |
| 6.10             | TELKOM's Medium-Term Investment<br>Program, 1989/90 - 1998/99 . . . . .                        | 115             |
| 6.11             | Development Expenditures in the<br>Transport Sector . . . . .                                  | 117             |

Text Tables

| <u>Table No.</u>          |  | <u>Page No.</u> |
|---------------------------|--|-----------------|
| <u>CHAPTER 6 (Cont'd)</u> |  |                 |
| 6.12                      | Indicative Public Sector Investment Program<br>for the Transport Sector . . . . .                    | 119             |
| 6.13                      | Water Discharge and Requirements in Java<br>in Average and Dry Years (m <sup>3</sup> /sec) . . . . . | 120             |
| 6.14                      | Central Government Expenditures in<br>Water Sector . . . . .   | 122             |
| 6.15                      | Indicative Investment Program for the<br>Water Sector . . . . .                                      | 123             |

Graphs

| <u>Graph No</u>  |  | <u>Page No.</u> |
|------------------|--|-----------------|
| <u>CHAPTER 1</u> |  |                 |
| 1.1              | Demand for and Supply of Telephone<br>Service, 1976-87 . . . . . | 8               |
| <u>CHAPTER 2</u> |  |                 |
| 2.1              | Sustainable Current Account Deficits . . . . .                   | 19              |
| 2.2              | Selected Indicators of Creditworthiness . . . . .                | 20              |
| 2.3              | Sustainable Fiscal Deficits . . . . .                            | 22              |
| 2.4              | Performance of Non-Oil GDP . . . . .                             | 24              |

Boxes

| <u>Box No.</u>   |  | <u>Page No.</u> |
|------------------|--|-----------------|
| <u>CHAPTER 1</u> |  |                 |
| 1.1              | Private Costs of Public Infrastructure<br>Deficiencies: The Case of Nigerian<br>Manufacturing . . . . .                            | 4               |
| 1.2              | Indicators of Efficiency of Infrastructure<br>Services . . . . .   | 10              |
| <u>CHAPTER 2</u> |  |                 |
| 2.1              | Indicative Estimates of Infrastructure<br>Investment Requirements and Public/Private<br>Participation, 1989/90 - 1998/99 . . . . . | 28              |
| 2.2              | Critical Role of Cost Recovery/Pricing<br>Policies for Financing Infrastructure . . . . .  | 30              |

Boxes (Cont'd)

| <u>Box No.</u>   |   | <u>Page No.</u> |
|------------------|---|-----------------|
| <u>CHAPTER 3</u> |   |                 |
| 3.1              | Infrastructure Pricing Policies: Main<br>Recommendations . . . . .                                    | 40              |
| 3.2              | Main Elements of O&M Policy Agenda . . . . .  | 52              |
| <u>CHAPTER 4</u> |   |                 |
| 4.1              | Deregulating Entry Barriers and Promoting Private<br>Participation in the Power Sector . . . . .      | 66              |
| 4.2              | Creating the Potential for Competition in<br>Telecommunication and Ports Sectors . . . . .            | 67              |
| 4.3              | Potential Indirect Competition in the Water<br>Supply and Electricity Distribution Sectors . . . . .  | 70              |
| 4.4              | Difficulties with Public Contracting Procedures:<br>Solid Waste Management (SWM) in Jakarta . . . . . | 71              |
| <u>CHAPTER 5</u> |   |                 |
| 5.1              | Systemic Constraints on PLN's Performance . . . . .   | 79              |
| 5.2              | Decentralization of Urban Sector Infrastructure . . . . .   | 81              |
| 5.3              | Planning and Programming Transport<br>Infrastructure . . . . .  | 84              |
| 5.4              | Institutional Framework for Water<br>Resource Management . . . . .                                    | 85              |
| 5.5              | Procurement Delays . . . . .  | 90              |
| 5.6              | Impact of Present Procurement Policies on PLN<br>and TELKOM's Performance . . . . .                   | 91              |
| 5.7              | Kedung Ombo Multipurpose Dam . . . . .  | 94              |
| 5.8              | Java Thermal Power Project . . . . .  | 95              |
| 5.9              | A Regulatory Approach to Urban Concentration:<br>The Korean Experience . . . . .                      | 101             |
| <u>CHAPTER 6</u> |   |                 |
| 6.1              | Meeting the Challenges in Piped Water Supply . . . . .  | 124             |

MAP

Indonesia . . . . . IBRD 20514R3

## SUMMARY AND CONCLUSIONS

### Emerging Challenges for Infrastructure Development in the 1990s

i. Following a period of successful adjustment during the 1980s, Indonesia now faces the challenge of sustaining rapid growth with macroeconomic stability. A strong private sector response to the Government's deregulation measures is restructuring and diversifying the production base, substantially enhancing the prospects for sustained growth. However, the rapid pace of Indonesia's recent growth is straining infrastructure facilities, which in many instances are now operating close to capacity or are already overloaded. Along with prudent macroeconomic management and sustained progress with deregulation, ensuring the adequate and efficient availability of economic infrastructure--notably power, telecommunications, transport and water--will be critical for promoting private sector development. In addition to helping sustain rapid growth based on private sector development, which is necessary to provide productive employment for Indonesia's growing labor force, many of these infrastructure services will directly contribute to improving living standards (e.g. residential electricity, public transport, and household water and sewage).

ii. Past Achievements. The importance of economic infrastructure was recognized early on by the Government of Indonesia (GOI). In the past 15 years, GOI allocated over 40 percent of all development spending for such infrastructure, which led to impressive growth in services. For example, the installed capacity of the state electric company (PLN) increased eighteen-fold; the number of telephone lines rose seven-fold; and the length of paved roads increased nearly six-fold. The rapid expansion of economic infrastructure supported strong growth in economic activity--7-8 percent per annum--during the 1970s, and facilitated economic recovery in the late 1980s from the external shocks experienced earlier in the decade. At the same time, the development of infrastructure, especially transport and irrigation, was a major factor in the reduction of poverty in Java.

iii. Future Challenges. Despite these achievements, major challenges remain for the 1990s. First, there is still a large backlog of unmet demand at efficient prices, especially for electricity and telecommunications. For example, Indonesia's current electrification ratio of 31 percent is low by standards in East Asia. PLN is able to serve only about 62 percent of urban households and 16 percent of rural households, whereas it is estimated that at least 90 percent of urban households and two-thirds of those in rural areas can afford to purchase electricity at economic prices. Moreover, PLN supplies only about half of the electricity used in industrial plants; the rest being provided by diesel-based captive generation facilities operated by industrial plants, which are much less economical than grid-based electricity supply. Similarly, the current number of 0.6 telephone lines per 100 persons is by far the lowest telephone density among the ASEAN countries. Registered unmet demand for telephone service increased as a proportion of total supply from 39 percent in 1982 to 76 percent by-end 1989. Second, the projected pace and pattern of economic growth for the medium term--6-7 percent per annum growth of

the non-oil economy, based on manufacturing sector growth of 9-10 percent and non-oil export growth of 8 percent--will lead to substantial new demand for infrastructure services. Third, service efficiency needs to be improved. There is significant scope for increasing the reliability of electricity supply, reducing transmission and distribution losses, and improving the efficiency of power generation based on least-cost development plans; in telecommunications, indicators of network performance are much below acceptable norms while unit costs of investment are high; in road transport, overall system costs are high; and in water supply, there is a high proportion of unaccounted for water in the public piped water systems, the efficiency of most irrigation systems is significantly below that achieved in other countries, and the overall quality of water is poor. Finally, there is an important need to take into account environmental factors in the planning, investment and pricing of infrastructure services.

#### Main Elements of a Strategy for Efficient Infrastructure Development

iv. The task of ensuring the adequacy and efficiency of infrastructure supply during the 1990s, therefore, poses a major development challenge for GOI. There is both a need to facilitate a prudent expansion of infrastructure, based on a careful review of priorities and the availability of resources, as well as to ensure that the infrastructure is maintained and used efficiently. The main elements of a strategy for the efficient development of infrastructure in Indonesia can be classified under five broad, interrelated headings:

- securing adequate financial resources for infrastructure development, within a stable macroeconomic framework;
- ensuring the efficient use of infrastructure facilities;
- developing a framework to promote private provision;
- enhancing the efficiency of public services; and
- setting appropriate priorities for public infrastructure investment.

#### Securing Adequate Financial Resources Within a Stable Macroeconomic Framework

v. Mobilizing Financial Resources. Securing adequate financial resources within a stable macroeconomic environment would be a critical element of an appropriate infrastructure development strategy. In the near term, given emerging concerns about macroeconomic stability, decisive actions to slow aggregate demand will be necessary. This will require a balanced combination of monetary and fiscal policies to restrain demand. Over the medium term, prudent macroeconomic management will be important both to keep the external deficits manageable and to mobilize adequate domestic savings needed to finance required investments in infrastructure and other areas.

vi. Indonesia's medium-term growth target will require gross fixed investment to rise by about 1.4 percentage points of GDP, which will raise its GDP share to 26 percent by 2000. The projected path of sustainable current account deficits--that is, deficits that can be financed without jeopardizing Indonesia's external creditworthiness--shows that they will need to be reduced

from around 4 percent of GNP to about 2 percent by 1995 and maintained at that level through the rest of the decade. This implies that the national savings rate, after allowing for investment in stock changes, will need to grow from 22 percent of GDP in 1991/92 to 24 percent by 1995 and 26 percent by 2000. With sound policies, Indonesia should be able to realize these targets.

vii. In order to achieve the projected reduction in the current account deficit, policies to maintain a strong non-oil export performance--and conserve oil for exports--will be essential. The former entails preserving the competitiveness of the economy by avoiding an appreciation of the real effective exchange rate, maintaining the deregulation momentum in trade and investment, and improving labor productivity through human resource development. The latter would require proper energy pricing policies to restrain domestic demand to efficient levels. At the same time, securing the required growth in national savings will necessitate a major effort to mobilize private and public savings. Encouraging private savings will require improving the opportunities for profitable private enterprise; the household savings rate could also be expected to increase with sustained higher economic growth. Higher public savings will call for a strong public resource mobilization effort and restraints on current expenditures. The resource mobilization policies include: raising non-oil tax revenues through selective increases in rates and continued improvements in tax administration; improving cost recovery from public services; and increasing the profitability of public enterprises by enhancing their operational and financial autonomy. The main policies for restraining current expenditures would be to reduce subsidies and contain the government wage bill.

viii. Prudent Rate of Public Investment. Even with the successful implementation of the above policies to raise national savings, the public investment effort will need to be contained to a prudent level to ensure that fiscal deficits are sustainable. The projections presented in this Report suggest that maintaining a public investment rate of about 1.0 percent of GDP per annum would constitute a prudent strategy. This would entail keeping the overall fiscal deficit at below 1 percent of GDP through the end of the decade. Higher levels of fiscal deficit will either crowd out the private sector, or result in higher inflation and current account deficits, thereby jeopardizing the sustainability of the growth path.

ix. Indicative Sectoral Allocations of Public Investment in Infrastructure. Sectoral allocations of public investment in infrastructure will need to be based on four considerations: (a) overall investment requirements for meeting sectoral targets; (b) availability of financing; (c) implementation capacity constraints; and (d) potential role of the private sector. Based on these factors, the Report suggests the following indicative allocations: public investment in the power sector will need to rise from 1.4 percent of GDP per annum during 1983/84-1988/89 to 2.2 percent during 1994/95-1998/99; over the same period, annual public investment in telecommunications will need to increase from 0.3 percent of GDP to 0.7 percent; in transport, public investment would rise from 2.0 percent to 2.2 percent of GDP; and in water, the annual investment level would also grow marginally from 0.9 percent of GDP to 1.0 percent. Together, total public investment in infrastructure would grow from 4.6 percent of GDP per annum in

1983/84-1988/89 to 6.1 percent in 1994/95-1998/99. The proposed total allocation for public infrastructure is consistent with revised REPELITA V allocations, although there are some differences at the sectoral level.

x. Financing Options. In the past, the Central Government budget has been the main source of funding public infrastructure investments. This funding has taken two forms: equity participation, and onlending of external loans. Although there are important sectoral differences in the relative contribution of the budget and other sources of finance, on average the budget has financed about 90 percent of the total public infrastructure investment. This reflects three important characteristics of the current arrangements for financing public infrastructure: (a) regulated pricing policies; (b) restrictions on foreign borrowing; and (c) restrictions on non-bank domestic borrowing. The restrictions on foreign and domestic borrowing by state enterprises are based on the need to maintain prudent limits on the size of the public sector and to maintain macroeconomic stability. In view of the prevailing strong link between the Central Government budget and the financing of public infrastructure, these prudential regulations have served Indonesia well and they need to be maintained. However, there is significant scope for improving the efficiency of negotiating procedures for external borrowing. Looking beyond the present institutional framework, in an environment where all (or most) infrastructure-related public enterprises are deregulated into fully autonomous units with their finances delinked from the Central Government budget, there may also be a strong case for removing most types of borrowing restrictions, although some overall supervision of their borrowing levels would still be necessary.

xi. On the other hand, the rationale underlying current regulations on pricing policies is weak in most instances. The critical role of cost recovery/pricing policies in financing infrastructure cannot be overemphasized. While some infrastructure services are of the nature of public goods and a large part of investment in them would need to be financed through the tax system, for most services appropriate cost recovery policies--direct and indirect--are necessary and could be developed fairly easily. For marketable services (power, telecommunications, ports, piped water, toll roads), charges linked to the level of consumption could be devised. For these services, cost recovery will need to play a dominant role in investment finance, with minimal reliance on government equity. In the case of pure or semi-public goods, (non-toll roads, sewerage, flood control), investment financing will need to be based on a mix of government equity and indirect cost recovery. Examples of indirect cost recovery mechanisms are: fuel taxes as a proxy for road user charges; urban property tax as a proxy for user charges for urban infrastructure (urban roads, sewerage, flood control, street lighting); and land tax as a proxy for user charges for rural infrastructure (rural roads, irrigation, flood control).

xii. Illustrative projections presented in the Report suggest that with appropriate cost recovery/pricing policies, combined with efficiency improvements, it would be possible to increase the share of self-financing in public infrastructure investment from 10 percent at present to over 25 percent during the REPELITA VI period (1994/95-1998/99). The scope for self-financing is the largest in the telecommunications sector, closely followed by the power sector. The Report suggests that the share of self-financing in

telecommunications could be increased from 22 percent in the REPELITA IV period to at least 40 percent during the REPELITA VI period; the corresponding share in the power sector could be increased from 14 percent to 35 percent. GOI would need to develop an appropriate dividend policy to ensure that public enterprises have adequate flexibility in using their surplus earnings for financing new investments.

### Ensuring the Efficient Use of Infrastructure

xiii. Given the magnitude of the infrastructure challenge, and in view of concerns about the quality of service, managing demand and ensuring the efficient use of existing and new infrastructure facilities are an important priority. Policies that support this objective have two main elements: appropriate pricing of infrastructure services, and effective operations and maintenance (O&M) activities.

xiv. Pricing Policies for Infrastructure. In addition to mobilizing resources for expansion programs in the public sector (as noted in para. xi), appropriate pricing policies are important to: (a) ensure the efficient use of facilities; (b) mobilize resources for financing adequate levels of O&M; and (c) provide incentives for private sector participation. At present, except for telecommunications services, prices do not reflect the economic cost of provision. As a result, there is inefficient use of services; the shortage of resources has constrained proper O&M as well as expansion programs in the public sector; and there is inadequate incentive for private provision. Therefore, major pricing policy changes are needed for most infrastructure services. The main recommendations are: (i) as a general rule, require public utilities to cover their operating expenses, interest and depreciation and self-finance a part of their investment program; (ii) adopt a properly targeted lifeline rate for residential consumption of electricity and piped water, and eliminate all remaining subsidies; if needed, also reduce the connection charges for the poor; (iii) raise groundwater extraction fee, in areas of relatively scarce groundwater resources, in line with charges for piped water, while also improving the enforcement of groundwater licensing and tariff regulations; (iv) extend the pilot irrigation service fee to other areas and consider developing a volume-based user charge for irrigation; (v) design appropriate fuel taxes and vehicle registration fees to properly take into account road user costs; (vi) progressively bring charges for airport and port services in line with costs, limiting subsidies to clearly identified "pioneer" services in remote areas; and (vii) institute a mechanism for regular adjustment of infrastructure prices.

xv. Improving O&M of Infrastructure. In recent years, the Government has made significant progress in several areas of O&M: the importance of O&M has been articulated in high-level policy statements; budgetary allocations to O&M, in both the routine and development budgets, have been increased; and actions to improve the institutional framework for O&M have been initiated. Nevertheless, the magnitude and complexity of the O&M problem require that this effort be increased and sustained for several years. At the sectoral level, compared to the water resources and transport sectors, O&M problems are on the whole less severe in the telecommunications and power sectors. The latter sectors are managed by semi-autonomous public enterprises and are therefore relatively protected from the administrative and financial fragmentation that

affect the other sectors. Moreover, the better O&M performance of these sectors is supported by their stronger cost recovery policies. This suggests that deregulation and decentralization of public infrastructure entities, coupled with stronger cost recovery policies, would need to be key elements of an efficient O&M policy framework. At the same time, O&M could be strengthened by: (a) maintaining the recent reorientation of budgetary allocations towards O&M; (b) reducing the fragmentation of responsibilities and sources of funding for O&M; (c) improving the budgetary classification of expenditures to facilitate identification of the magnitude and composition of O&M outlays; (d) reviewing criteria for allocating transfers (INPRES grants) to regional governments in order to achieve better correspondence between the resources provided to regions and their O&M responsibilities and needs; (e) including O&M implications of current and planned investments in the medium-term expenditure program; (f) preparing O&M strategies for individual sectors to serve as the framework for formulating coherent sector-specific policies, including--for sectors remaining largely dependent on government finance--the development of guidelines defining unit costs of different O&M activities to facilitate both planning and performance evaluation; and (g) strengthening sectoral O&M data bases, especially the preparation and updating of asset inventories.

#### Promoting Private Sector Participation

xvi. A carefully developed policy framework for encouraging greater private sector provision, including network development, could play a major role in ensuring the efficiency and adequacy of infrastructure during the 1990s. A successful implementation of this strategy would: (a) reduce the financing requirement for the public sector; (b) ease implementation constraints in the public sector; and (c) contribute to overall efficiency of service by allowing greater competition.

xvii. Policy Options for Private Participation. Policy instruments to encourage private provision can be grouped under two categories: (a) where the service can be provided through competitive markets, the main instruments are deregulation of public monopolies, changes in the regulatory framework to allow a competitive environment for substantial private sector entry, and possible privatization of all or part of public enterprises; and (b) where public monopolies are expected to remain the dominant service provider, leases, franchises, concessions, and BOT schemes, in a framework of competitive bidding, are possible options. A number of considerations would be important in deciding the appropriate choice between these options: (i) the relative contribution that the option would make in achieving the objectives for private participation; (ii) market structure underlying the infrastructure service; and (iii) the capacity of GOI to develop and implement the associated policy framework.

xviii. Encouraging Private Provision in Potentially Competitive Markets. The scope for enhancing the private sector's role is the largest in potentially competitive markets. In the power sector, electricity generation is a potentially competitive activity. At present, private sector does play a substantial role in power generation based on high-cost captive plants. The suggested approach is to encourage private provision of large-scale electricity generation, where economically justifiable, based on least-cost options. In telecommunications, there are at least three types of services where a

competitive private sector role is possible--manufacturing and supply of terminal equipment to end-users subject to standards; cellular telephone services; and VSAT services and other specialized services accessing the existing network for business users. There already is private participation in these areas, but the use of private services is limited and competition is constrained by various restrictions. In transport, the private sector already plays a substantial role in road and maritime transport services. Recently, GOI has also allowed a private domestic air carrier to operate. The private sector's role can be further increased in areas such as urban bus services and in ports (e.g., operation of berths and terminals).

xix. The deregulation of entry barriers to private investment in potentially competitive activities will require a careful design of policies, and major changes in the role of public institutions. The main policy issues to be resolved include: (a) a clear and supportive regulatory and legal framework to allow freedom of entry, which would avoid converting a public monopoly into a private monopoly, while setting clear norms and standards for consumer and producer safeguards; (b) pricing policies will need to be overhauled to allow an adequate return on investment, while promoting the efficiency of supply and demand; and (c) major changes in institutional responsibilities for the sector will become necessary--the sectoral line ministries will need to shift their focus from managing provision of services to providing an appropriate policy and regulatory role, while affected public sector enterprises will need to redeploy their services to other areas (where their role would remain important), or will have to be reorganized.

xx. Private Sector's Role in Natural Monopoly Services. Public provision will remain dominant in infrastructure that falls under the category of public goods and in natural monopoly activities, which are characterized by large capital costs, long-gestation periods and significant decreasing costs with scale. The private sector's ability to undertake long-term risks of the type associated with natural monopoly activities is limited, because the domestic capital markets and term-financing options are not yet well developed and the legal system has many gaps. Moreover, GOI's ability to regulate private monopolies is constrained by the lack of a sound policy framework in this area. Nevertheless, there are important opportunities and options for encouraging partial private provision, especially where full cost recovery is feasible. These include: (a) concessions and franchises to the private sector to manage and run certain specific investments and services under public regulation (e.g., urban water supply, and electricity distribution); (b) short-term contracting out, management services, and leases in a variety of public infrastructure service areas; and (c) build-operate-transfer (BOT) or build-operate-own (BOO) schemes, where private investment is encouraged in specific, divisible, infrastructure investments of a project type e.g., toll roads.

xxi. The Government is currently emphasizing BOT schemes, long-term concessions and franchises in natural monopoly areas (e.g., entire ports, toll roads, and bulk urban water supply). BOT schemes are also being encouraged in potentially competitive activities (power generation). The benefits of such private investment will depend critically on meeting the additionality test of either providing needed infrastructure capacity that would not otherwise be provided by the public sector, or providing infrastructure at lower investment and operating costs, given the likely constraints on public sector finance and

management skills. These potential benefits need to be weighed carefully against the potential costs of private investment: (a) the higher cost of funds mobilized by private borrowing and equity investment; (b) the financial risks of exposure to debt repayment, foreign exchange and profit guarantees likely to be sought by private investors; (c) the supply risks of non-performance in project completion and operation of private contractors; and (d) the efficiency risks of inadequate coordination of the size, location and timing of private investments with the least-cost expansion plan for the sector. Ensuring that private sector participation serves the public interest would require a sound policy framework that provides a proper balance between the benefits and costs of private investment, presents a transparent basis for negotiation between GOI and private investors, and allows for adequate competition in the bidding process for the underlying service contract.

xxii. The key tests of additionality under a private proposal are: (a) long-term price/revenue assurances should not involve prices that would exceed, and preferably should be less than, the full market cost of providing the incremental services by the public sector; (b) the quality and performance of services contracted should at least be equal to that provided by the public sector; and (c) risks of project failure, where they arise from factors directly within the control of project sponsors, should be entirely borne by the private investors and lenders.

xxiii. The legal contract is the crucial instrument for GOI to obtain appropriate assurance on price, performance standards and risk allocation. Given the limited present capacity to develop appropriate contracts, GOI may need to establish a specialized unit which would: ensure that proposed projects are in priority areas; publicize internationally and invite pre-contract bids from as many competent sources as possible; establish standard contract terms and standard government security packages; establish pricing principles to be applied; establish criteria to evaluate bids; provide guidelines on financing packages; and negotiate and monitor the terms of contract. This would ensure that private sector proposals are invited, evaluated, and contracted competently, and that the selected projects are economically, technically and financially sound.

#### Improving the Efficiency of Public Provision

xxiv. Improved pricing policies and private sector participation will play an important role in managing the demand for infrastructure services and reducing the pressure on the public sector. Nevertheless, the public sector will continue to play a dominant role in the provision of many infrastructure services. The projected expansion in public expenditure on infrastructure will pose a major challenge for the design, selection and implementation of programs and projects in the 1990s. In addition to appropriate pricing policies, the efficiency and effectiveness of higher levels of public spending on infrastructure will require careful consideration of a number of interrelated factors: (a) improving public sector management; (b) enhancing project management and implementation capacity; (c) ensuring the consistency of the public infrastructure investment program with environmental protection; and (d) ensuring an appropriate choice of location for infrastructure.

xxv. Improving Public Sector Management. Improving the management of public infrastructure programs would entail deregulating public enterprises (PEs), providing greater responsibility to local level agencies, and improving management capacity of the Central Government. Many of the infrastructure services (power, telecommunications, port services) are provided by public enterprises. In conjunction with policies for fostering greater competition, deregulating the operations of these PEs, to set them up as corporate bodies, will help to increase the quantity and quality of services, and reduce cost. Similarly, a well managed program of decentralization of responsibilities to the local governments can improve efficiency by providing more opportunities for local initiative in planning, implementation and monitoring of many public infrastructure projects, and by creating better accountability. Finally, while the deregulation of PEs and the decentralization of responsibilities to local governments will relieve the pressure on the Central Government's limited administrative capacity, further policies to improve its planning and monitoring functions, and enhancing implementation capabilities (concerning tasks for which it will remain responsible), will be important. The main need is to improve the quality and motivation of the civil service.

xxvi. GOI has made important progress in all these areas. The Government has been developing a policy framework for the reform of public enterprises based on the Presidential Decree No. 5 of October 1988. A set of corporate restructuring strategies have been identified and instructions have been issued to the enterprise to prepare five-year corporate plans and annual programs. Similarly, some progress has been made towards decentralization. Also, GOI has recently embarked on a process of civil service reform led by the Ministry for the Utilization of State Apparatus (MENPAN). The focus of this process is on classification of tasks and responsibilities through a wide-ranging job analysis initiative. Nevertheless, major challenges remain. The main areas for further reform include: (a) deregulating major public enterprises such as PLN (the state electric company) and TELKOM (the state telecommunications company), with the aim of improving efficiency by providing greater financial and operational autonomy; (b) promoting greater provision of infrastructure services at the local level by strengthening local revenue mobilization and reform of the central-local grant system, and by developing their administrative capacity based on a clearer definition of responsibilities, job classification, incentives and training; (c) improving central and sectoral investment planning by strengthening guidelines for project selection, ensuring macroeconomic and intersectoral consistency of planned investments, and developing sound project appraisal capacity; and (d) improving interagency coordination through early involvement of all parties concerned, involving beneficiaries in the decision making, and sharing information among all participants.

xxvii. Enhancing Project Implementation Capacity. Project implementation delays and quality lapses have enormous economic costs. Therefore, enhancing project implementation capacity will be of major importance, especially as the size and complexities of the infrastructure program increase. While notable improvements in project implementation capacity have been achieved in recent years, based on GOI's effort to partially ease procurement and financing procedures, a substantial unfinished agenda has remained. In particular, procurement policies continue to hamper the performance of large enterprises such as PLN and TELKOM. Further improvements in project implementation

capacity will require progress in five key areas: (a) implementation planning and management; (b) budgeting and finance procedures; (c) land acquisition procedures; (d) procurement procedures; and (e) the design and selection of technical assistance (TA). In each of these areas, the two broad thrusts of specific recommendations contained in the Report are that: first, central planning and finance agencies will need to reduce their approval requirements and delegate greater authority to the project implementing agencies; and second, policy attention needs to be directed to simplifying procedures for land acquisition, procurement and hiring of TA services.

xxviii. Minimizing the Adverse Effects of Infrastructure Development on the Environment. Infrastructure development has a potentially enormous impact on the environment: it can undermine or enhance sustainable development prospects, depending on the type of infrastructure and the extent to which environmental considerations are factored into the planning, delivery and pricing of services. Infrastructure planning must include the environment as a key variable in all major projects, from the design stage to implementation and monitoring. Much greater emphasis also needs to be placed on infrastructure pricing policies to achieve environmental objectives, especially in relation to private infrastructure investments. Regulatory systems face serious institutional constraints and cannot be expected to yield widespread environmental benefits in the near term. Over the longer term, a combination of market-based and regulatory systems will be required.

xxix. Detailed environmental assessments (EA) would be necessary for measuring the environmental impact of major projects. Based on EA, corrective steps to mitigate any environmental damage will be needed. GOI has already initiated an EA process, but much remains to be done to make it operationally effective. Key actions to accelerate this process include: (a) the preparation and evaluation of EA must be kept separate to ensure impartiality--the evaluation roles of BAPEDAL and commissions at the central and regional levels need to be clarified for these purposes; (b) elaboration of subsector specific guidelines is required for consistency and timeliness of the EA process; (c) donor financing should be directed towards evaluation of EAs, as the present technical capacity in GOI is not very strong; and (d) guidelines for assigning project responsibility, backed by a system of incentives and sanctions, are required to improve the consistency and technical quality of projects.

xxx. Ensuring Appropriate Choice of Location of Infrastructure. Policymakers in Indonesia, as in other countries, are concerned with regional imbalances in growth (e.g., Eastern Indonesia vs. Java), and with the perceived excessive concentration of economic activities in or around major urban centers (e.g., Jakarta), especially since it leads to potentially large negative externalities--pollution, urban congestion and excessive rates of rural-urban migration. Many countries have attempted to achieve more balanced regional development and avoid excessive urban build-up through industrial regulation and infrastructure location policies that deliberately attempt to spread the location of industries and infrastructure away from major existing centers to other locations. However, there are potentially high costs associated with such policies--inefficient industrial location leading to high costs and uncompetitiveness for private firms; low rates of return to costly public investment resulting from underutilized infrastructure facilities; and lack of

adequate infrastructure services in existing growth centers. Regional balance can be better promoted by alternative policies that rely on the use of market mechanisms and decentralized planning. Only in a small number of special cases, where market failure and poverty reduction objectives are paramount, can direct intervention be justified.

### Securing the Efficiency of Sectoral Public Investment Program

xxxi. The size of the public investment program in infrastructure is expected to increase significantly during the 1990s. The appropriate choice of projects within each infrastructure sector will be of critical importance.

xxxii. Electric Power. A key issue in the power sector is the size of the public investment program. The current supply-demand projections suggest that the investment requirements in the power sector are expected to more than double (from 1.4 percent of GDP per annum during 1984/85-88/89 to 3.2 percent in 1994/95-1998/99). Under the present institutional arrangements, PLN's capacity to implement this program will be constrained both by its inability to mobilize the necessary resources as well as inadequate institutional capacity. A balanced electricity development strategy for the 1990s calls for a combination of policies that will allow significant private participation in power generation and provide greater financial and operational autonomy to PLN. In addition to promoting bulk-generation by private producers to supply the grid through BOT schemes and franchising in delineated geographic areas (such as Batan and Bintan islands), a reorganization of PLN to create a separate, fully autonomous power generation entity for Java, which could be progressively privatized by offering shares to the public, could allow the private sector to finance almost a third of the total required investment in the power sector.

xxxiii. Although significant progress has been achieved in improving the balance among generation, transmission and distribution, efforts are needed to ensure the generation of electric power based on least-cost options. A comparison of economic costs indicates that natural gas, as compared to oil, nuclear and geothermal, is the least-cost alternative for power generation. To achieve the substitution of natural gas for petroleum products, GOI will need to ensure that petroleum product prices reflect their economic values. At the same time, PLN will need to make efforts to improve the reliability of power supply and reduce transmission and distribution losses through improved staffing and better maintenance practices.

xxxiv. Telecommunications. In recognition of the large economic benefits of adequate and reliable telecommunications service, GOI accorded high priority to the sector in REPELITA IV. Actual implementation of the investment program, however, was constrained by the implementation capacity of the state telecommunication enterprise (previously known as PERUMTEL). A number of steps have been taken to improve the situation, including converting the enterprise to a limited liability company (now known as TELKOM) and applying commercial principles to improve operational performance. Efforts are also needed to reduce high unit costs through competitive procurement policies, to keep abreast of technology changes by organizing a high-level committee that would study progress in other countries, evaluate costs of emerging technologies and develop an appropriate strategy to adopt new technology, and enhance TELKOM's capabilities to efficiently operate the expanded network. At the same time,

further steps are needed to increase competition in the provision of telecommunications services (see para. xviii). This will help improve TELKOM's efficiency and quality of service, and also increase the supply of telecommunications services by encouraging greater private participation.

xxxv. Transport. In transport, public investment will largely need to concentrate on the road subsector. The geometry and pavement of key interurban road links have been improved to a satisfactory condition and appropriate maintenance programs have been put in place. During the coming years, the main challenges will increasingly shift to: (a) providing additional capacity in those corridors, principally on Java, where traffic volumes are now approaching capacity and where heavy freight traffic will necessitate further pavement strengthening; and (b) improving considerably the quality of road works. The current level of spending on district roads probably already exceeds the absorptive capacities of local governments; in addition to improving implementation capacity of the local governments, the main task for the future is to provide progressively larger shares of resources to maintaining roads that have recently been improved. Expenditures on urban roads and other related transport infrastructure (network of segregated busways and light rail lines) will need to increase rapidly in the coming years. Such spending needs to be combined with effective traffic restraint measures to slow the growth in demand for private transport to manageable levels. In railways, the major priority is to reduce the backlog of deferred maintenance and replacement of its locomotive fleet. In addition, minor investments in rollingstock are needed to serve high potential markets. Other investments in railway system capacity expansion can be deferred until the operational performance and financial condition of the railway corporation has improved significantly. For maritime transport, the main priority is to provide additional capacity in the large general cargo ports in Java and Sumatra. However, there is also a need to develop and rehabilitate small ports in more remote areas, particularly in eastern Indonesia.

xxxvi. Water Resources Development. In irrigation, the main priority is the completion of existing command areas instead of construction of entirely new systems. A substantial investment effort in rehabilitation and upgrading is also needed. Improvement in the efficiency of irrigation facilities will require a substantial O&M effort. Regarding non-agricultural water, expenditures on piped water and sanitation and drainage will need to increase substantially. However, GOI's targets for piped water provision delivered through household connections in REPELITA V are somewhat ambitious and may need to be reconsidered. With appropriate tariff policies, the demand for piped water is unlikely to justify the planned expansion program; at the same time there are doubts about the public sector's capacity to implement the planned program. There is a need to improve the distribution of water supply expenditures, by focusing more on larger cities where the backlog of demand for piped water is significant. In particular, efforts to develop standpipe and other low-cost programs to reach the poor need to be continued. In view of implementation constraints on public provision, the private sector's role in providing piped water, both bulk water production (through BOT schemes) and water distribution (through competitively determined franchises), needs to be encouraged. To improve water quality, higher expenditures on sanitation and drainage are required. A concerted effort is also needed to develop and disseminate low-cost approaches in order to maximize coverage of waste disposal, garbage handling and flood control facilities.

## CHAPTER 1

### ROLE OF ECONOMIC INFRASTRUCTURE IN INDONESIA'S DEVELOPMENT

#### A. Introduction

##### Background

1.1 Following a period of successful adjustment during the 1980s, Indonesia now faces the challenge of sustaining rapid growth with macroeconomic stability in the 1990s. A strong private sector response to the Government's deregulation measures is restructuring and diversifying the production base, substantially enhancing the prospects for sustained growth. However, there is increasing concern that the rapid pace of Indonesia's recent growth is straining infrastructure facilities, which in many instances are operating close to capacity or are already overloaded. Along with prudent macroeconomic management and sustained progress with deregulation, ensuring the adequate and efficient availability of economic infrastructure--notably power, telecommunications, transport and water--will be critical for promoting private sector development. At the same time, a growing population and urbanization will add to the demand for residential electricity, public transport, and household water and sewage. The Government of Indonesia (GOI) is responding to these concerns by reviewing the nature of the emerging infrastructure constraints and preparing to develop a strategy to address the challenge.

1.2 The tasks of ensuring the adequacy and efficiency of infrastructure supply during the 1990s present a major development challenge for GOI. There is both a need to facilitate a prudent expansion of infrastructure, based on a careful review of priorities and resource availabilities, and to ensure that infrastructure is maintained and used efficiently. The objectives of this study are to help GOI to: (a) review the efficiency and adequacy of Indonesia's economic infrastructure in light of the need to sustain a 6-7 percent per annum growth of the non-oil economy during the 1990s and improve access of the population to key services; and (b) prepare an efficient infrastructure development strategy. The aim is to develop an analytical framework for reviewing relevant issues systematically, as an input to GOI's formulation of strategies and policies for infrastructure development.

1.3 The Report is organized as follows. Chapter 1 examines the role of economic infrastructure in Indonesia's development. It reviews past progress and identifies the main infrastructure challenges for the 1990s, focusing on both the magnitude of future needs and the quality of service. The availability of financial resources within a stable macroeconomic framework and the financing options at the sectoral level are analyzed in Chapter 2. The issue of efficient use of infrastructure is examined in Chapter 3; the analysis focuses on pricing policies and operations and maintenance (O&M) strategies. The subject of efficient provision of infrastructure is analyzed in Chapters 4 and 5, with Chapter 4 focussing on policies for enhancing the private sector's role while Chapter 5 deals with ways the efficiency of public provision can be improved. Finally, public expenditure priorities at the sectoral level and indicative estimates of investment requirements are presented in Chapter 6.

## B. Role of Economic Infrastructure

1.4 Economic infrastructure--notably transport, telecommunications, power and water--plays a fundamental role in facilitating private investment and supporting economic growth.<sup>1/</sup> An adequate supply of efficient infrastructure promotes the production and distribution of goods by lowering firms' production costs. By affecting production costs, the availability and cost of infrastructure exerts an important influence on firms' competitiveness in the international market. Transport and telecommunications are necessary to link producers with input and product markets. Power and water are essential inputs into the production process for most activities. Without adequate development of such infrastructure, serious bottlenecks in production and distribution can emerge and choke off growth. In addition to helping sustain a rapid pace of economic growth, which is necessary to provide productive employment opportunities, many of these infrastructure services will also directly contribute to improving living standards (e.g. residential electricity, public transport, and water and sewage).

1.5 The provision of infrastructure is widely considered to be a key responsibility of the public sector. Many infrastructure services have the properties of "public goods" because of the difficulty of charging individual users and excluding nonusers of these services, e.g., the basic road network. Some infrastructure services could also involve significant externalities, e.g., rural electrification. Moreover, some major infrastructure facilities, e.g., power transmission, have the attributes of "natural monopolies" because of the considerable economies of scale involved in their provision. In view of these characteristics, there is a risk that such infrastructure may be undersupplied or supplied inefficiently if left to private markets alone. The rationale for public provision of infrastructure has traditionally been developed around these considerations. In addition, the small financial and technical capacities of the private sector--relative to the requirements of major infrastructure projects--in the early stages of development have been an important factor in the heavy reliance on public infrastructure in most developing countries. Over time, with the growth of the private sector, and the rapid increase in the demand for infrastructure associated with economic growth, both the opportunities and the need for private sector participation in the provision of these services have increased in many such countries. It is also recognized that, even in the cases noted above where private markets alone would not lead to adequate or efficient provision, various "market failures" can often be addressed through appropriate fiscal or regulatory measures and, therefore, may not necessarily require direct public provision. Nonetheless, notwithstanding increased private participation, the public sector is likely to continue to be the dominant provider of key infrastructure services in these countries for some time to come.

1.6 While it is unclear whether public investment on balance raises or limits private investment, since higher public investment could crowd out private investment as they both compete for scarce financial and physical resources, public investment in infrastructure is considered complementary to

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<sup>1/</sup> Though the focus of this report is on economic or physical infrastructure, social or human infrastructure--education and health--is, of course, just as important.

private investment because it contributes to improving the "enabling environment" for the latter and raising its potential profitability. Available empirical evidence on the impact of public infrastructure investment on private investment is generally supportive of the complementarity hypothesis. A number of cross-country and individual country studies have found a significant positive effect of public infrastructure investment on private investment.<sup>2/</sup> There is also a sizeable body of evidence supporting the complementarity of public infrastructure investment and private investment at the sector and firm levels. For example, studies of the agricultural sector have reported strong evidence of a significant positive impact of public investment in irrigation on farmer investment and output response.<sup>3/</sup> A detailed firm-level study of the manufacturing industry in Nigeria, documents how deficiencies in public infrastructure hampered private enterprises by imposing substantial additional costs on them (Box 1.1).<sup>4/</sup> A study of Thailand found infrastructure deficiencies as a major constraint both to the industrial growth in the Bangkok area--the country's present industrial center--and to the spread of industrial development to other regions of the country.<sup>5/</sup> Studies relating to Seoul and Bogota have shown that city centers with good infrastructure facilities can serve as "incubators" for the growth of new industrial enterprises, particularly small- and medium-size firms which cannot afford the capital cost of providing their own infrastructure.<sup>6/</sup>

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- <sup>2/</sup> M. Blejer and M. Khan, "Government Policy and Private Investment in Developing Countries", IMF Staff Papers, Vol. 31:2, June 1984; L. Serven and A. Solimano, "Adjustment Policies and Investment Performance in Developing Countries: Theory, Country Experiences, and Policy Implications", World Bank, PRE Working Paper No. 606, March 1991; and A. Shah, "Public Infrastructure and Private Sector Profitability and Productivity in Mexico", World Bank, PRE Working Paper No. 100, September 1988.
- <sup>3/</sup> H. Binswanger, "The Impact of Infrastructure and Financial Institutions on Agricultural Output and Investment in India", mimeo, World Bank, 1988; A. Chhibber, "The Aggregate Supply Response in Agriculture: A Survey", in S. Commander (ed.), Structural Adjustment in Theory and Practice, James Cuvier Publishers, London, 1988.
- <sup>4/</sup> K.S. Lee and A. Anas, "Manufacturers' Responses to Infrastructure Deficiencies in Nigeria: Private Alternatives and Policy Options", World Bank, Report INU 50, July 1989.
- <sup>5/</sup> K.S. Lee, "Infrastructure Constraints on Industrial Growth in Thailand", World Bank, Working Paper INURD WP88-2, September 1988.
- <sup>6/</sup> K.S. Lee, "A Model of Intraurban Employment Location: Estimation Results from Seoul Data", Journal of Urban Economics, Vol. 27, No. 1, 1990; and K.S. Lee, "The Location of Jobs in a Developing Metropolis: Patterns of Growth in Bogota and Cali, Colombia", Oxford University Press, 1989.

**Box 1.1: PRIVATE COSTS OF PUBLIC INFRASTRUCTURE DEFICIENCIES:  
THE CASE OF NIGERIAN MANUFACTURING**

A 1988 survey of Nigerian manufacturing revealed that firms faced frequent interruptions of publicly provided services such as power, water, transport, telecommunications and waste disposal, and also suffered from the generally poor quality of these services when and where they were available. Not only did these deficiencies in public infrastructure services entail costs in terms of inefficient use of public resources engaged in the provision of these services, but they also added substantially to private manufacturers' costs of production. The additional costs imposed on private firms took several forms. First, many firms had to make costly investments in services such as power and water for themselves. In the case of power, as many as 92 percent of the sample firms were found to have installed their own generators. Such investment by individual firms was highly inefficient because of the diseconomies associated with its small-scale as well as the overall low rate of utilization of the resulting capacity (average utilization by manufacturing firms of their installed generation capacity was estimated at only 25 percent). It was determined that aggregate investment by Nigerian manufacturing firms in electric generation capacity was of a magnitude that would have sufficed to cover the capital costs of a program to improve transmission and distribution for the entire country, including the residential sector. Similarly, almost one-half of the sample firms had invested in boreholes and water treatment plants. Typically, investment in electric generators and boreholes was found to add as much as 20 percent to the initial capital costs of new manufacturing plants. Second, firms--typically the smaller ones--which could not afford to invest in their own infrastructure supply suffered frequent and sizable production losses from interruptions in publicly provided services, e.g., from power outages and voltage fluctuations, with some being forced to close down for these reasons. Third, deficiencies in transport and telecommunications caused significant loss of management and staff time and necessitated numerous small expenditures by firms, for example, on private vehicles and radio systems, to cope with these deficiencies.

Clearly, better provision of public infrastructure to the Nigerian manufacturers would reap high returns, by reducing the indicated private and social costs and thereby inducing both higher and more efficient investment. The recent step-up in efforts by the Government of Nigeria to reverse past deterioration in key public infrastructure services reflects a recognition of this.

**C. Infrastructure Developments in Indonesia**

1.7 The importance of infrastructure development was recognized early on by the Government of Indonesia. This has found expression in successive policy statements (Guidelines of State Policy or "GBHN") and five-year development plans (REPELITAS). The development of infrastructure has been viewed, and funded, as a key function of the Government in promoting and sustaining economic growth and private sector development. The spread of infrastructure has also been seen as a means of achieving more equitable development across regions and income groups; examples of such an emphasis are the rural roads and electrification programs, "pioneer" ports, and support for infrastructure spending in the Outer Islands.

1.8 Within this guiding framework, substantial progress has been made in strengthening economic infrastructure. Various measures of infrastructure coverage and growth over the past two decades are given in Tables 1.1 and 1.2. In all sectors, significant progress was achieved during this period. For example, the installed capacity of the state electricity company (PLN) increased eighteen-fold; the number of telephone lines rose seven-fold; and the length of paved roads increased nearly six-fold. In addition to expanding access to infrastructure, emphasis was also placed on modernizing facilities; in telecommunications, Indonesia became the first developing country to install a domestic satellite system.

**Table 1.1: INDICATORS OF DEVELOPMENT OF ECONOMIC INFRASTRUCTURE, 1970-90**

|   | 1970  | 1975  | 1980  | 1985  | 1990  |
|---|-------|-------|-------|-------|-------|
| <b>Power</b>                                  |       |       |       |       |       |
| PLN installed capacity (GW)                   | 0.5   | -     | 2.6   | 5.6   | 8.9   |
| PLN sales (GWh)                               | 1.6   | 2.8   | 6.5   | 12.7  | 23.4  |
| PLN customers (million)                       | -     | 1.1   | 2.7   | 6.0   | 10.4  |
| <b>Telecommunications</b>                     |       |       |       |       |       |
| Telephone lines ('000)                        | 142   | 177   | 370   | 531   | 1,000 |
| <b>Transport</b>                              |       |       |       |       |       |
| Paved roads ('000 km)                         | 20    | 33    | 57    | 84    | -     |
| Rail freight (km x million ton)               | 855   | 916   | 961   | 1,333 | -     |
| Sea freight (million ton)                     | -     | 94    | 120   | 155   | -     |
| Air freight (km x million ton)                | -     | -     | 606   | 1,908 | -     |
| <b>Water</b>                                  |       |       |       |       |       |
| Land under technical irrigation (thousand/ha) | 1,550 | 1,785 | 1,950 | 2,485 | 2,610 |

Source: Various GOI publications and World Bank Staff Reports.

**Table 1.2: SELECTED RATES OF EXPANSION OF ECONOMIC INFRASTRUCTURE, 1970-90 (percent p.a.)**

|                           | 1970-75 | 1975-80 | 1980-85 | 1985-90 |
|---------------------------|---------|---------|---------|---------|
| <b>Power</b>              |         |         |         |         |
| PLN sales                 | 11.5    | 18.1    | 14.2    | 16.0    |
| <b>Telecommunications</b> |         |         |         |         |
| Telephone lines           | 4.6     | 15.4    | 7.5     | 13.2    |
| <b>Transport</b>          |         |         |         |         |
| Paved roads               | 10.2    | 11.3    | 8.0     | -       |
| <b>Water</b>              |         |         |         |         |
| Land under irrigation     | 2.9     | 1.8     | 5.0     | 1.0     |

Source: Table 1.1.

1.9 These advances were made possible by the high priority placed by the Government on the development of economic infrastructure in the allocation of budgetary resources; on average, over 40 percent of all government development expenditure was allocated to this objective (Table 1.3). Real spending on infrastructure rose sharply during the latter half of the 1970s and the early 1980s, as the Government used its increased oil revenues to embark on a major program of public investments. This period saw an acceleration of expansion of capacity in most infrastructure sectors. This growth slowed in the mid-1980s, as Indonesia entered a period of macroeconomic adjustment necessitated by the collapse of oil prices. Alongside the tightening of other spending in response to the drop in oil revenues, infrastructure spending was also restrained. While all new capital-intensive spending was affected by the fiscal adjustment, the Government, mindful of the adverse implications of excessive cuts in infrastructure spending for future growth, limited the reduction of such spending by focusing the cuts more on large industrial projects. Consequently, though declining in real terms, spending on economic infrastructure rose as a share of total development expenditure during this period. As successful macroeconomic adjustment created the room for recovery of public spending toward the end of the 1980s, the Government allowed infrastructure spending to rebound to make up for the lost ground over the preceding period.

1.10 The emphasis on infrastructure was well placed; the rapid expansion of economic infrastructure supported strong growth in economic activity-- 7-8 percent per annum--during the 1970s. The improved availability of infrastructure also facilitated the recovery of the economy in the late 1980s from the external shocks experienced earlier in the decade. Power supply from PLN, for example, played an important role in accommodating the large increase in power demand from the fast-growing manufacturing sector. In this, as well

**Table 1.3: GOVERNMENT EXPENDITURE ON ECONOMIC INFRASTRUCTURE DEVELOPMENT (percent)**

|                                  | 1974/75-1978/79<br>(REPELITA II) | 1979/80-1983/84<br>(REPELITA III) | 1984/85-1988/89<br>(REPELITA IV) | 1989/90 |
|----------------------------------|----------------------------------|-----------------------------------|----------------------------------|---------|
| Average real growth rate p.a.    | 8.0                              | 9.0                               | -2.0                             | 25.0    |
| Share in development expenditure | 42.0                             | 38.0                              | 43.4                             | 45.7    |

*/s* Includes government development expenditure on: irrigation; power, transport, telecommunications, municipal water supply and other infrastructure programs financed under the regional development and transmigration funds. Expenditure by state enterprises not funded through the government budget is not included.

Source: Statistical Annex, Table 1.

as other sectors, the strengthening of public infrastructure has been a significant contributory factor, alongside improved investor incentives stemming from policy and regulatory reform, in the surge in private investment at double-digit rates over the past few years. Given the dispersal of Indonesia's population, production and resources across many islands over a vast area, the development of transport and telecommunications has been central to the commercialization of the economy, enhancing the internal mobility of goods and services and supporting the strong growth in non-oil exports in the

1980s. The development of land, sea and air transport networks have all shared in this outcome. Agricultural production and yields have benefitted from the expansion and improvement of irrigation facilities. The development of infrastructure, especially transport and irrigation, was a major factor in the reduction of poverty in Java.

#### D. Infrastructure Challenges for the 1990s

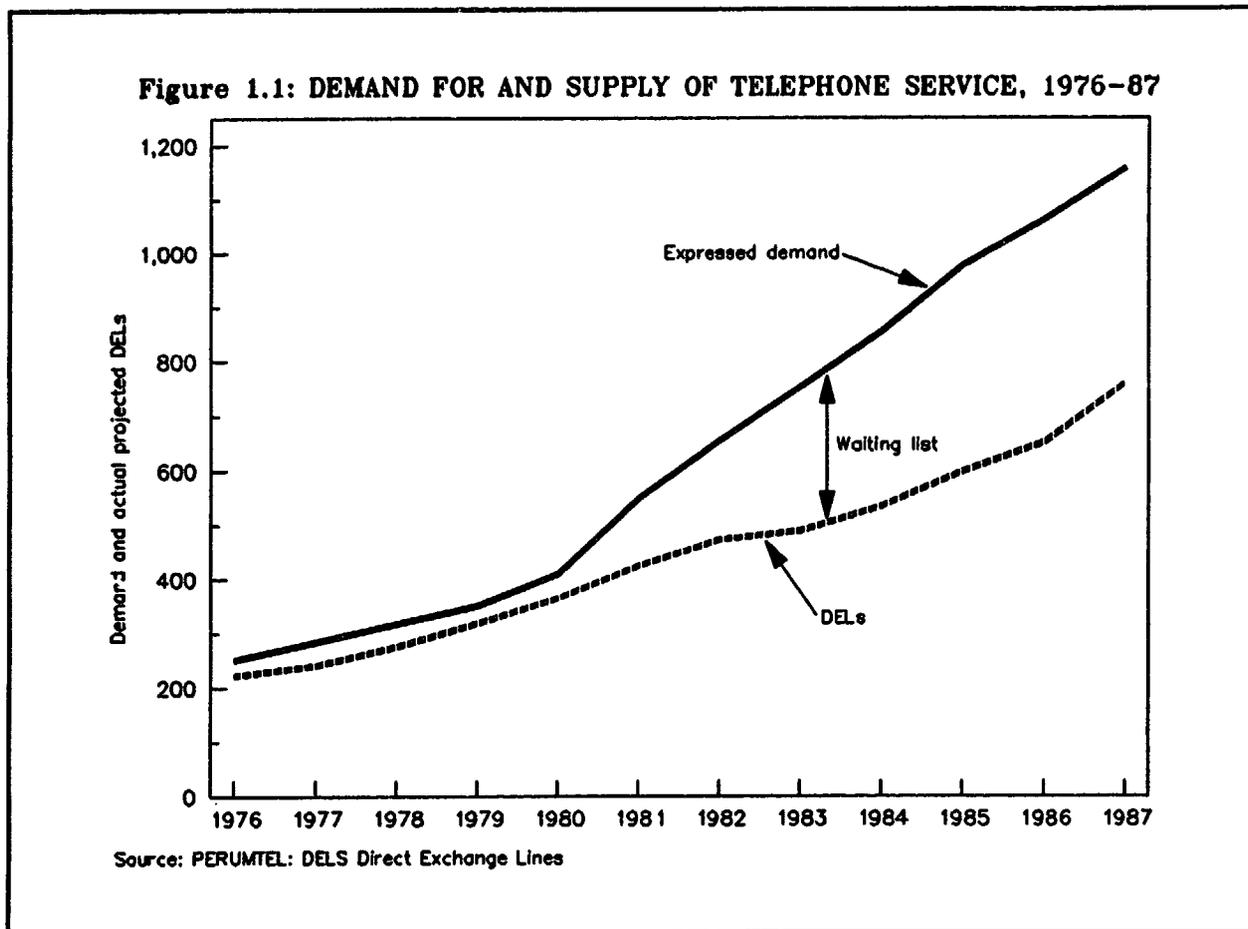
##### Infrastructure Development Needs

1.11 Despite significant past achievements, major challenges remain for the 1990s. First, with a population of 179 million dispersed over more than 13,000 islands, there still remains, not surprisingly, a large backlog of unmet demand for economic infrastructure, especially for telecommunications electricity, and piped water. And second, Indonesia needs to sustain a 6-7 percent per annum real growth of the non-oil economy, based on manufacturing sector growth of 9-10 percent and non-oil export growth of 8 percent, to absorb its expanding labor force productively. The demand for infrastructure services emerging from this pace and pattern of growth, combined with the backlog from past unmet demand, presents a substantial policy challenge for GOI in terms of developing an efficient infrastructure strategy.

1.12 Adequacy of Service Levels. The magnitude of future infrastructure needs can be illustrated with some sector-specific examples. Indonesia's current electrification ratio of 31 percent is low by standards in East Asia. PLN is only able to serve about 62 percent of urban households and 16 percent of rural households, whereas it is estimated that at least 90 percent of urban households and two-thirds of those in rural areas can afford to purchase electricity at economic prices. Moreover, in spite of its rapid development, PLN still supplies only about half of the electricity used in the industrial sector, with the rest being provided by captive generation facilities operated by industrial plants. The rapid emergence of captive generators in the 1970s and their continued growth in the 1980s, bridged the shortfall in electricity supply, albeit at a cost, as grid-supplied electricity is generally more economical than captive generation. In addition to industrial captive generation, a shortage of electricity has also given rise to thousands of village generating sets providing a precarious service of varying quality to rural customers. The better-than-expected recovery of economic activity, especially in the non-oil manufacturing sector, over the past few years has fuelled a large increase in the demand for electricity. With the projected fast pace of economic growth, demand for electricity will continue to increase rapidly during the 1990s.

1.13 In telecommunications, the expansion of the network, while rapid, did not keep pace with the growth in demand. As a result, excess demand for telecommunications services has emerged, and the gap has widened over time (see Graph 1.1). For the great majority of the population, access to telecommunications services remains very limited. The current number of about a million telephone lines for a population of about 182 million corresponds to only 0.7 telephone per 100 persons. This is by far the lowest telephone density among the ASEAN countries. The projected high pace of economic growth will continue to fuel the increase in demand for telephone services during the

1990s. For example, a GDP growth rate of 5-6 percent per annum is expected to increase the demand for telephone service by about 12 percent per annum. Given the large backlog of unmet demand, the expansion of new demand will pose a tremendous challenge.



1.14 Unlike other more homogenous infrastructure sectors--such as electric power and telecommunications--there are no simple aggregate measures which might be used to assess the overall adequacy of existing transport infrastructure capacity. Nevertheless, some simple indicators suggest the need for significant expansion in transport, especially for road network capacity. For example, the average network density for transport is low in relation to other East Asian countries. Moreover, as a result of the dramatic growth in manufacturing activities, mostly concentrated in East and West Java, the demand for transport is growing very rapidly in these corridors. In addition, compared to the past, the current growth in manufacturing output and exports is requiring much more diversified and sophisticated transport facilities and services in terms of handling techniques, packaging, time in transit, controlled climatic environment and intermodal transport.

1.15 In water supply, still only about one-quarter of urban and less than 10 percent of rural households are connected to public piped water, while only about one-eighth of industrial and commercial water demand is met from this source. A normal level for urban households in countries with similar levels of urban income would be 40-50 percent and 50-70 percent for industrial and commercial users. The heavy reliance on private groundwater extraction, facilitated by very low user charges, has no doubt contributed to low connection levels. However, groundwater sources in many areas, especially Jakarta, are being rapidly exhausted. In addition to this backlog, there is a need to keep pace with new demand emerging from the expected increase in urban households, which could exceed 6 percent per year, and the increase in commercial and economic activity associated with rapid economic growth.

1.16 Efficiency of Service. In parallel with the challenge of addressing the emerging large gaps in supply-demand balance for many economic infrastructure services, another important challenge is to improve the quality of services, in order to ensure a more efficient use of existing facilities and increase the rate of return on future investments (see Box 1.2). Despite recent improvements, the power sector still suffers from low reliability of supply and distribution losses can be reduced further. There is also a large reliance on captive generation, which is often less efficient. More importantly, the overall efficiency of power generation in Indonesia is low, when measured in terms of reliance on least-cost options. For example, the economic cost of power generation based on natural gas is much lower than that based on oil and diesel. At present, 51 percent of total power generation in Indonesia is based on use of petroleum products (oil and diesel), while less than 4 percent uses gas. In the future, choice of power projects will need to be based on least-cost options, especially gas.

1.17 In telecommunications, the quality of telephone service is poor; indicators of network performance are significantly below acceptable norms. Due to the acute shortage of subscriber lines and interexchange equipment, the network is congested and a large portion of call attempts fail. For example, the successful call ratio (SCR) nationwide for local, subscriber long distance dialed (SLDD) and international direct dialing (IDD) calls are 38 percent, 26 percent and 20 percent respectively. Efficient networks achieve 60-70 percent in each of these categories. Similarly, the average fault ratio is 8-9 faults per 100 telephone lines per month. The average time taken to correct a defective line is six days. In comparison, well-managed systems would average one fault per 100 lines per month with 90 percent of the defects corrected within two days.

1.18 The efficiency of many parts of the road system is also low. As a result, road transport system costs--road construction, rehabilitation and maintenance costs on the one hand and vehicle operating costs on the other--are high. In water supply, major efficiency issues remain to be resolved. In most public piped water systems in Indonesia, there is a very high proportion of unaccounted for water (UFW). The national average UFW has been estimated at 43 percent, with even higher levels in Jakarta. Although a part of this water loss represents unauthorized use, a large proportion of UFW results from leakages into the soil. In irrigation, the operational efficiency in some systems may be as low as 25 percent. Experience in other countries has shown

**Box 1.2: INDICATORS OF EFFICIENCY OF INFRASTRUCTURE SERVICES**

| <u>Sector</u>             | <u>Efficiency Indicator</u>                     | <u>Indonesia level</u>                             | <u>Best Practice</u>                                 |
|---------------------------|---|--|--|
| <u>Power</u>              | - Reliability of supply                         | - 21.7 interruptions per consumer per year in 1991 | - 10-12 interruptions                                |
|                           | - Transmission and distribution losses          | - 15.8% in 1991                                    | - 18-14%   |
|                           | - Captive generation as share of total          | - 81% in 1990                                      | - Need to reduce as much as economically justifiable |
|                           | - Petroleum based power generation (% of total) | - 51% in 1990                                      | - need to reduce as much as economically justifiable |
| <u>Telecommunications</u> | - Successful call ratio: local                  | - 86% in 1991                                      | - 80-70%   |
|                           | - Successful call ratio: long distance          | - 22% in 1991                                      |  |
|                           | - Average fault ratio                           | - 8-9 per 100 in 1991                              | - 1 per 100  |
|                           | - Average time to correct defective lines       | - 6 days in 1991                                   | - 90% corrected within 2 days                        |
| <u>Water</u>              | - Unaccounted for piped water: nationwide       | - 48% in 1991                                      | - 25-30%   |
|                           | - Unaccounted for piped water: Jakarta          | - 48% in 1991                                      |  |
|                           | - Irrigation, water efficiency                  | - 25-35%   | - 45-50%   |

Source: Government of Indonesia and World Bank Staff estimates.

that an efficiency level of 50 percent is possible.<sup>7/</sup> In addition to these inefficiencies, impairment of water quality in Indonesia threatens to become as serious as quantity shortages. The lack of adequate sewage treatment and garbage handling in Indonesia has caused a great deal of human sewage and solid waste to be dumped near or directly into surface water sources. As a result, none of the public water is drinkable without boiling first.

1.19 Environmental Concerns. Infrastructure development in Indonesia, as elsewhere in the world, has potentially enormous impact on the environment: it can exacerbate or ameliorate sustainable development prospects, depending on the type of the infrastructure and the extent to which environmental considerations are factored into the planning, investment and pricing of services. In the past, environmental considerations did not receive adequate attention in the choice and implementation of infrastructure projects, contributing to environmental degradation. This will need to be redressed; in the future, infrastructure planning must integrate the environment as a key variable in all major projects, right from the design stage to implementation and monitoring.

<sup>7/</sup> Due to evapotranspiration of the water that stands for long periods in the rice paddies, it is not feasible to achieve 100 percent efficiency.

1.20 Location of Infrastructure. In the past, large increases in oil revenues allowed GOI to expand infrastructure rapidly across all regions, based primarily on regional balance considerations. During the 1990s, the constrained financial resources and implementation capacity will place much greater challenges on GOI in meeting regional equity concerns while ensuring the efficiency of location decisions. A careful consideration of the role of infrastructure locations in the context of an effective approach to regional development will be necessary.

Elements of a Strategy for Efficient Infrastructure Development:  
The Tasks Ahead

1.21 The main elements of a strategy for the efficient development of infrastructure in Indonesia can be classified under five broad interrelated headings:

- securing adequate financial resources for infrastructure development, within a stable macroeconomic framework;
- ensuring the efficient use of infrastructure facilities;
- developing a framework to promote private provision;
- enhancing the efficiency of public services; and
- setting appropriate priorities for public infrastructure investment.

1.22 Securing Adequate Financial Resources Within a Stable Macroeconomic Framework. Securing adequate financial resources within a stable macroeconomic environment is a critical element of an appropriate infrastructure development strategy. This, in turn, will require a review of the aggregate resource envelope and its distribution between private and public sectors, based on Indonesia's target for a sustainable growth path. Prudent macroeconomic management will be essential to achieve a stable macroeconomic environment that is conducive to growth. This will be important both to keep the external deficits manageable and to ensure the mobilization of domestic saving needed to finance required investments in infrastructure and other areas. At the same time, care has to be taken to keep the overall size of the public investment program within prudent limits. This is important to avoid crowding out of private investment. In the short term, given emerging concerns about macroeconomic stability (e.g., a widening in the current account deficit and an acceleration in inflationary pressures) decisive actions to slow aggregate demand will be necessary. This will require the pursuit of a balanced combination of monetary and fiscal policies to restrain demand. To ensure the consistency of the growth objective with macroeconomic stability in the medium term, prudent macromanagement must be combined with appropriate exchange rate policies as well as continued progress with structural reforms in areas of trade, investment, finance and corporate legal framework, and human resource development.

1.23 Within the overall framework of prudent macromanagement, policies aimed at enabling resource mobilization at the sectoral level will be necessary. The main need here is to pursue appropriate pricing/cost recovery policies in all the infrastructure sectors--power, telecommunications,

transport and water. In addition to helping mobilize resources for expansion programs in the public sector, appropriate pricing policies are important to: (a) ensure the efficient use of facilities; (b) mobilize resources for financing adequate levels of O&M; and (c) provide incentives for private sector participation. Furthermore, a strengthening of financial sector policies aimed at improving the availability and affordability of long-term finance will be necessary to facilitate private participation in infrastructure.

1.24 Ensuring the Efficient Use of Infrastructure Facilities. Given the magnitude of the infrastructure development challenge, and in view of concerns about the quality of service, major attention will need to be paid to managing demand and ensuring the efficient use of existing and new infrastructure facilities. Policies that support this objective have two main elements: appropriate pricing to ensure the efficient management of the demand for these services; and effective management of operations and maintenance (O&M) activities to support the efficient functioning of past investments and secure maximum return on those investments in terms of the output and quality of services.

1.25 Developing a Framework to Promote Private Provision. A carefully developed policy framework for encouraging greater private sector participation, including the network development, can play a major role in ensuring the efficiency and adequacy of infrastructure availability during the 1990s. In addition to pricing policy reforms, this will require the formulation of an appropriate regulatory framework that improves incentives and stimulates competition, while at the same time securing the protection of public interests. Over the longer term, steps will need to be taken to privatize public infrastructure enterprises that operate in potentially competitive markets.

1.26 Enhancing the Efficiency of Public Services. Despite a larger role for the private sector, the public sector will continue to play a dominant role in the provision of many infrastructure services. As a result, policies for reducing the cost and improving the quality of service delivery in the public sector will be necessary. In addition to promoting greater competition from the private sector and reforming pricing policies, the efficiency and effectiveness of public spending on infrastructure will require careful consideration to a number of interrelated factors: (a) improving public sector management; (b) enhancing project implementation capacity; (c) ensuring the consistency of public infrastructure investment program with environmental protection; and (d) ensuring appropriate choice of location for infrastructure. Policies for improving the capacity of the public sector to plan and implement efficient infrastructure programs would entail deregulating public infrastructure enterprises, providing greater responsibility to local level governments for planning, implementing and maintaining infrastructure programs, and improving program management capacity of the Central Government through civil service reforms. At the same time, more simplified procedures for budgeting, procurement, land acquisition and hiring of technical assistance services will be needed to improve project implementation. To ensure the consistency of public infrastructure investment program with the protection of the environment, policies are needed to improve the design of projects, and to mitigate negative externality through appropriate pricing, fiscal and regulatory measures. The latter policies are also important to minimize the

adverse effects of private infrastructure investment on the environment. Finally, care will need to be taken to ensure that the choice of location of public infrastructure is based on sound criteria.

1.27 Securing the Efficiency of Sectoral Public Investment Programs.

Major new investments by the public sector in power, telecommunications, transport and water will be required in the 1990s. A number of important considerations will need to guide the sectoral allocations, within the context of a prudent level of total expenditure. These include: (a) the relative role of public and private provision; (b) implementation capacity constraints within each sector; (c) choice of projects based on a proper evaluation of economic benefits and costs; and (d) the relative balance between maintenance, rehabilitation and new capacity.

1.28 These elements of the strategy for efficient infrastructure development are elaborated in the remainder of the Report.

## CHAPTER 2

### MACROECONOMIC FRAMEWORK FOR PUBLIC INFRASTRUCTURE INVESTMENT

#### A. Introduction

2.1 An essential part of formulating an appropriate infrastructure development strategy is the analysis of the availability of external and internal financial resources. This requires a review of the aggregate resource envelope, its distribution between private and public sectors, and the competing claims on the resources available to the public sector, within the framework of a strategy for sustainable growth. Indonesia's main macroeconomic task in the 1990s is to sustain a rapid pace of growth without jeopardizing financial stability. In the near term, given emerging concerns about macroeconomic stability, decisive actions to slow aggregate demand will be necessary. Over the medium-term, containing and gradually reducing the current account deficit as a share of GDP will steadily lower the burden of Indonesia's debt and expand the economy's options in the future. Maintaining a strong non-oil export performance is central to this strategy. Public and private savings will need to rise to finance the higher investment rate required to sustain the growth in output and non-oil exports, while offsetting the decline in foreign savings resulting from the gradual reduction in the current account deficit. These objectives will need to be pursued in the context of an uncertain external environment, especially the outlook for oil prices. A careful evaluation of the implications of these uncertainties for the public investment program will become necessary. At the same time, it will be important to ensure that the allocation of investment across sectors reflect Indonesia's development priorities while the associated sectoral financing plans are consistent with the analysis of the overall resource envelope. These elements of the macroeconomic strategy are integrated into a quantitative framework in this chapter.

2.2 Following the introduction in Section A, a framework for achieving growth with stability in Indonesia is reviewed briefly in Section B. The analysis provides indicative estimates of prudent levels of public investment, based on estimates of sustainable current account and fiscal deficits. Section C then reviews the sources and nature of uncertainties in Indonesia's economic prospects and draws implications for managing the public investment program. Against the background of overall resource availability and the size of the public investment program, Section D provides indicative estimates of investment requirements for public infrastructure and highlights the various financing options at the sectoral level.

#### B. Macroeconomic Framework for Growth with Stability

##### Overview

2.3 Progress on Economic Adjustment. Responding to a sharp deterioration in the external environment since the early 1980s, the Government of Indonesia (GOI) implemented a balanced program of adjustment and structural reform measures. The contents of the program were based on a major shift in development strategy--a move away from inward-oriented, public sector led strategy towards an outward-oriented, private sector based strategy. This

resulted in large improvements in macroeconomic imbalances and also led to a strong recovery of economic growth.<sup>1/</sup> By 1989/90, the current account deficit had been reduced to less than 2 percent of GNP, the fiscal deficit had been brought down to about 2 percent of GDP and inflation had been contained at less than 10 percent per annum (see Table 2.1). Non-oil exports and private investment grew at an average pace of 21 percent and 12 percent per annum respectively over 1986/87 - 1989/90. These, in turn, supported a growth rate of 7 percent for the non-oil economy during 1986-89. Employment and real wages increased, while impressive progress on poverty reduction was achieved.<sup>2/</sup>

2.4 The Growth Imperative. Despite these achievements, major challenges remain. With per capita GNP of about \$570, Indonesia is still a relatively low-income country. While poverty has declined, millions of people remain poor. At the same time, over 2 million people are expected to enter the labor market each year during the 1990s. Finding productive employment for these new entrants while raising the average earnings of existing workers is a fundamental development challenge for Indonesia's policymakers. Sustained growth--with non-oil GDP growing at 6-7 percent per annum--is needed to make substantial progress in raising living standards and providing productive employment opportunities for a growing labor force.

2.5 The Need to Preserve Macroeconomic Stability. In order to ensure that this growth path does not compromise macroeconomic stability, it will be necessary to keep the current account deficit to manageable levels and contain inflationary pressures. During 1990/91, aggregate demand increased sharply, supported by strong private sector investment and an accommodating monetary policy, which was reflected in an acceleration in the demand for imports and pressure on domestic prices. The Government has realized that a growth path that does not fully preserve macroeconomic stability is unsustainable. Consequently, corrective monetary policy measures have been taken to slow aggregate demand, while complementary fiscal policies are being contemplated.

#### A Macroeconomic Policy Framework for the 1990s

2.6 Restoring macroeconomic stability in the near-term, while preserving the economy's medium-term growth prospects, calls for policy actions in three interrelated areas: (a) a continuation of policies to support non-oil export growth; (b) monetary policy designed to complement fiscal policy to maintain low inflation and preserve Indonesia's international reserves; and (c) fiscal policies to dampen aggregate demand while protecting key expenditure priorities, particularly in infrastructure. Over the medium-term, in addition to sound macroeconomic management, sustained progress on the remaining agenda of structural reforms and a significant increase in the provision of supportive infrastructure will be necessary to achieve the growth target. The recent shift to an outward-oriented private sector-led growth strategy in Indonesia will require that the momentum of GOI's structural policy reform be

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<sup>1/</sup> Detailed reviews of Indonesia's adjustment performance and policy progress are available in the annual World Bank country economic reports.

<sup>2/</sup> See Indonesia: Strategy for Sustained Reduction in Poverty, A World Bank Country Study, World Bank, November 1990.

maintained until the remaining elements of the policy agenda are successfully implemented, including in the areas of trade policy and domestic regulation, prudential regulation of financial markets, and the corporate legal framework. To ensure that bottlenecks in the availability of basic infrastructure services do not impede private sector prospects, new investments (as well as increased funding for O&M) will be required in power, telecommunication, transport, and water. Human resource development will continue to be a critical ingredient for improving human health and welfare and enhancing the skills, productivity and employment prospects of the labor force. Finally, a combination of policy reforms to improve the incentive framework for environmental conservation and protection and institutional strengthening will be needed to ensure more sustainable resource management in the key sectors of the economy.

### Medium-Term Prospects

2.7 Growth Prospects. In the short term economic growth will fall somewhat as a result of tightening of aggregate demand (see Table 2.1). Over the medium-term, as macroeconomic stability is restored, the rate of growth of the non-oil economy can rise and be sustained at around 7.0 percent per annum. This will be fuelled by improvements in productivity resulting from structural reform and a strong investment effort. A substantial build-up of production capacity in the agriculture and manufacturing, as well as supporting improvements in economic infrastructure, are incorporated in the base case projections.

2.8 Investment Requirements. Even allowing for significant gains in economic efficiency, the rate of fixed investment will need to rise by about 1.5 percentage points of GDP--which will raise the share of fixed investment in GDP to 26 percent by end of the decade--to support the projected growth rate. The investment rate needs to rise for two reasons. First, cutbacks in public investment during the mid-1980s have slowed the expansion of infrastructure capacity. At the same time, the demand for infrastructure services has surged, following the stronger-than-expected recovery of growth since 1987. As a result, despite the recent increase, substantial further investments in infrastructure will be necessary to support growth in the 1990s. Second, the structure of the economy has been changing, with a relatively lower reliance on agriculture and informal, low-productivity activities. The expanding role of the manufacturing sector and higher-productivity formal and informal services sectors will require a faster pace of investment to create new capacity in these areas.

2.9 External Stability: Sustainable Current Account Deficits. The balance of payments projections of the base case assume that decisive actions to correct the widening gap in the non-oil trade balance are taken early on to contain the current account deficit to about 4 percent of GNP in 1992/93 and reduce it to below 3 percent of GNP in 1993/94. Over the medium-term, the pressure on the balance of payments can be expected to ease, as new export capacity from ongoing investments comes on stream, world demand for Indonesia's exports picks up based on a projected recovery of world economic activity, and the demand for imports in Indonesia returns to more normal levels following the restraints imposed on aggregate demand. Developments in 1991/92 suggest, provided that GOI continues its current course of prudent

**Table 2.1: RECENT DEVELOPMENTS AND FUTURE OUTLOOK /a**

|   | Actuals | Actual |       |       | Est.  | Projected |           |
|---|---------|--------|-------|-------|-------|-----------|-----------|
|   | 1988-87 | 1988   | 1989  | 1990  | 1991  | 1991-95   | 1995-2000 |
| <b>Average growth rates (% p.a.)</b>                |         |        |       |       |       |           |           |
| GDP   | 5.0     | 5.8    | 7.4   | 7.3   | 6.8   | 5.5       | 5.9       |
| Non-oil GDP   | 5.7     | 7.4    | 8.2   | 7.8   | 6.5   | 6.4       | 7.0       |
| Agriculture   | 3.3     | 4.9    | 3.1   | 2.5   | 0.9   | 3.0       | 3.0       |
| Manufacturing                                       | 12.0    | 12.8   | 11.6  | 13.0  | 11.4  | 10.1      | 10.5      |
| Other services                                      | 6.0     | 6.9    | 9.3   | 7.6   | 6.6   | 6.4       | 6.4       |
| Non-oil exports                                     | 12.2    | 14.2   | 21.5  | 3.4   | 24.8  | 11.7      | 7.6       |
| Non-oil imports                                     | -8.2    | 8.0    | 17.7  | 26.0  | 9.7   | 7.6       | 7.3       |
| Fixed investment                                    | -3.7    | 10.3   | 13.4  | 19.7  | 10.7  | 6.2       | 7.5       |
| Public  | -9.8    | 15.6   | 12.1  | 11.9  | 11.2  | 6.4       | 6.8       |
| Private   | 0.9     | 7.4    | 14.2  | 24.4  | 10.4  | 6.1       | 7.8       |
| Consumption   | 4.0     | 4.3    | 5.7   | 7.5   | 5.2   | 5.3       | 6.3       |
| <b>Macroeconomic Balances /b</b>                    |         |        |       |       |       |           |           |
| Current account/GNP                                 | -2.5    | -2.2   | -1.7  | -3.8  | -4.3  | -2.0      | -2.0      |
| Non-interest current account/GNP                    | 2.0     | 2.2    | 2.5   | 0.3   | 0.1   | 2.1       | 1.6       |
| Overall public sector balance/GDP                   | -2.8    | -3.0   | -2.1  | 0.2   | -0.7  | -0.2      | -0.3      |
| MLT debt service/exports                            | 34.8    | 34.4   | 32.3  | 27.8  | 30.1  | 25.8      | 19.9      |
| MLT debt/exports                                    | 234.3   | 218.3  | 186.3 | 183.3 | 191.2 | 143.5     | 102.6     |
| MLT debt/GNP  | 65.6    | 60.4   | 54.7  | 58.6  | 61.1  | 52.9      | 41.2      |
| <b>Structure of the economy /b</b>                  |         |        |       |       |       |           |           |
| Non-oil manufacturing/GDP                           | 12.8    | 13.6   | 14.1  | 14.9  | 15.5  | 18.4      | 22.8      |
| Non-oil exports/non-oil imports                     | 80.8    | 89.7   | 87.9  | 71.2  | 77.5  | 93.5      | 97.1      |
| Public savings/GDP                                  | 4.8     | 5.4    | 6.5   | 9.3   | 8.9   | 9.7       | 9.8       |
| National savings/GDP                                | 19.1    | 19.9   | 21.7  | 22.1  | 22.2  | 24.4      | 25.6      |
| Fixed investment/GDP                                | 19.2    | 20.0   | 21.2  | 23.5  | 24.7  | 24.9      | 26.1      |
| Private fixed investment/<br>Total fixed investment | 60.6    | 57.9   | 59.6  | 60.9  | 61.2  | 60.4      | 61.4      |
| Consumption/GDP                                     | 75.6    | 75.0   | 73.4  | 72.8  | 72.8  | 70.9      | 70.4      |
| Consumption/GNY                                     | 76.9    | 75.7   | 74.4  | 73.6  | 73.4  | 72.0      | 71.4      |
| <b>Prices</b>                                       |         |        |       |       |       |           |           |
| DIT prices (\$/bbl) /b                              | 17.6    | 15.1   | 17.9  | 22.6  | 18.3  | 20.5      | 30.6      |
| Non-oil terms of trade<br>(1983/84=100)/b           | 96.3    | 101.1  | 95.9  | 94.7  | 94.7  | 94.2      | 96.3      |
| Domestic inflation (% p.a.) /c                      | 7.9     | 9.3    | 6.3   | 7.9   | 9.4   | --        | --        |

/a Balance of payments data are for fiscal years (starting April 1). Other indicators are for calendar years.

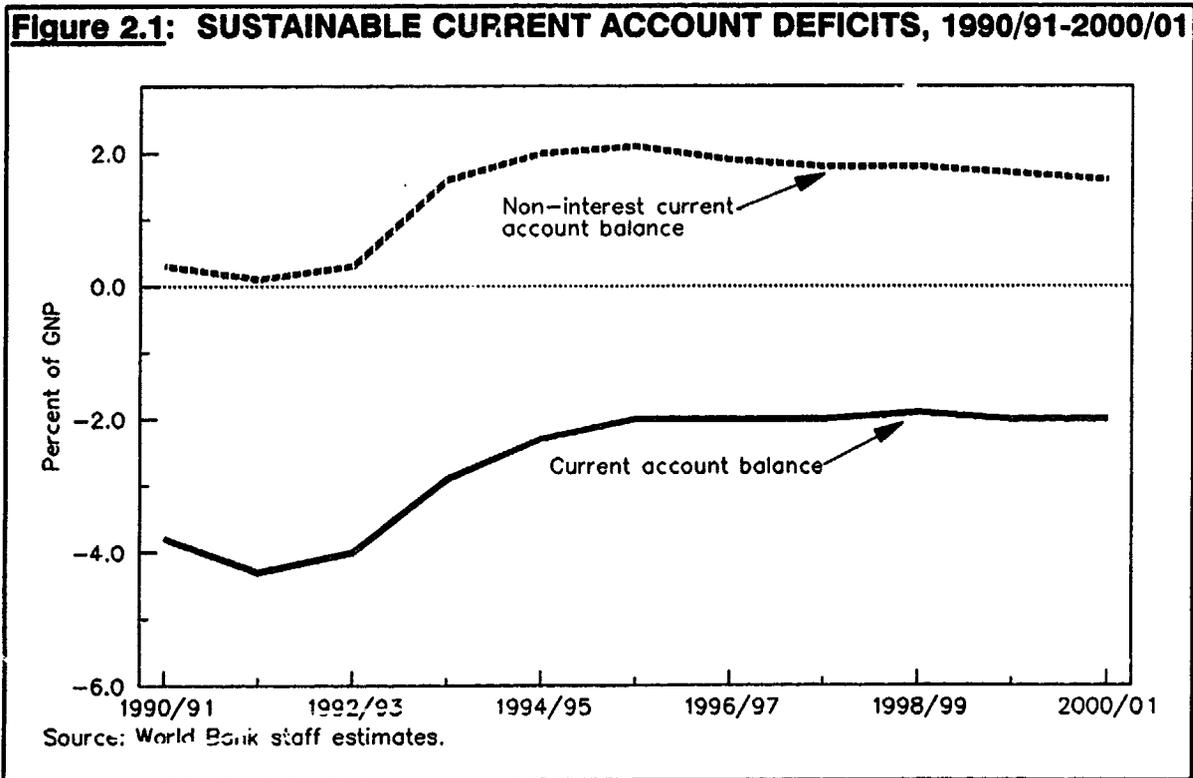
/b For last year of multi-year periods.

/c As measured by the consumer price index (CPI), with an adjustment for rice prices during 1987-89.

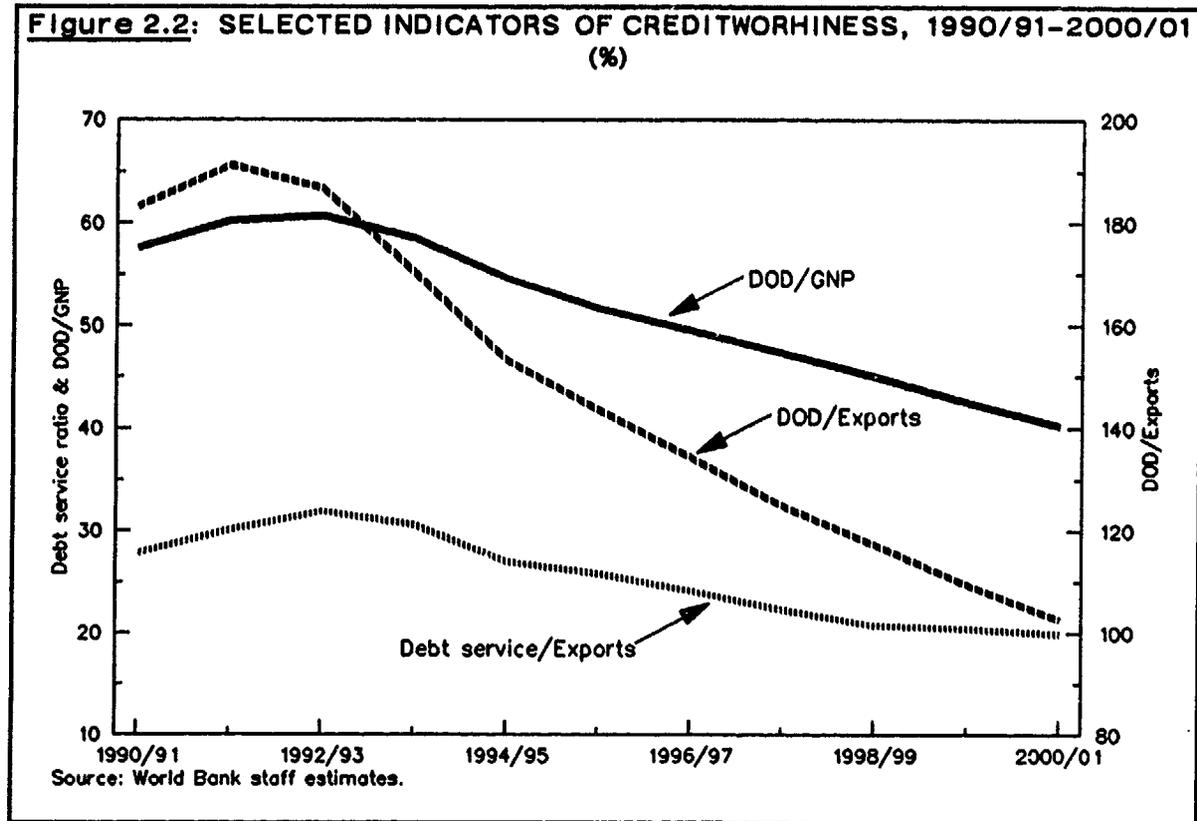
Source: Central Bureau of Statistics and World Bank estimates.

macroeconomic management and there are no unexpected external disturbances, these assumptions are reasonable. Overall, the projections assume that non-oil exports will grow by 9.0 percent per annum in real terms during the remainder of the 1990s, while growth of non-oil imports will stabilize at around 7.5 percent per annum. These, in turn, are expected to reduce the current account deficit steadily over the medium-term, to stabilize at 2.0 percent of GNP by the year 1995. Given the projected growth in non-oil exports, the debt service ratio for public and private medium- and long-term debt (MLT) would decline from 30 percent in 1991 to 26 percent in 1995 and to 20 percent in the year 2000. Similar declines would also happen in the Debt/Exports and Debt/GNP ratios, indicating an improvement in Indonesia's creditworthiness.

2.10 The path of the sustainable current account deficit is illustrated in Figure 2.1. These levels of current account deficit are sustainable in the sense that, given the assumptions about the external environment, domestic demand conditions, and the estimated supply response of exports, they can be financed without jeopardizing Indonesia's external creditworthiness. The trend of the underlying creditworthiness indicators is shown in Figure 2.2. Other things remaining unchanged, if domestic demand accelerates (e.g., a higher growth path is attempted), the current account deficit will widen, creating financing problems and jeopardizing Indonesia's creditworthiness. This higher growth path would, therefore, be difficult to sustain.



2.11 Internal Balance: Sustainable Fiscal Deficits. Reducing the current account deficit to more sustainable levels while maintaining the growth momentum over the medium term will require that the national savings rate rise substantially--from 22 percent of GDP in 1991 to about 26 percent in 2000 (see Table 2.2). This is a major policy challenge for the 1990s. Private savings will need to increase considerably from the low rates which prevailed in the past two years, although they will need to increase by only 1 percentage point over their peak in 1989. Rapid economic growth and a stable macroeconomic environment will help to raise savings. Moreover, business savings is expected to increase in response to higher profitability. Demographic factors will reinforce higher private savings, as the dependency rate is declining and the rate of population growth is slowing. At the same time, further efforts to raise the public saving rate to 10 percent of GDP by the year 2000 will be necessary. This will require a continued strong public resource mobilization effort and expenditure restraints. The resource



mobilization policies include: raising non-oil tax revenues through selective increases in rates and continued improvements in tax administration; improving cost recovery from public services; and increasing the financial and economic profitability of public enterprises by enhancing their operational and financial autonomy.<sup>3/</sup> On the expenditure side, the main measures include: reducing budgetary subsidies and containing the government wage bill. As a result of these measures, non-oil taxes will grow from 13 percent of non-oil GDP in 1991 to 14 percent in 1992 and maintained at that level for the remainder of the decade; non-tax revenues increase from 1.4 percent to 2.0 percent and public enterprise savings grow from 1.6 percent to 3.0 percent over the decade. On the other hand, current expenditures are restrained to 12 percent of GDP, with emphasis placed on adequately funding O&M expenditures<sup>4/</sup> but cutting subsidies (limiting subsidies to less than 0.5 percent of GDP by 1993).

2.12 Prudent Levels of Public Investment. The projected improvements in public resource mobilization and restraints on non-priority expenditures will allow a growth of real public investment of 6-7 percent per annum during the

<sup>3/</sup> Cost recovery/pricing policies underlying the base case scenario are reviewed in Chapter 3.

<sup>4/</sup> The projections build substantial allocations for O&M to ensure the productivity of the public investment program. The O&M strategy is reviewed in Chapter 3.

**Table 2.2: SAVINGS-INVESTMENT BALANCES, 1991-2000 /a**  
(% of GDP at current prices)

|                              | Annual<br>Average<br>1981-82 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | Est.<br>1991 | Projection<br>1995-2000 |      |
|------------------------------|------------------------------|------|------|------|------|------|------|------|------|--------------|-------------------------|------|
| Gross domestic investment    | 29.5                         | 27.0 | 25.3 | 24.0 | 23.0 | 22.5 | 22.2 | 23.5 | 25.2 | 26.2         | 26.4                    | 27.6 |
| - Fixed investment           | 25.1                         | 25.1 | 23.3 | 20.5 | 20.1 | 19.2 | 20.0 | 21.2 | 23.5 | 24.7         | 24.9                    | 26.1 |
| - Change in stocks           | 4.4                          | 1.9  | 3.0  | 3.5  | 2.9  | 3.3  | 2.2  | 2.3  | 1.7  | 1.5          | 1.5                     | 1.5  |
| Gross national savings       | 25.2                         | 21.0 | 21.7 | 21.5 | 17.4 | 19.1 | 19.9 | 21.7 | 22.1 | 22.2         | 24.0                    | 25.8 |
| Savings-investment gap /b    | -4.3                         | -6.0 | -3.6 | -2.5 | -5.6 | -3.4 | -2.3 | -1.8 | -3.1 | -4.0         | -2.0                    | -2.0 |
| <b>Public Sector</b>         |                              |      |      |      |      |      |      |      |      |              |                         |      |
| Gross domestic investment /c | 11.7                         | 11.9 | 10.0 | 10.1 | 8.1  | 7.6  | 8.4  | 8.6  | 9.2  | 9.6          | 9.9                     | 10.1 |
| Public savings               | 8.7                          | 8.9  | 10.0 | 8.2  | 4.9  | 4.8  | 5.4  | 6.5  | 9.4  | 8.9          | 9.7                     | 9.8  |
| Savings-investment gap       | -3.0                         | -3.0 | 0.0  | -1.9 | -3.2 | -2.8 | -3.0 | -2.1 | 0.2  | -0.7         | -0.2                    | -0.3 |
| <b>Private Sector</b>        |                              |      |      |      |      |      |      |      |      |              |                         |      |
| Gross domestic investment    | 17.8                         | 15.2 | 15.3 | 13.9 | 15.0 | 14.9 | 13.8 | 14.9 | 16.0 | 16.6         | 16.5                    | 17.5 |
| - Fixed investment           | 13.4                         | 13.2 | 12.3 | 10.4 | 12.1 | 11.6 | 11.6 | 12.6 | 14.3 | 15.1         | 15.0                    | 16.0 |
| - Change in stocks           | 4.4                          | 1.9  | 3.0  | 3.5  | 2.9  | 3.3  | 2.2  | 2.3  | 1.7  | 1.5          | 1.5                     | 1.5  |
| Savings                      | 16.5                         | 12.1 | 11.7 | 13.3 | 12.6 | 14.3 | 14.5 | 15.2 | 12.7 | 13.3         | 14.7                    | 15.8 |
| Savings-investment gap       | -1.3                         | -3.0 | -3.6 | -0.6 | -2.4 | -0.6 | 0.7  | 0.3  | -3.3 | -3.3         | -1.8                    | -1.7 |

/a All data converted to calendar-year basis. As a result, the data on the current account deficit and the public sector deficit differ slightly with other tables.

/b Expressed in calendar years.

/c Fixed investment only. Investment in stock changes is assumed to be financed by the private sector.

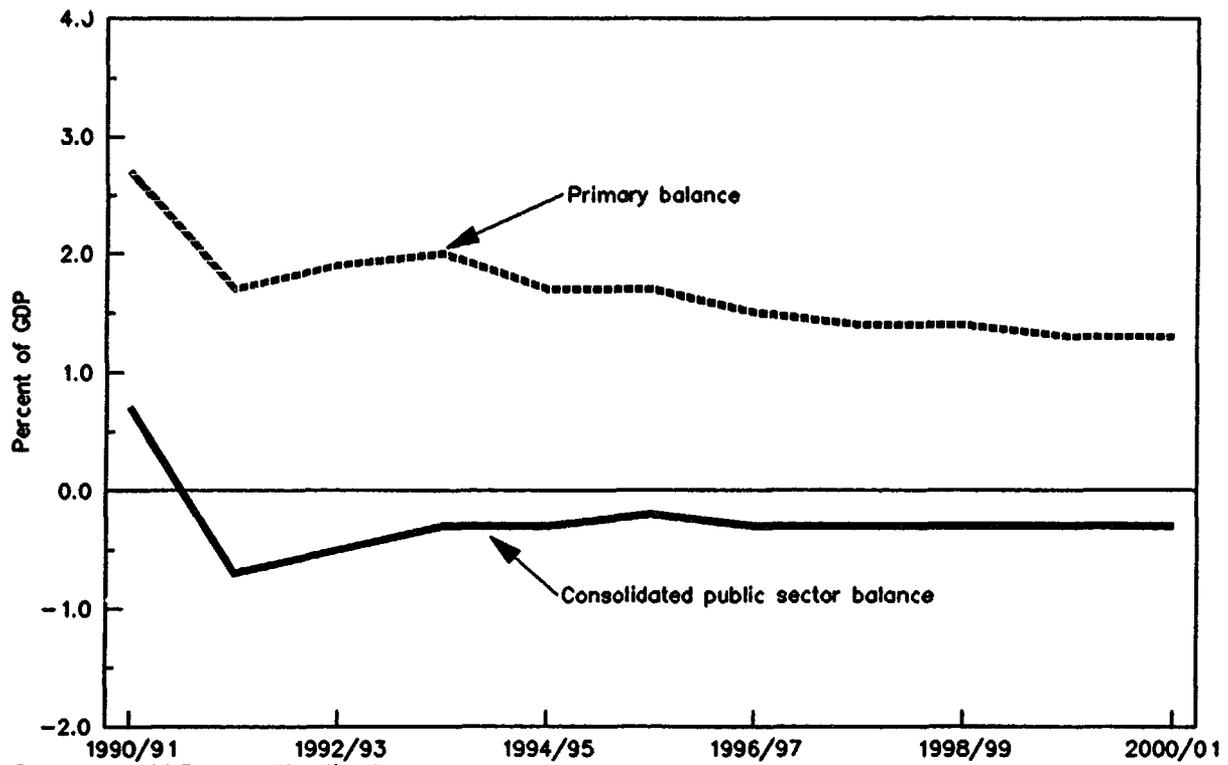
1990s. This yields a prudent level of public investment of 9-10 percent of GDP per annum. This level of public investment is consistent with sustainable fiscal deficits (see Figure 2.3). These levels of fiscal deficit are sustainable in the sense that, given the sustainable levels of current account deficit and the national savings effort, they will leave adequate resources for the private sector to finance its investment. A higher level of fiscal deficit will either crowd out the private sector or result in higher inflation and current account deficit, thereby jeopardizing the sustainability of the growth path.

### External Borrowing and Debt Management

2.13 The gross external capital flows that are consistent with the sustainable current account deficits are shown in Table 2.3. Although the increase in national savings will be the main source of financing the required expansion of investment, Indonesia's gross external financing needs will remain substantial. The projected financing pattern assume the following:

- An important recent change in the sources of external financing is the increasing share of private capital flows--in the form of direct foreign investment and disbursements of private MLT loans. The projections assume this trend will continue.

**Figure 2.3: SUSTAINABLE FISCAL DEFICITS, 1990/91-2000/01**



Source: World Bank staff estimates.

- Despite the increasing importance of private capital flows, Indonesia's needs for official development assistance remain substantial.
- The composition of public external borrowing will change noticeably as special assistance (balance of payments support) is phased out. Disbursements from project assistance are projected to increase significantly over the medium term. At the same time, the share of concessional official assistance would continue to fall, while reliance on import-related and commercial credit would increase.

### C. Uncertainties in Prospects

#### Adverse External Environment

2.14 The macroeconomic scenario outlined in Section B is subject to several risks and uncertainties. From the point of view of managing the investment program, the main uncertainty is the availability of financial resources due to fluctuations in the external environment. The main risks are: a sharp decline in oil and other commodity prices; a reduction in world demand for Indonesia's non-oil exports; and a sharp depreciation of US dollar viz-a-

**Table 2.3: EXTERNAL CAPITAL REQUIREMENTS AND SOURCES**  
(annual averages in \$ billion)

|  | Actual              |             | Estimated   | Projected   |                     |                     |
|--|---------------------|-------------|-------------|-------------|---------------------|---------------------|
|  | 1988/87-<br>1989/90 | 1990/91     | 1991/92     | 1992/93     | 1993/94-<br>1995/96 | 1996/97-<br>2000/01 |
| <b>Requirements</b>                          | <b>6.6</b>          | <b>12.0</b> | <b>12.3</b> | <b>12.6</b> | <b>13.4</b>         | <b>17.0</b>         |
| Current account deficit                      | 2.4                 | 3.7         | 4.6         | 4.6         | 3.2                 | 3.8                 |
| (of which interest payments)                 | (2.9)               | (3.2)       | (3.6)       | (3.9)       | (4.4)               | (5.2)               |
| Principal repayments                         | 4.7                 | 5.4         | 6.4         | 7.6         | 8.5                 | 10.2                |
| Increase in net foreign assets               | -0.5                | 2.9         | 1.4         | 0.5         | 1.7                 | 3.0                 |
| <b>Sources</b>                               | <b>6.6</b>          | <b>12.0</b> | <b>12.3</b> | <b>12.6</b> | <b>13.4</b>         | <b>17.0</b>         |
| Direct foreign investment                    | 0.6                 | 1.4         | 1.6         | 1.6         | 1.7                 | 1.8                 |
| Disbursement of private MLT loans            | 1.1                 | 5.6         | 3.9         | 3.3         | 3.4                 | 5.6                 |
| Short-term and other capital (net) <u>/a</u> | -1.1                | -0.1        | 0.6         | 0.9         | 1.0                 | 1.7                 |
| Disbursements of public MLT loans            | <u>6.1</u>          | <u>5.1</u>  | <u>6.2</u>  | <u>6.8</u>  | <u>7.3</u>          | <u>7.9</u>          |
| of which:                                    |                     |             |             |             |                     |                     |
| Official loan assistance <u>/b</u>           | 3.5                 | 3.8         | 3.9         | 3.9         | 4.3                 | 4.4                 |
| Other GOI borrowings <u>/c</u>               | 2.1                 | 0.9         | 1.1         | 1.2         | 1.7                 | 3.0                 |
| Loans to public enterprises <u>/d</u>        | 0.5                 | 0.3         | 1.2         | 1.7         | 1.3                 | 0.5                 |

/a Includes errors and omissions, short-term trade credit, oil export credit, and valuation adjustments.

/b Fast-disbursing program aid and local-cost financing.

/c Import-related credits and untied commercial credits.

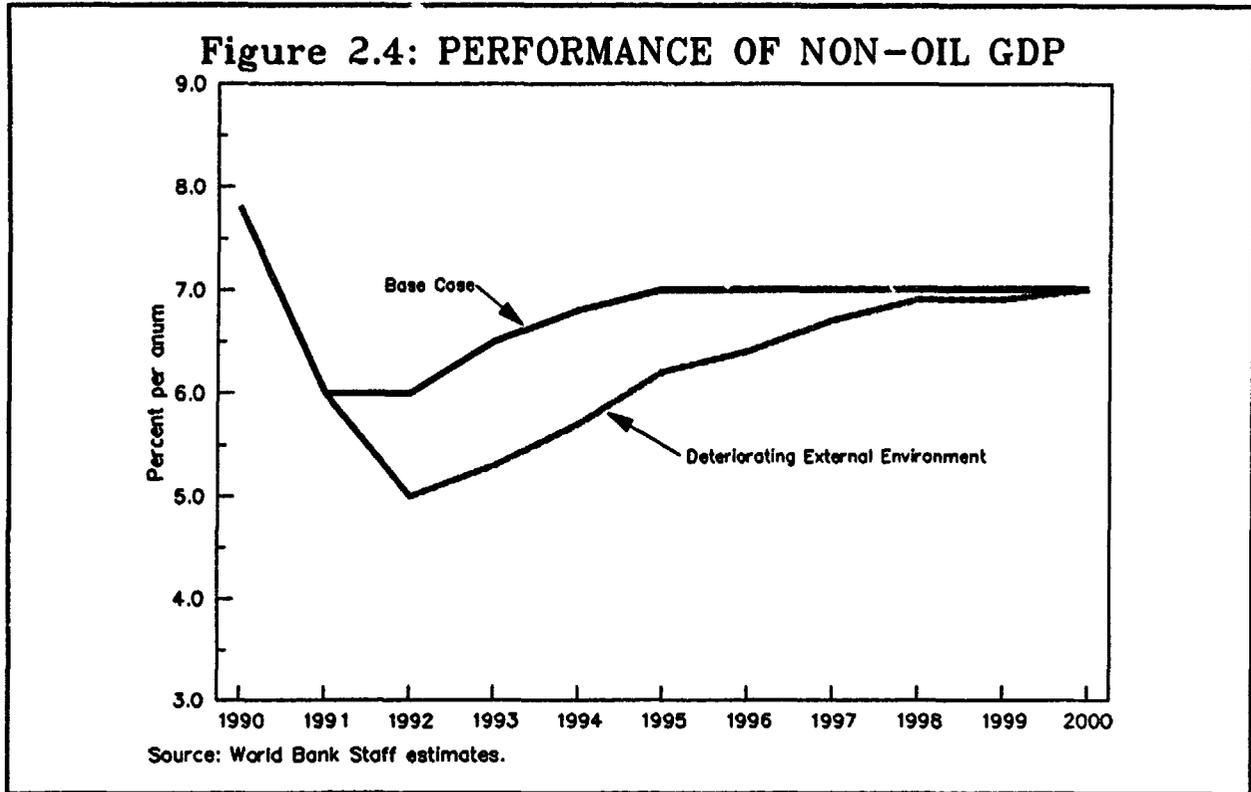
/d Credits for LNG expansion, LPG and paraxylene projects and other public-related borrowings under the state enterprise ceilings.

Source: World Bank staff estimates.

viz major world currencies, especially the Japanese Yen.<sup>5/</sup> To a large extent, these shocks are negatively correlated. Thus, lower oil prices are likely to be associated with a higher pace of world economic activity and trade, and vice versa. More fundamentally, as the structure of the economy becomes progressively more diversified, the Indonesian economy will become more resilient to any single source of shock.

2.15 In the short term, Indonesia's main downside risk is lower oil prices. To protect against this risk in the near-term, the Government needs to maintain a strong reserve position and keep adequate room to use its line of credit. Investment and growth is not likely to be affected. However, in the event of a sustained decline in oil prices, it would be important to move quickly using the full range of macroeconomic policies to ensure that the current account deficit remains sustainable. Policies outlined in the base case would need to be accompanied by additional measures to restrain domestic demand, improve competitiveness and mobilize domestic resources. In the short term, investment and economic growth would be lower than in the base case. However, with appropriate policies, growth of investment and GDP would recover over the medium term. An illustrative growth path associated with a sustained decline in oil prices and appropriate policy response along the above lines is shown in Figure 2.4.

<sup>5/</sup> The adverse impact of a rise in the world interest rate is small.



### Implications for Managing the Public Investment Program

2.16 The presence of major external risks combined with the need to implement substantial adjustment measures in the short-term reinforce the importance of prudent macroeconomic management. There are a number of important implications for balance of payments and budgetary management:

- a need to maintain low current account deficit, to allow flexibility in absorbing the impact of external shocks without unduly constraining growth prospects;
- a need to maintain relatively high level of reserves, to ride out short-term shocks as well as to maintain investor confidence in the economy, given open capital account;
- a need to maintain a flexible budget policy, able to absorb surplus oil earnings through government asset build-up to avoid excess demand pressures, while standing ready to drawdown these reserves in a downturn to maintain a steady pace of public investment.

2.17 Indonesia's development experience over the past decade suggests that these considerations have played an important role in macroeconomic management. For example, the Government has generally sought to maintain a comfortable level of reserves. It also succeeded in sterilizing some of the revenues from higher oil earnings during the second oil boom (1979-80). The resultant asset build-up allowed GOI to maintain a relatively stable pattern of government spending in the difficult period of the oil price collapse (1986-87).

Furthermore, the Government has generally tended to keep the current account deficit under control during periods of stable external environment. While this experience is reassuring, similar achievements during the 1990s will require special efforts. As a result of substantial trade deregulation over the past five years, the size of total non-oil imports is now much larger than in the past. For example, the ratio of non-oil imports to GDP has grown from 11 percent in 1980 to 22 percent in 1991. Consequently, the level of reserve requirements to keep a prudent coverage of months of non-oil imports is now much larger. Second, managing the level of imports in a deregulated environment is more difficult than in a regulated environment; at the same time, the adverse implications of a sudden disruption in import flows for economic activity are much more serious now than in the 1980s. Therefore, keeping the current account deficit under manageable limits will require much more adept macroeconomic management skills than in the past. Finally, the flexible interpretation of the balanced budget law, aimed at maintaining a sound budget policy, has served Indonesia well in the past. This may not be as easily possible in the 1990s. The information flows are better now than in the past, while at the same time the political scrutiny of the budget has intensified. As a result, the sterilization of oil or other revenue surpluses within the balanced budget framework may not be easy. In the event that this flexible use of the balanced budget law is no longer possible, steps will need to be taken to set aside resources when necessary to curb aggregate demand, and then draw upon them as needed to maintain a steady pace of capital spending in priority areas.

2.18 During a downturn, the size of the public investment program will need to be reduced. In order to avoid disruptions to ongoing programs and ensure that priority expenditures are protected, a sound medium-term public investment program is essential. The experience of the 1980s suggest that while GOI has made good progress in defining broad expenditure priorities, a systematic medium-term public investment program is lacking. Given uncertainties in prospects, this could pose serious risks of inefficiencies in the management of the public investment program.

2.19 There are obviously many ways of dealing with uncertainties in financial availabilities; for example, it is often possible to make annual adjustments to the public investment program through the annual development process. It is also possible to deal with more difficult and precipitate circumstances by introducing across-the-board cuts in the development program. While both these expedients are often resorted to, they are, however, unsatisfactory for a variety of reasons. First, across-the-board cuts do not often differentiate between more important and less important projects, with the result that all projects are generally affected. Secondly, the stop-go approach exacerbates project implementation delays. Selective adjustments through the budget, though somewhat better than across-the-board cuts, also have their own pitfalls. The scope for annual adjustments might become more limited, particularly in a situation where the Government is committed to several large multi-year projects at the same time. Once under way, such projects may be difficult to cut back and consequently will pre-empt the bulk of public resources for several years; as a result, other equally desirable projects and sectors with relatively short gestation periods may have to bear a disproportionate share of the required adjustments.

2.20 It is, therefore, important that other mechanisms are put in place to ensure that the adjustments to the public investment program are not excessively disruptive. The experience of other countries with such mechanisms has been favorable. For example, it would be extremely useful to prepare multi-year expenditure plans at least for the larger projects. Such an exercise would help to clarify the expenditure commitments on major ongoing projects for two-to-three years at a time; it would also provide guidance to policymakers on the extent to which new project starts could be initiated later, adjustments that will have to be made in other sectoral programs, the adjustments which might be required in the larger projects in terms of revisions, rephasing, modifications of projects etc., well ahead of the normal annual budget cycle. A second, and even more effective device is that of establishing a core program of high priority projects within a larger development plan. For example, such a core program could be limited to 70-75 percent of funding that may be available in a particular year and include all high priority projects which the Government will want to protect from resource shortfalls and implementation delays.

**D. Investment Requirements and Financing Options for Public Infrastructure**

2.21 The analysis of Section B suggested that an average of 9-10 percent of GDP per annum will constitute a prudent level of public investment during the 1990s. The distribution of this investment effort over 1989/90 - 1998/99 (corresponding to REPELITA V and VI periods) is illustrated in Table 2.4. It is important to note that these are indicative estimates and their basic purpose is to provide a reference point for discussions.

**Table 2.4. PRUDENT LEVELS OF PUBLIC INVESTMENT /a**

|                                       | Actual          | Projected       |                 |
|---------------------------------------|-----------------|-----------------|-----------------|
|                                       | 1984/85-1988/89 | 1989/90-1993/94 | 1994/95-1998/99 |
| Public investment<br>(percent of GDP) | 8.8             | 9.3             | 10.0            |
| Public investment                     |                 |                 |                 |
| - Rupiah (trillion)                   | 9.8             | 19.9            | 36.1            |
| - US Dollar (billion)                 | 6.5             | 10.1            | 16.1            |
| <u>Memo Item</u>                      |                 |                 |                 |
| Gross public MLT borrowing            |                 |                 |                 |
| - US Dollar (billion)/b               | 5.2             | 6.2             | 7.7             |
| - Percent of Public Investment        | 80.0            | 0.61            | 0.48            |

/a Average per annum.

/b Includes balance of payments support.

2.22 Given the overall resource envelope for the public investment program, the next issue is the allocation among sectors. In the absence of a well-defined, practically implementable methodology for determining sectoral

investment allocations, a first step is to look at GOI's priorities as reflected in REPELITA V (the current five year development plan, 1989/90 - 1993/94). The distribution of public investment by sectors is consolidated into three categories: economic infrastructure; social services; and others (see Table 2.3). As in the past, GOI continues to place a strong emphasis on economic infrastructure. Actual implementation of REPELITA V so far suggests a further shift in emphasis in favor of economic infrastructure, moving towards 60 percent allocation of total development resources. If this revised REPELITA V sectoral allocation is retained, the availability of financial resources from the public sector for funding infrastructure services would be about 5.5-6.0 percent of GDP per annum during remainder of the 1990s. These levels of infrastructure funding would be consistent with macroeconomic stability and a maintenance of GOI's priorities in other areas. Given that infrastructure provision and poverty alleviation are both priorities and they together exhaust over 80 percent of the public investment program, the room for flexibility in reallocating resources within the public sector is limited.

**Table 2.5: GOI SECTORAL INVESTMENT PRIORITIES**  
(percent)

|                           | <u>Actual</u><br>1979/80-1983/84<br>(REPELITA III) | <u>Actual</u><br>1984/85-1988/89<br>(REPELITA IV) | <u>Planned</u><br>1989/90-1993/94<br>(REPELITA V) |
|---------------------------|--|---|---|
| Infrastructure <u>/a</u>  | 33.0   | 43.0  | 53.0  |
| Poverty-Related <u>/b</u> | 23.0   | 25.0  | 31.0  |
| Others                    | 44.0   | 32.0  | 16.0  |

/a Includes: Irrigation, power, transport, communications, municipal water supply and other infrastructure programs financed through the regional development and transmigration funds.

/b Includes: health, education, basic agriculture, population and family planning, and social programs supported through the regional development fund.

Source: Ministry of Finance and GOI plan documents.

### Indicative Allocations for Public Infrastructure

2.23 The sectoral allocations of public investment in infrastructure will need to be based on four considerations:

- overall investment requirements for meeting sectoral targets;

- availability of financing;
- implementation capacity constraints; and
- potential role of the private sector.

Indicative estimates of overall infrastructure investment needs and illustrative allocation between public and private sectors, broken down into the four components--power, telecommunications, transport and water are shown in Box 2.1. The underlying basis for the investment requirements are discussed in Chapter 6, and the rationale for private sector involvement is reviewed in Chapter 4.

| <b>Box 2.1. INDICATIVE ESTIMATES OF INFRASTRUCTURE INVESTMENT REQUIREMENTS AND PUBLIC/PRIVATE PARTICIPATION, 1989/90 - 1998/99</b> |  |  |   |  |   |  |
|--|--|--|---|--|---|--|
|  | Public Sector                            |  |   | Private Sector                             |   | Rationale for Private Sector Participation   |
|  | Actual<br>1984/85-88/89<br>(Repetita IV) | Projected<br>1989/90-93/94<br>(Repetita V) | Projected<br>1994/95-98/99<br>(Repetita VI) | Projected<br>1989/90-93/94<br>(Repetita V) | Projected<br>1994/95-98/99<br>(Repetita VI) |  |
| <b>Power</b>   |  |  |   |  |   |  |
| - % of GDP p.a.  | 1.4                                      | 1.7  | 2.2   | 0.2  | 1.0   | Public investment program constrained by both resources and implementation capacity; new private investment focused on bulk-generation on Java.  |
| - (US\$ bl) p.a.   | (1.07)                                   | (1.96)                                     | (3.30)                                      | (0.33)                                     | (1.57)                                      |  |
| <b>Telecommunications</b>  |  |  |   |  |   |  |
| - % of GDP p.a.  | 0.3                                      | 0.6  | 0.7   | 0.1  | 0.2   | Public investment constrained by operational capacity; apart from specialized services (VSAT, cellular phones, Telex), new private investment will support a modest addition to telecommunications network.  |
| - (US\$ bl) p.a.   | (0.19)                                   | (0.62)                                     | (1.06)                                      | (0.11)                                     | (0.32)                                      |  |
| <b>Transport</b>   |  |  |   |  |   |  |
| - % of GDP p.a.  | 2.0                                      | 2.1  | 2.2   | 1.2  | 1.5   | Public investment program constrained by resources; private sector's role envisaged in both services and fixed facilities.   |
| - (US\$ bl) p.a.   | (1.50)                                   | (2.58)                                     | (3.88)                                      | (1.30)                                     | (2.36)                                      |  |
| <b>Water</b>   |  |  |   |  |   |  |
| - % of GDP p.a.  | 0.9                                      | 0.9  | 1.0   | 0.1  | 0.2   | Public investment in irrigation cutback due to efficiency considerations while in municipal water it is constrained by implementation capacity; in addition to management of small irrigation schemes, new private investment focused on piped water supply on Java. |
| - (US\$ bl) p.a.   | (0.71)                                   | (1.02)                                     | (1.50)                                      | (0.11)                                     | (0.32)                                      |  |
| <b>Total</b>   |  |  |   |  |   |  |
| - % of GDP p.a.  | 4.6                                      | 5.3  | 6.1   | 1.6  | 2.9   |  |
| - (US\$ bl) p.a.   | (3.5)                                    | (6.18)                                     | (9.06)                                      | (1.85)                                     | (4.57)                                      |  |

Source: GOI Five-Year Development Plan and World Bank staff estimates.

2.24 The main conclusions are: (a) electric power investment requirements are expected to grow very rapidly over the next decade; they will pose both a financing and an implementation problem for the public sector. A carefully coordinated public and private sector effort will be essential to achieve the

needed expansion in electricity capacity over the next decade; (b) in the telecommunications sector, the main challenge for the public sector will be to improve its operational capacity; given this constraint, in addition to specialized services, there is also a need to encourage private participation in network provision; (c) for transport, investment requirements will remain very large although resource constraints are likely to limit its share in the public investment program to around the current levels of 2 percent of GDP; apart from commercial type services (bus, shipping, air services), the private sector's role is also envisaged in network provision (both terminals such as ports, airports, bus stations; and links, e.g., toll roads); and (d) for water, public sector involvement in new irrigation schemes needs to be reduced relative to REPELITA V targets on grounds of economic efficiency while implementation constraints will limit investment in piped water; therefore, in addition to the current policy of turning over small irrigation schemes to the private sector, private provision of piped water in Java needs to be encouraged. These will entail a reduction in the share of water resources in the public investment program relative to REPELITA V allocations.

### Financing Options at the Sectoral Level

2.25 Overview. The provision of infrastructure services in the public sector is dominated by state enterprises. However, the Central Government budget has been the main source of funding public infrastructure investments. This funding has taken two forms: equity participation and the on-lending of external loans. Although there are important differences among individual enterprises in the relative contribution of the budget and other sources of finance, on average the budget has financed about 90 percent of the total public investment in infrastructure. This reflects a number of important characteristics of the present arrangements for financing public infrastructure:

- Regulated pricing policies;
- restrictions on foreign borrowing; and
- restrictions on non-bank domestic borrowing.

2.26 Given the current institutional framework for the public infrastructure entities, the rationale for some of these restrictions is justified. The logic of some others, however, needs to be examined and in some cases, modified. Thus, the restrictions on foreign and domestic borrowing by state enterprises are based on the need to maintain prudent limits on the size of the public sector and to maintain macroeconomic stability. In view of the strong link between the Central Government budget and the financing arrangements underlying public infrastructure provision, these prudential regulations have served Indonesia well and they need to be maintained. Nevertheless, within the present institutional arrangements and the need for prudential limits, there is significant scope for improving the flexible use of the borrowing instrument by public enterprises. The example of financing options in the telecommunications sector described below illustrates this point. Looking beyond the present institutional set-up, in an environment where all (or most) infrastructure-related public enterprises are deregulated into fully autonomous units with their finances delinked from the Central

Government budget, there would be a strong case for removing most types of borrowing restrictions, although some overall supervision of their borrowing levels would still be necessary.

2.27 On the other hand, the rationale underlying current regulations on pricing policies is not justified in most instances. Regulations on pricing policies, often justified as a means of controlling inflation and/or to promote equity, are questionable not only on grounds of generating inefficiency and constraining resource mobilization, but also for failing to achieve their stated objectives (inflation control and equity promotion). Chapter 3, which contains a detailed review of pricing issues, concludes that, in most cases, prices of services should at least be sufficient to cover their economic cost of provision. In some situations, prices need to be fixed at levels in excess of economic cost to allow revenue mobilization. Only in a limited number of cases, some reduction in the price below economic cost may be justified (see also Box 2.2).

**Box 2.2: CRITICAL ROLE OF COST RECOVERY/PRICING POLICIES FOR FINANCING INFRASTRUCTURE**

The critical role of cost recovery/pricing policies in financing infrastructure investments cannot be overemphasized. While some infrastructure services are of the nature of public goods and a large part of investments in them would need to be financed through the tax system, for most services appropriate cost recovery policies--direct and indirect--are necessary and could be developed fairly easily. For marketable services (power, telecommunications, ports, piped water, toll roads), direct service charge linked to the level of consumption could be devised. For these services, cost recovery will need to play a dominant role in investment finance, with minimal reliance on government equity. In the case of pure or semi-public goods (non-toll roads, sewerage, flood control), the investment financing will need to be based on a mix of government equity and indirect cost recovery. Examples of indirect cost recovery mechanisms are: fuel taxes as a proxy for road user charges; urban property tax as a proxy for user charges for urban infrastructure (urban roads, sewerage, flood control, street lighting); and land tax as a proxy for user charges for rural infrastructure (rural roads, irrigation, flood control). Overall, the relative contribution of government equity and cost recovery will be determined by: (a) the disincentive effects of taxation; (b) the tax administrative efficiency factor; (c) the political will to institute appropriate cost recovery policies; and (d) administrative capacity to implement cost recovery policies.

2.28 Financing of Investments in the Power Sector. Total capital spending by the state electricity company--PLN--during REPELITA IV (1984/85-1988/89) was Rp 8,054 billion. PLN's own contribution to the investment amounted to only 13.6 percent because it was not permitted to adjust tariff over the entire five year period. Progressively, GOI required PLN to use a greater level of externally borrowed resources; these project loans were obtained by GOI and it carried the foreign exchange risk of loans. Some of the borrowed funds were onlent to PLN as Rupiah loans and some of them were given as equity contributions. The Government also onlent to PLN a part of the loans from the Exim Bank, Japan, which were designed to cofinance the local costs of ongoing World Bank and ADB projects.

2.29 Over the REPELITA IV period, GOI's equity participation in PLN amounted to about 40 percent. Normally, PLN does not borrow from the local banks or raise money in the local markets. However, during the periods when

PLN's available funds from other sources were not adequate to meet the requirement of the investment program, the Government directed PLN to borrow from domestic banks and subsidized the interest rates.

2.30 Future Financing Requirements. PLN has formulated its development plan and estimated its investment requirements for the ten year period 1989/90-1998/99. This program is based on the target of increasing PLN's generation capacity, from 9.2 MW to 21.8 MW, which would result in satisfying approximately all current demand by 1999.<sup>6/</sup> If the proposed investment plan was fully implemented by PLN, this would not only require major improvements in PLN's implementation capacity, but also substantial increases in PLN's share of public investment. Under the present institutional arrangements, PLN's capacity to implement this program will be constrained both by its inability to mobilize the necessary resources as well as inadequate institutional capacity. Moreover, the need to maintain fiscal discipline, especially in the next 2-3 years, will limit GOI's ability to fund PLN's full investment program from budgetary resources. Therefore, a balanced development strategy for the power sector for the 1990s calls for a combination of policies that will allow: (a) significant private participation in power generation; (b) appropriate institutional reforms to provide greater autonomy to PLN; and better prioritization of expansion programs. Based on this approach (see Chapter 6), PLN's funding requirements are indicated in Table 2.6.

**Table 2.6: INVESTMENT REQUIREMENTS AND INDICATIVE FINANCING PLAN FOR PLN  
1989/90 - 1998/99  
(current prices)**

|                     | 1984/85-1988/89 /a |                 | 1989/90-1993/94 /a |                 | 1994/95-1998/99 /a |                 |
|---------------------|--------------------|-----------------|--------------------|-----------------|--------------------|-----------------|
|                     | Rp<br>(trillion)   | \$<br>(billion) | Rp<br>(trillion)   | \$<br>(billion) | Rp<br>(trillion)   | \$<br>(billion) |
| Capital Expenditure | 8.04               | 5.87            | 18.91              | 9.80            | 39.98              | 16.52           |
| <u>Financed by:</u> |                    |                 |                    |                 |                    |                 |
| Internal sources    | 1.09               | 0.78            | 5.11               | 2.65            | 15.97              | 6.61            |
| External loans      | 3.78               | 2.49            | 9.48               | 4.90            | 19.97              | 8.28            |
| Government equity   | 3.22               | 2.15            | 4.84               | 2.25            | 3.99               | 1.65            |

<sup>/a</sup> Total expenditure over the period; 1984/85-1988/89 figures are actuals, the others are projected.

Source: PLN and World Bank Staff estimates.

2.31 Proposed Financing Strategy. An appropriate financing strategy for PLN would be to progressively reduce the dependence on government funds, with a commensurate increase in internal savings. The main elements of this strategy

<sup>6/</sup> The demand projections assume that GDP will grow at 6-7 percent, manufacturing sector at 10-11 percent, and electricity tariff would be at or above long-run marginal cost (LRMC) of supply for all categories of consumers except several social institutions, small residential customers, several hotels and small industrial customers.

are: (a) a continuation of measures, including efficiency improvements and tariff adjustments, should allow PLN to maintain a self-financing ratio of about 40 percent during the REPELITA VI period. This will require an appropriate tariff policy; (b) the Government's equity contribution to PLN's investment requirements would be gradually reduced and ultimately linked only to infrastructure whose benefits are available in the long-term and for supporting socially directed programs, such as rural electrification; (c) the financial losses incurred by PLN from pursuing other social objectives, such as subsidized electricity for certain consumer groups, will need to be compensated on the basis of a transparent mechanism.

2.32 The financing plan contained in Table 2.6 is based on a self-financing ratio of 27 percent in 1989/90-93/94, growing to 40 percent in 1994/95-98/99; foreign borrowing of 50 percent; and GOI equity participation of 23 percent in 1989/90-93/94, falling to 10 percent in 1994/95-98/99. Under this plan, PLN's annual external borrowing requirement will grow from about \$500 million per annum (10 percent of total gross public borrowing) in REPELITA IV to about \$1.0 billion per annum (16 percent) in REPELITA V and \$1.7 billion per annum (22 percent) in REPELITA VI. Attracting such amounts of external funds will require conditions that permit potential lenders to perceive PLN as a financially sound institution. Such a perception requires good financial performance and a predictable environment for PLN's operations.

2.33 Financing of Investments in the Telecommunications Sector. During the fourth five year plan (REPELITA IV) the state telecommunications agency (TELKOM) implemented an investment program of Rupiah 1.44 trillion (or \$1.0 billion), which was financed through 22 percent internal savings; 67 percent foreign borrowing, and 31 percent domestic bank borrowing. The foreign loans were obtained by GOI and passed on to TELKOM as a mix of loan and equity. Given this modest level of investment (relative to needs) and the fact that GOI has followed a liberal pricing policy for TELKOM's services, financing has not been a problem. The main difficulty has been TELKOM's project implementation capacity. For the future, however, with the recent improvements in implementation capacity through large scale single responsibility contracts, TELKOM's investment program will need to increase substantially to ease the growing telecommunications bottleneck. While the size of the investment program will depend primarily upon TELKOM's ability to improve its capacity to operate and monitor the expanded network, commensurate improvements in its financing strategy will also become necessary.

2.34 Future Financing Requirements. TELKOM has formulated its development plans and estimated its investment requirements (see Table 2.7) for the 10-year period 1989-1999. This program is based on what is needed to meet outstanding applications for telephone lines and to partly satisfy new demand forecast for this period. The program aims to increase the working lines four-fold from its present 1.2 million lines to 5 million. This would satisfy about 82 percent of the expressed demand by the end of the period.

2.35 Proposed Financing Strategy. An appropriate financing strategy which ensures that sufficient foreign as well as local funds are available to support telecommunications development will necessitate: (a) continued emphasis on improving TELKOM's financial performance through productivity increases and tariff adjustments; and (b) establishing procedures for securing foreign funds

**Table 2.7: INVESTMENT REQUIREMENTS AND INDICATIVE FINANCING PLAN FOR TELKOM, 1989/90-1998/99  
(current prices)**

|                         | 1984/85-1988/89 /a |                 | 1989/90-1993/94 /a |                 | 1994/95-1998/99 /a |                 |
|-------------------------|--------------------|-----------------|--------------------|-----------------|--------------------|-----------------|
|                         | Rp<br>(trillion)   | \$<br>(billion) | Rp<br>(trillion)   | \$<br>(billion) | Rp<br>(trillion)   | \$<br>(billion) |
| Investment requirements | 1.44               | 0.96            | 6.16               | 3.10            | 12.93              | 5.32            |
| <b>Financed by:</b>     |                    |                 |                    |                 |                    |                 |
| Internal savings        | 0.32               | 0.21            | 2.48               | 1.25            | 5.17               | 2.13            |
| Foreign borrowing       | 0.67               | 0.45            | 2.48               | 1.25            | 5.17               | 2.13            |
| Domestic borrowing      |                    |                 |                    |                 |                    |                 |
| - Banking sector        | 0.45               | 0.30            | 0.90               | 0.45            | 1.29               | 0.53            |
| - Subscriber bonds      | -                  | -               | 0.30               | 0.15            | 1.29               | 0.53            |
| <b>Total</b>            | <b>1.44</b>        | <b>0.96</b>     | <b>6.16</b>        | <b>3.10</b>     | <b>12.93</b>       | <b>5.32</b>     |

/a Total expenditure over the period; 1984/85-1988/89 figures are actuals, the others are projected.

Source: PERUMTEL and World Bank Staff estimates.

that will facilitate long-term planning, synchronize the availability of funds with the planned implementation of the investment program and enhance TELKOM'S ability to purchase equipment at competitive prices.

2.36 While TELKOM'S past financial performance has generally been satisfactory, further improvements will be required to support an expanded investment program. Internal savings need to be raised through appropriate tariff adjustments, network performance must be improved, and existing facilities and financial assets will need to be managed more effectively. In addition, more emphasis needs to be placed on: reducing operational costs; improving cash flows by establishing more stringent control of expenditures; improving financing, accounting and information systems; and building the capability of the financial and managerial staff to analyze and use the data for operational control.

2.37 Procedures need to be established to ensure that foreign funds are secured on an efficient and timely basis. A critical step in this direction would be an agreement between GOI and TELKOM on a long-term financing plan that is consistent with an approved medium term investment program. The financing plan would identify project components to be serviced through multilateral sources and price and terms bidding. In addition, donors could be identified for items that can be purchased efficiently with direct bilateral funds. Once the financing plan has been agreed on, the Government should give TELKOM authority to enter into multi-year contracts. To facilitate GOI'S annual budget preparation, disbursement schedules should be prepared prior to the start of procurement and updated annually.

2.38 In the past, the only source of domestic borrowing was the banking sector. TELKOM will need to adjust its financing strategy to include sources such as subscriber financing, bond issues, and other sources of private sector

funding. The financial environment is now more conducive to the development of an active bond market, including a secondary market for subscriber bonds. It is essential that these bonds are clearly established and perceived as marketable securities and not as an additional installation fee. GOI policies already permit, on a limited scale, user credit financing of those parts of the telecommunications network where construction is carried out by the private sector and subsequently handed over to TELKOM. Expansion of such schemes and other options to increase private sector investment in the sector could be explored systematically.

2.39 The implications of the above financing strategy for TELKOM's investment program is shown in Table 2.7. The financing plan assumes that: (a) the foreign costs of investments would average 40 percent of total costs; (b) TELKOM would finance a minimum of 40 percent of the total costs from own sources; (c) local bank borrowing would be maintained at current levels; and (d) subscriber bond financing would be introduced gradually, providing 10 percent of local cost financing by the end of 1998/99.

2.40 Financing of Investment in the Transport Sector. Unlike other more homogenous infrastructure sectors--such as electric power and telecommunications--there are no simple aggregate measures or relationships which might be used to assess the overall adequacy of existing transport infrastructure capacity or to relate future development requirements to projected economic growth. The starting point adopted here in considering future investment requirements is the REPELITA V plan. The plan shows projected total state development budget expenditures for transport over the five year period (1989/90-1993/94) of Rp 20.0 trillion at current prices. Including road infrastructure expenditures to be funded under the regional development sector increases the total to Rp 23.7 trillion, which implies an allocation of 2.2 percent of GDP per annum. This compares with 2 percent of GDP per annum actually spent during REPELITA IV. Maintaining the annual level of public investment in transport at around 2 percent of GDP per annum over the medium term will allow an expanding role for the private sector while meeting sectoral priorities.

2.41 Although data on the financing pattern for transport infrastructure are not available, crude estimates suggest that some 90 percent of investment financing was obtained from the government budget during REPELITA IV. The full amount was provided as equity participation, including foreign funding (40 percent of the total transport sector financing) secured by the Government as loans.<sup>7/</sup> From the standpoint of pricing, transport infrastructure related services provided by the Government falls into two categories, namely: (a) facilities such as seaports and airports, where there are published tariffs which the users must pay directly; and (b) other facilities, such as public roads, for which there are no direct user payment mechanisms, although significant revenues from road users through indirect ways (taxes and charges on vehicles and fuel) is obtained. In general, the level of user charges for various transport services is believed to be below the economic cost of service

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<sup>7/</sup> A recent review of the finances of state enterprises done by the IMF suggests that many transport related enterprises are incurring financial losses.

provision. Thus, apart from numerous inefficiencies in the structure of transport network pricing, there is significant scope for improving cost recovery from transport infrastructure services.

2.42 Future Financing Requirements. Despite the scope for strengthening cost recovery, the overall resource availability in the public sector will constrain the size of the allocation for the transport sector. As noted, the allocation proposed in this study is to keep the public sector investment in transport at around 2 percent of GDP per annum for the rest of the decade. This will allow the private sector to play an increasing role in providing transport services including investment in fixed facilities.

2.43 Proposed Financing Strategy. The projected investment allocation and an indicative financing plan for the 1990s is shown in Table 2.8. The plan assumes that: (a) the share of cost recovery policies in funding investment requirements will grow to about 15 percent during the REPELITA V period, and reach 20 percent during the REPELITA VI period; and (b) GOI's equity contribution will correspondingly be reduced to 80 percent; with the share of foreign funding remaining unchanged at 40 percent, and with general taxes providing the rest.

**Table 2.8: INVESTMENT REQUIREMENTS AND INDICATIVE FINANCING PLAN FOR TRANSPORT SECTOR**  
(current prices)

|                          | Estimated        |                | Projected        |                |                  |                |
|--------------------------|------------------|----------------|------------------|----------------|------------------|----------------|
|                          | 1984/85-1988/90  |                | 1989/90-1993/94  |                | 1994/95-1998/99  |                |
|                          | Rp<br>(trillion) | ₹<br>(billion) | Rp<br>(trillion) | ₹<br>(billion) | Rp<br>(trillion) | ₹<br>(billion) |
| Investment requirements  | 11.3             | 7.5            | 25.4             | 12.9           | 40.7             | 16.8           |
| <u>Financed by:</u>      |                  |                |                  |                |                  |                |
| Cost recovery            | 1.1              | 0.8            | 3.8              | 1.9            | 8.1              | 3.4            |
| Government equity        | 10.2             | 6.7            | 21.6             | 11.0           | 32.6             | 13.4           |
| of which: external funds | (4.5)            | (3.0)          | (10.2)           | (5.2)          | (16.8)           | (6.7)          |
| local funds              | (5.7)            | (3.7)          | (11.4)           | (5.8)          | (16.3)           | (6.7)          |
| <u>Total</u>             | <u>11.3</u>      | <u>7.5</u>     | <u>25.4</u>      | <u>12.9</u>    | <u>40.7</u>      | <u>16.8</u>    |

Source: Ministry of Finance and World Bank Staff estimates.

2.44 Financing of Investment in Water Supply. A total of Rp 5.0 trillion (0.9 percent of GDP per annum) has been spent on the development of water infrastructure during REPELITA IV. This has been funded almost entirely through government equity (54 percent local resources and 46 percent foreign borrowings). Direct cost recovery for irrigation was virtually non-existent during REPELITA IV.<sup>8/</sup> For municipal water supply, although the past approach

<sup>8/</sup> In recent years, an irrigation service fee has been introduced on a pilot basis.

to pricing policy has been to recover at least O&M and depreciation, and in some cases achieve a return on assets, the surplus generated has been insignificant compared to the future capital spending needs.<sup>9/</sup>

2.45 Future Needs and Proposed Financing Strategy. The current investment level (around 1.0 percent of GDP per annum) will be adequate to meet the objectives for irrigation services and enable achievement of realistic targets for piped water supply, given implementation constraints. However, important changes are necessary in the focus of the investment program (see Chapter 6). Major changes in the financing pattern are also necessary. Given the overall external borrowing constraint, the dependence on foreign funding needs to be reduced, while a commensurate increase in the contribution of cost recovery to investment finance is required. This increase, in the first instance, will need to come from the municipal water enterprises. There is also a case for developing an irrigation pricing policy linked to water use. Such a pricing scheme could potentially recover O&M, plus a share of capital costs. However, recognizing the difficulties associated with implementing large increases in user charges in the irrigation subsector, the financing plan proposed in Table 2.9 assumes a relatively modest role for cost recovery in financing water resources--5 percent during REPELITA V period, increasing to 10 percent during REPELITA VI period. The contribution of foreign borrowing is projected to decline to 40 percent, while government equity falls to 55-50 percent.

**Table 2.9: INVESTMENT REQUIREMENTS AND INDICATIVE FINANCING PLAN FOR WATER SECTOR**  
(current prices)

|                      | Estimated       |            | Projected       |            |                 |            |
|----------------------|-----------------|------------|-----------------|------------|-----------------|------------|
|                      | 1984/85-1988/90 |            | 1989/90-1993/94 |            | 1994/95-1998/99 |            |
|                      | Rp              | \$         | Rp              | \$         | Rp              | \$         |
|                      | (trillion)      | (billion)  | (trillion)      | (billion)  | (trillion)      | (billion)  |
| <b>Investment</b>    | 5.0             | 3.4        | 10.0            | 5.1        | 18.2            | 7.5        |
| <b>Financed by:</b>  |                 |            |                 |            |                 |            |
| Cost recovery        | -               | -          | 0.5             | 0.3        | 1.8             | 0.7        |
| Government equity    | 5.0             | 3.4        | 9.5             | 4.8        | 16.4            | 6.8        |
| - External borrowing | (2.3)           | (1.6)      | (4.0)           | (2.0)      | (7.4)           | (3.1)      |
| - Local resources    | (2.7)           | (1.8)      | (5.5)           | (2.8)      | (9.0)           | (3.7)      |
| <b>Total</b>         | <b>5.0</b>      | <b>3.4</b> | <b>10.0</b>     | <b>5.1</b> | <b>18.2</b>     | <b>7.5</b> |

Source: World Bank Staff estimates.

<sup>9/</sup> For example, a 1988 study of the financial viability of water enterprises in Indonesia estimated an overall profit of Rp 20.3 billion after deducting for both interest and depreciation in 1987. This is less than 7 percent of capital spending for water enterprises and less than 2 percent of total capital spending in water sector in 1987/88. See: Indonesia Support Study for Master Planning for Water Supply Subsector Policy, Government of Indonesia, Ministry of Public Works, Directorate General of Human Settlements, September 1988.

## CHAPTER 3

### PROMOTING EFFICIENT USE OF INFRASTRUCTURE

#### A. Introduction

3.1 While the rapid growth of the private sector has created the need for substantial new investment in infrastructure capacity, it is equally important, in order to make the best use of scarce resources, that the existing facilities be utilized efficiently. Policies that support this objective have two main elements: appropriate pricing of infrastructure services to ensure efficient management of the demand for these services; and effective management of operations and maintenance (O&M) activities to support the efficient functioning of past investments in infrastructure and secure maximum return on those investments in terms of the output and quality of services obtained. These policies are related, as appropriate pricing--in addition to its function of regulating and rationing demand--is necessary to generate resources to adequately fund O&M expenditures to keep these services running effectively. On the supply side, pricing policies, of course, also affect efficiency in the production of these services and influence new investments, including incentives for private sector participation. This chapter reviews the current status of these policies in Indonesia and discusses areas for improvement.

3.2 Infrastructure pricing policies are discussed in Section B, which is sub-divided into three main sections: the first subsection sets out an analytical framework outlining key considerations in the pricing of economic infrastructure services; against the background of this framework, the second sub-section reviews pricing policies in four major economic infrastructure sectors--electric power, telecommunications, transport and water resources--identifies deficiencies and suggests improvements; and the third sub-section discusses certain issues of price regulation specific to private provision of infrastructure services. O&M policies are reviewed in Section C, which examines both sector-specific and systemic causes of inadequate or inefficient O&M, and proposes an agenda of actions to yield a more effective O&M strategy.

#### B. Pricing of Economic Infrastructure

##### A Framework for Infrastructure Pricing

3.3 Appropriate prices are necessary to ensure that infrastructure services are used efficiently. At the same time, prices influence the supply of these services; they influence the level of capacity utilization of existing facilities as well as new investment decisions, by affecting profitability of these decisions. Ensuring the appropriateness of prices, therefore, is of considerable importance. For goods produced and sold under competitive conditions, market forces establish a price that brings their demand and supply into an efficient balance. However, many infrastructure services, such as power and water, are provided by public monopolies or franchised private companies. The role of the government in setting appropriate prices for these services in the absence of effective competition is critical for efficient provision of infrastructure.

3.4 The goal of allocative efficiency requires that the prices that guide the decisions of consumers and producers be set equal to the cost of providing an additional unit at the margin. This principle of marginal cost pricing provides the benchmark rule in pricing infrastructure services. Charging less than marginal cost induces excess demand and wasteful use, pushing consumption beyond the point where the benefit from additional consumption falls below the incremental cost of resources used in production. It also necessitates the generation of funds from other activities to support these services, which in turn can create distortions elsewhere in the economy. If prices are set equal to marginal costs, the resulting production and consumption would be consistent with efficiency in the allocation of resources. Unsatisfied demand at these prices would signal the need to expand production, as it would indicate that consumers are willing to pay for the expansion.

3.5 This efficient pricing principle is subject to some qualifications. First, in the absence of effective competition, basing prices simply on marginal cost may weaken the incentives to produce the services at minimum cost. To ensure cost minimization in these market conditions, the regulatory system would need to contain appropriate checks and balances and evaluate the performance according to rigorous criteria. Second, in some infrastructure sectors, such as power and ports, where capacity expansion requires lumpy investments, setting price to short-run marginal cost could result in excessive price instability; long-run marginal cost provides a better basis for pricing in these sectors. Third, where externalities are present, marginal cost needs to be defined in social terms in order to take these into account in setting prices.

3.6 Experience suggests that a suitable basis for utility pricing would be to cover operating expenses, interest payments and depreciation charges, and also self-finance part of the investment program. For most services, a structure of user charges based on the long run marginal cost (LRMC) would achieve this objective. The application of this principle, however, would yield less than full cost recovery in the case of utilities which experience declining unit costs below the capacity limit as production increases, e.g. power. In such cases either the service must be subsidized from general tax revenues or users must be charged more than the price based on marginal cost. The appropriate policy would need to be guided by which of these alternatives would raise the required revenue at lower economic cost. Because of the relative narrowness of the tax base and weak tax administration, the efficiency and administrative costs of raising additional revenue from general taxes tend to be high in developing countries, making the latter the preferable course in most such cases. However, this may not necessarily involve a mark-up over marginal cost. Often, a more efficient alternative would be a multipart pricing scheme, which keeps the tariff at marginal cost but supplements that by a lump-sum charge (e.g. a connection fee) to capture the fixed costs not recovered by the tariff. Power and water charges, for example, are often structured in this way.

3.7 Often, a departure from the LRMC principle is advocated to promote equity. If utility pricing is used to address distributional objectives, proper targeting of the subsidy to reach the poor is of critical importance. Some subsidization of services that meet basic human needs, such as water and power, may be desirable. To achieve better targeting of intended beneficiaries, and to minimize efficiency and revenue losses, one possible

approach is to adopt a "lifeline" pricing arrangement, which allows subsidized prices up to a threshold level of consumption and then charges either at marginal cost thereafter or at rising block rates. If the poor lack access altogether, it is appropriate first to subsidize the lump-sum connection charges, where levied, and subsidize the unit consumption charge, for a limited quantity, only if it is still deemed necessary on equity grounds.

### Pricing Policies in Major Infrastructure Sectors

3.8 The foregoing section discussed some general principles of pricing economic infrastructure services, taking into account the objectives of efficiency, revenue generation and equity. Against this framework, this section reviews current pricing policies for electric power, water resources, telecommunications and transport in Indonesia, and proposes appropriate modifications where improvements are needed. The main recommendations are summarized in Box 3.1.

#### Electric Power

3.9 In Indonesia, power tariffs are regulated by the Government, but there is no automatic and regular linkage between tariff adjustments, marginal supply costs and demand growth. Power rates are subsidized for several categories of small users, though the important ones are those of residential and industrial users (see Annex Tables 2 and 3). Power tariffs were raised in July 1991, by 20 percent on average. Even with this adjustment, the average tariff is estimated to be about 13 percent below the long-run marginal cost of supply. Total economic subsidy is estimated at about Rp.600 billion, of which roughly 80 percent is on account of residential customers and the remainder largely on account of industrial customers. On equity grounds, subsidizing a level of consumption that is considered a basic need can be justified, but then the subsidy should be focused on, and limited to, the target group. In contrast, under the present tariff structure, the subsidy extends to a large number of users and can hardly be considered an effective means of achieving the Government's equity objectives. For example, the poor, the intended primary beneficiaries of the subsidy, account for only 15 percent of PLN's residential customers in urban areas and only 4 percent of residential sales;<sup>1/</sup> these numbers would be still smaller in rural areas as the poor are less likely to be connected. Therefore, of the total residential subsidy, only about one-twentieth is estimated to reach to the poor. Moreover, the subsidization of power extends to many non-residential customers, and indeed covers the bulk of the industrial sector. In a situation marked by substantial unmet demand for electric power, such a subsidized pattern of consumption is clearly undesirable, and unsustainable.

3.10 The Government's equity objectives in subsidizing power could be met more effectively, and at much lower cost in terms of efficiency and revenue losses, by adopting a scheme of lifeline rates for residential consumption of up to, say, 25 kWh per month-- which is estimated to be enough for basic

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<sup>1/</sup> See Indonesia: Urban Household Energy Strategy Study, Report No. 107/90 of the World Bank/UNDP/Bilateral Energy Sector Management Assistance Program, 1990.

**Box 3.1: INFRASTRUCTURE PRICING POLICIES: MAIN RECOMMENDATIONS**

**Electric Power**

- Adopt a properly targeted lifeline rate for residential consumption, and eliminate subsidy on residential consumption above that level; reduce the connection charge for the poor.
- Eliminate subsidies to industrial users.
- Consider allowing tariffs to reflect regional cost differentials.
- Institute a mechanism for regular review and adjustment of tariffs.

**Telecommunications**

- Raise the quality of telephone service to a level commensurate with the user charges.
- Adjust tariffs regularly.

**Transport**

- Implement an improved road user charges regime, particularly for commercial vehicles, through the appropriate pricing and taxation of diesel fuel and the restructuring of the annual motor vehicle tax (PKB).
- Set tariffs for ports, airports and other transport infrastructure to reflect costs and limit subsidies and cross-subsidies to supporting carefully targeted "pioneer" and other services.
- Permit regulated tariffs for transport services to be adjusted regularly in line with changes in associated costs.

**Water Resources**

- Simplify the structure of tariffs for public piped water, reducing the number of categories and rates.
- Adopt a properly targeted lifeline rate for piped water for residential consumption, and reduce the connection charge for the poor; eliminate subsidy at higher levels of residential consumption.
- Raise groundwater extraction fee, in areas of relatively scarce groundwater resources, in line with user charges for municipal water.
- Improve enforcement of licensing and tariff regulations for groundwater extraction.
- Extend the pilot irrigation service fee to other areas.
- Design a volume based user charge for irrigation water, particularly in water scarce areas and where feasible.
- Adjust tariffs/charges periodically.

amounts of lighting and cooking--and charging consumption above that level at the economic cost of supply. This should be considered together with a partial waiver of the connection charge for the poor in order to improve their access to the service and hence to the benefits of the subsidy. Currently, the connection charge ranges from Rp. 70,000 to 100,000, which is high for the poor, as it is equivalent to about two months' income of an average poor household. Subsidies benefitting the better-off under the present tariff structure cannot be justified and needs to be phased out. The introduction of an ascending block tariff for residential customers as part of the 1989 tariff adjustment indicates that the Government is aware of the existing distortions and has taken a right step in the phasing-out process. However, substantial further tariff correction would be necessary. The rationalization of the level and structure of the power tariff should also include the elimination of the subsidy to industrial users. This subsidy can hardly be expected to contribute

significantly to the promotion of small enterprises, because the cost of electricity for these enterprises is usually only a small fraction (less than 5 percent) of total production cost.

3.11 PLN's power tariff structure has in recent years generated enough revenue to meet the utility's operating costs and finance part of its investment program. However, one reason why PLN has been able to achieve this is the substantial below-market financing it has received from the Government (see Chapter 2). In order to strengthen incentives to improve efficiency and make PLN function more fully along commercial lines, the provision of subsidized financing needs to be phased out while internal revenue generation needs to be enhanced. Appropriate and timely adjustments in the power tariff would be central to meeting the need to increase internal revenues. At the same time, PLN will need to be compensated, on a transparent basis, for any losses incurred for meeting GOI's social objectives.

3.12 In improving power tariff policies, consideration could also be given to allowing tariffs to reflect regional cost differentials. At present, a single set of power tariff rates based on the average cost of supply at the national level is charged in every part of the country. This structure of tariff reflects GOI's objective to promote balanced regional development. However, the cost of supplying electricity in different regions varies significantly, depending on the location, voltage level and consumption pattern of users. This pattern of cross-subsidization does not promote an efficient use of the service; its cost-effectiveness in promoting regional balance is also doubtful as it limits availability of supply (see also Chapter 5). Cost differentials, therefore, need to be signalled to users through appropriate adjustments in the rates. The principle of setting national tariff guidelines is useful, but flexibility needs to be allowed in modifying the tariff structure to reflect differences in cost.

3.13 In order to ensure that appropriate tariff adjustments are made in a timely fashion, the mechanism for adjusting tariffs needs to be improved. As noted, there is no automatic or regular linkage between tariff adjustments and cost developments. In the past, this led to prolonged delays in adjustments, also necessitating larger--and politically more difficult--adjustments when they eventually occurred (the adjustment in tariffs in April 1989 was the first since 1984 and raised the average tariff by 25 percent). A mechanism needs to be developed whereby tariffs could be adjusted regularly and predictably, based on agreed criteria. This should allow tariff adjustments to reflect changes in PLN's costs (due to factors such as inflation, fuel cost increases and exchange rate movements, adjusted for efficiency improvements) to be made in a routine manner, and at short intervals, such as annually. These adjustments could be supplemented by fuller reviews of the overall tariff policy every two or three years.

### Telecommunications

3.14 The existence of substantial unmet demand for telephone services that cannot be fulfilled over several years because of supply constraints justifies pricing the service on efficiency grounds at a level that exceeds full cost recovery. Moreover, unlike basic services such as electricity and water, residential telephone service can be considered essentially a superior good in developing countries like Indonesia, which means there is little justification

for lifeline rates or similar subsidy schemes for this service.<sup>2/</sup> Therefore, in addition to covering LRMC and self-financing a large part of investment, telephone service should also contribute to general fiscal revenue through taxes in a manner similar to private commercial activities.

3.15 The pricing policy for telephone service adopted by the Government is broadly consistent with these principles. This has allowed TELKOM, the state-owned company providing domestic telephone service, to achieve full cost recovery and also self-finance a sizable part--close to a quarter during REPELITA IV--of its investment program. At the same time, TELKOM has been making a notable net contribution to the public treasury through income tax payments and dividend on government equity; foreign loans channeled to the company through the Government have generally been at market rates. In view of the large demand-supply gap and the need to moderate demand growth, and to enable TELKOM to mobilize more resources to fund system expansion, the Government announced major adjustments in telephone tariffs in October 1990. First, installation charges were raised by 100-200 percent to moderate the demand for new service. Second, monthly subscription charges, which had been low relative to costs, were raised nearly threefold in major cities; this will improve the allocation of telephone service by inducing subscribers with low utilization to terminate the service and channeling it to those who value it more. Third, the charge for local calls was raised and that for long-distance calls over 1,000 km was lowered; while no separate estimates of long-run marginal costs are available, the previous structure of charges suggested that local calls had been priced lower relative to cost than long-distance calls. These improvements in the level and structure of telephone charges are appropriate. The Government will need to undertake regular tariff reviews (say, every two years) in order to avoid larger and more sensitive rate increases that become necessary at longer intervals.

3.16 While the pricing policy is rightly geared to efficient demand management and supporting more rapid network development, supply efficiency needs improvement. First, the costs of providing the service can be lowered through improvements in operational efficiency. An indication of the scope for cost reduction is the existence of significant overstaffing at lower levels in TELKOM--50 staff per 1000 lines, which is more than twice as high as in some of the neighboring countries. It is important to ensure that the lack of market competition does not erode incentives to produce at minimum cost (possibilities for increasing competition in the telecommunications sector through greater private sector participation are discussed in Chapter 4). Raising productivity and reducing production costs would be important not only to improve efficiency but also to upgrade the financial performance of TELKOM to enable it to raise its own contribution to an expanded investment program. Second, the quality of service needs improvement. Quality deficiencies are reflected in high rates of call failure and fault incidence and slow fault correction. To justify high user charges, regulators need to ensure that customers get the quality they pay for.

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<sup>2/</sup> Rather, the Government's objective of broadening access to telephone service can be achieved by extending the coverage of basic telephone service to rural areas currently not connected and establishing public pay phones.

## Transport

3.17 Road Network. In the transport sector, pricing of road use is quite complex. Facilities such as ports and airports have well-defined tariffs which users must pay directly to use the service; however, there is no direct pricing mechanism linked to road use, except for toll roads, both because of the difficulty of determining which road-related costs (e.g., pavement damage, congestion, pollution, etc.) should be recovered from users and of attributing these costs to different users. As direct road user charges are not feasible, some indirect means have to be employed. Through various such means--import duties on vehicles and parts, domestic indirect taxes on vehicles, parts, fuel and lubricants, and local government fees for vehicle registration and transfer--GOI has collected significant revenues. However, several of these taxes, such as import duties and the VAT, are levied to raise general fiscal revenue, and their level and structure are not determined primarily by considerations of efficiency and cost recovery in transport. Even taxes more closely related to road use, i.e., fuel taxes and vehicle registration fees, are only imperfect substitutes for direct user charges, as the tax incidence may not correspond to road costs actually imposed by users--which depend on several factors such as the type of vehicle, the distance travelled, the size and distribution of the load carried, and the route and time of road use. Nonetheless, fuel taxes and registration fees provide the closest available approximation to direct road user charges, as they can better capture some of these factors. Neither, however, has been used to its full potential advantage in Indonesia to underpin efficiency of road use by giving correct signals to users about the road costs that they impose in the form of congestion, road damage and pollution.

3.18 The key issue in this context concerns the pricing taxation of automotive diesel oil (ADO or solar). The price of ADO was last increased in July 1991, but the subsidy remains high; estimated at Rp.300 billion at the projected 1992/93 prices. In addition to the fiscal cost and the encouragement given to inefficient use of the resource, the subsidization of diesel considerably distorts the pattern of charges levied on road users relative to the costs that they impose, which, in turn, distorts the pattern of demand for different transport modes and operators' investment decisions.<sup>3/</sup> Vehicles using diesel--medium and heavy commercial vehicles--impose much higher road-user costs than vehicles using gasoline--passenger cars, minibuses, etc.; however, under the present pricing arrangements, the former are subsidized and the latter taxed. Gasoline-driven vehicles generally represent final consumption, which is associated with a relatively high income in a developing country such as Indonesia and a low price elasticity. Accordingly, taxation of gasoline, like that of similar consumption, is justified. Freight transport service, on the other hand, is normally an input in the production process, and, as such, a tax on it may not be justified. However, allocational efficiency requires that commercial vehicles pay at least the cost attributable to them at the margin. In contrast, it is estimated that, in Indonesia, such vehicles make no net contribution to the recovery of substantial road costs they entail--medium and heavy trucks are estimated to account for over

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<sup>3/</sup> The current large subsidy for diesel also induces inefficient power generation and adversely affects the environment.

40 percent of total road infrastructure costs.<sup>4/</sup> One distortion resulting from the underpricing of diesel is the diversion of traffic to road that could be carried more economically by another mode, e.g., rail. A central step in rationalizing the structure of road user taxation is to raise the price of diesel, not only to cover its costs of production and distribution but also to include a component pertaining to road user costs. In addition to improving the efficiency of road use, it would contribute to mobilizing increased resources to support road development programs.

3.19 The structure of the annual registration fee also needs to be rationalized. Currently, the fee for commercial vehicles is low both in absolute terms and relative to that for private cars. Moreover, the fee is based on vehicle age and engine capacity; these characteristics do not adequately capture the road damaging potential of different vehicles. The present structure of the registration fee encourages the purchase and use of vehicles--notably medium-size two-axle trucks--which are easily overloaded and hence cause heavier pavement damage than if the same weight were carried by multi-axle trucks.<sup>5/</sup> In order to induce efficient vehicle investment and operating decisions, and reduce the costs of road maintenance, the annual registration fee for commercial vehicles needs to be raised and restructured to better reflect their road damaging potential--by taking into account characteristics such as the load carrying capacity and the type of vehicle.<sup>6/</sup>

3.20 Indonesia's public ports and airports are each divided into two categories, with the larger "commercial" facilities being managed by public corporations<sup>7/</sup> and the smaller "non-commercial" facilities being managed directly by MOC through its Directorates General of Sea Communications (DGSC) and Air Communications (DGAC). The tariffs for "commercial" ports and airports are increasingly being brought into line with accounting costs as the responsible corporations are by law required not to incur financial losses. However, in setting the tariffs for international services, account is also taken of the tariffs charged by other countries in the region, while in setting the tariffs for domestic services, considerable weight is given to perceptions concerning "what the market will bear" and the developmental role of ports and airports. Consequently, there are substantial cross-subsidies within some of these corporations, both between different types of services and between

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<sup>4/</sup> See Road User Taxation Study (Initial Planning Phase), Ministry of Communications, Bureau of Planning, Government of Indonesia, February, 1991.

<sup>5/</sup> Ibid.

<sup>6/</sup> The fee could be designed to take into account both the weight and distance factors. Such systems are in operation in some countries, for example, Iceland, Norway, Sweden, and New Zealand. The fee is graduated according to axle configuration and gross vehicle weight, also taking into account the distance travelled, with the latter being monitored through sealed hub odometers or other certified distance meters. However, such charges could be difficult to implement in developing countries.

<sup>7/</sup> Four Public Port Corporations (Perum Pelabuhan I-IV) and two Public Airport Corporations (Perum Angkasa Pura I and II).

facilities in developed and less-developed areas. Moreover, the accounting costs used as a basis for tariff-setting often understate the true economic costs of service provision, thereby resulting in tariffs that encourage inefficient use of facilities. Thus for example, low tariffs for container storage have encouraged congestion of the container terminals at Tanjung Priok port and at Bandung's Gede Bage rail terminal. For the smaller "non-commercial" facilities, the assessment of tariff-setting is complicated by the lack of suitable cost information.<sup>8/</sup> In general, however, the tariffs for small ports and airports are set well below costs and below the tariffs for "commercial" facilities on the principle that facilities in remote areas deserve subsidy and that the level of service at such facilities is lower than at their "commercial" counterparts. The above policies need to be progressively revised so as to target subsidies more effectively, and to encourage the more efficient use of existing facilities and thereby defer the need for investments in additional capacity. This could be done in conjunction with transferring more "non-commercial" facilities, and particularly airports, from MOC to the appropriate public corporations.

3.21 The Government has in recent years removed or considerably relaxed its controls over the tariffs for passenger and freight transport services. Freight rates are now deregulated for all modes, while controls over passenger tariffs have, for all intents and purposes, been removed for air transport and for first, second and business class services on other modes. For economy class services, however, the principal criterion influencing tariff setting is still the perceived ability to pay of the users, and the regulated fares for Perumka's intercity and urban railway services and for Perum PPD's Jabotabek bus services in particular are set significantly below their costs of provision. While in both these instances there is considerable scope for reducing costs through improved operation and maintenance, increases in tariffs will still be needed in order to permit the operation of better quality services. Thus, although one private bus company and two cooperatives have proven able, without subsidy, to survive and expand their operations in Jabotabek within the controlled tariffs, the quality of the services they provide is, like PPD's, poor and generally unattractive to those who can afford to travel by any other means. Perumka's most important rail freight rates--notably those for the bulk commodities that are the backbone of its freight traffic--are fixed by negotiation, while the corporation now has control over the setting of published rates for other freight services. However, no freight traffics are currently carried at rates that cover their true long run avoidable costs. For most general cargo, the door-to-door services and low rates offered by road hauliers--the latter made possible in part by subsidized ADO and the absence of a sound road user charges regime--precludes Perumka winning business at rates that contribute towards fixed costs. Yet for those bulk traffics that are effectively captive to rail, most notably coal in South Sumatra, Perumka is unnecessarily providing services at below their cost.

3.22 To address the above problems, there is a need to review all regulated passenger tariffs at regular intervals, and to allow increases that permit revenues to cover at least the long run avoidable costs of their

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<sup>8/</sup> Expenditures on these facilities are made through the Government's Development and Routine Budgets (DIP and DIK) and accrual accounting is not employed.

provision. Any subsidies should be very carefully targeted to ensure that they serve only basic transport needs of the lowest income groups. In parallel, steps need to be taken to reduce costs of service provision by improving efficiency, and in the urban bus transport subsector, to relax controls over entry so as to allow new private operators to compete to provide the types of high standard services that would be viewed as acceptable by those who currently use their own vehicles. Perumka's ability to survive as a Perum will depend upon its ability to raise the fares for its intercity economy class services and the rates for its main bulk freight traffics to levels that at least cover their avoidable costs. This will not be possible for Perumka's urban rail services in Jabotabek--although here continuing efforts are needed to reduce the very high levels of fare evasion--and consideration should be given to separating the accounts for these from those for other rail services.

### Water Resources

3.23 Urban/Industrial Water Supply. Current arrangements for pricing water for non-agricultural uses raise three basic issues that need to be addressed: the average price and the cross-subsidization of piped water between domestic and non-domestic (industrial and commercial) uses; the relative cost of groundwater; and enforcement of groundwater licensing and charges.

3.24 Most public water is at present not priced at its full cost of delivery. An important reason for this has been the practice to transfer many new public water systems following construction and initial operation to semi-autonomous local water authorities (PDAMs), but without transferring the related debt-service costs. This has led many PDAMs to set average tariffs at a level that recovers only O&M costs. For subsequent investments in system expansion, PDAMs must either seek equity financing from local governments or borrow from the central government, which many have. However, most of them have continued the general practice of pricing water at the level of O&M costs only, and are, as a result, facing difficulties in meeting their debt service obligations. A 1988 study found that, of the 163 PDAMs examined, 116 did not have full cost recovery, including 30 which had revenues even less than direct operational costs--in most cases caused by delays in adjusting tariffs to cover increases in these costs.<sup>9/</sup> Accordingly, there is a need to raise the average tariff on urban public water supply, especially tariff rates for residential consumption, not only to curb excessive consumption and waste induced by pricing below cost, but also to safeguard the financial viability of PDAMs. Of equal importance is a vigorous effort to reduce costs by lowering the proportion of unaccounted for water (UFW). Reducing UFW will mitigate the tariff increases needed to achieve full cost recovery.

3.25 While PDAMs set the water tariffs in their areas, their decisions are influenced by national guidelines developed by the responsible central agency (DGCK). Based on a set of progressive tariffs, the national guidelines require PDAMs to recover depreciation, interest and O&M costs. The national tariff structure is unduly complex, comprising 15 categories of customers, with most of these categories in turn containing four progressive rates (Annex Table 4).

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<sup>9/</sup> See Indonesia: Support Study for Master Planning for Water Supply Subsector Policy, Government of Indonesia, Ministry of Public Works, Directorate General of Human Settlements, September 1988.

Under this structure, tariffs to residential customers are heavily subsidized by much higher charges imposed on industrial and commercial consumers; in major urban areas, the latter are several-fold higher than the former and in some cases significantly exceed the supply costs (see Annex Table 5 for the actual pattern of cross-subsidization between domestic and industrial tariffs in 11 major urban areas). The tax on industrial and commercial consumers is appropriate to mobilize resources needed to expand piped water. But major changes are needed in the tariff policy for residential consumers. The residential subsidy is poorly targeted; it disproportionately benefits the better-off who can afford the high connection charge, set above installation cost in some areas, and who consume water more heavily--the rates are subsidized even at relatively high levels of residential consumption. The intended equity objectives would be better served by: (a) targeting the residential subsidy at lifeline consumption levels (say, 5 cubic meters/month); (b) reducing the connection charge for the poor to actual cost; (c) allowing installment payments spread over 5 years for the connection fees to low income households; and (d) eliminating subsidy at higher levels of consumption.

3.26 Increased reliance on private groundwater extraction is an efficient means of meeting growth in the demand for water where it entails lower economic costs than public piped water and groundwater resources are plentiful. However, tariff policies favoring this source risk inefficient extraction of groundwater--only a partially renewable resource--at unsustainable rates where water is scarce. The latter is indeed the case in some major urban areas, notably in Jakarta where groundwater extraction is believed to be running well beyond sustainable levels. In contrast to the high tariffs on piped water for industrial and commercial use, fees for groundwater extraction are generally very low. In areas of plentiful groundwater resources, low fees sufficient to cover the administrative costs of licensing may be justifiable. However, as groundwater becomes scarcer, as in many urban areas, extraction fees need to be raised to reflect the increasing cost and scarcity of the resource and to align these fees with tariffs on piped municipal water.

3.27 The distortion of incentives resulting from the underpricing of groundwater is exacerbated by weaker enforcement of groundwater charges. In principle, licenses are issued for groundwater extraction, the rate of extraction is metered and fees are levied on water use. In practice, however, these are not effectively enforced. Unlicensed drilling and undercollection of fees are common, encouraging wasteful use of the resource. It has been estimated that up to 75 percent of groundwater drilling and extraction are done outside the official licensing and fee system. Accordingly, appropriate adjustments in groundwater charges need to be accompanied by measures to ensure more effective enforcement.

3.28 Irrigation Water Supply. A significant part of the emerging water shortage in the country could be addressed by improving the efficiency of water use in irrigation. The costs of supplying irrigation water are sizable; the cost to the Government of supplying irrigation water to farms in Java was recently estimated at about US\$ 110 per ha/year.<sup>10/</sup> There is also an opportunity cost involved in diverting scarce water from other uses. Yet,

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<sup>10/</sup> World Bank, Indonesia: Sustainable Development of Forests, Land and Water, World Bank Country Study, 1990.

publicly provided irrigation water, which covers over 80 percent of the irrigated area, is provided virtually free of charge. The absence of a price signalling the costs of supply to farmers is a major cause of inefficient use of irrigation water at present. With virtual free provision, the public subsidy involved is large; total subsidy on irrigation water amounted to Rp. 4.8 trillion during Repelita IV and is currently estimated at about Rp. 1.0 trillion per year.<sup>11/</sup> This makes irrigation water the most heavily subsidized agricultural input, appreciably exceeding the subsidy on fertilizer, the other major input subsidized by the Government.

3.29 The Government has introduced an irrigation service fee in some provinces on a pilot basis, which is aimed at recovering O&M costs. This would contribute to improving system efficiency by supporting better maintenance, and would reduce the public subsidy. However, the fee is a lump-sum charge, not linked to the volume of water used. As such, it would not create the incentives necessary for users to improve the efficiency of water consumption; instead of being based on a price mechanism, farmers' water consumption would continue to be determined by their own actions and the administrative decisions of provincial irrigation committees. Nonetheless, the introduction of the fee represents an important first step toward establishing an appropriate pricing regime for irrigation water. As the next step, the fee needs to be extended nationwide. At the same time, consideration should be given to developing the fee into a broader, volume-based user charge for irrigation water.

3.30 The expense and technical difficulty of metering water usage of individual farmers have deterred many developing countries from attempting to institute volumetric user charges. However, it is not necessary to levy strict volume-based charges for irrigation water. Instead, there are measures that can provide a reasonably good approximation to volumetric pricing. On this basis, several developing countries do charge for water based on volume; examples are China, India, Pakistan, Morocco, Tunisia and Mexico.<sup>12/</sup> One approximation that can be considered is to distribute water to farmers by rotation, with the number of irrigation "turns" farmers receive or the length of irrigation time forming the basis of the charge. In addition, if farmers are allowed to trade irrigation turns, that could lead to equalization of the value of water to its marginal cost. If water supply can be maintained on a regular basis, this pricing mechanism could serve as an effective means of managing demand and providing incentives to farmers to use water efficiently. Such a mechanism is being employed in parts of India, Pakistan and Mexico.<sup>13/</sup> If implemented in Indonesia, it could potentially recover O&M costs as well as a part of irrigation capital costs. Since owners of irrigated farms are relatively well-off, such charges would not raise concerns about adversely affecting the poor. Other schemes such as wholesaling water to a

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<sup>11/</sup> Varley, R., Irrigation Issues and Policy in Indonesia: 1968-88, Development Discussion Paper No. 322, HIID, Cambridge, MA, 1989.

<sup>12/</sup> See Repetto, R., Skimming the Water: Rent-Seeking and the Performance of Public Irrigation Systems, Research Report No. 4, World Resources Institute, Washington, D.C., 1986.

<sup>13/</sup> Ibid.

group of farmers, e.g., at secondary or tertiary canal levels, and instituting charges among the users with effective enforcement through peer pressure, could also be considered.

### Pricing Policies and Private Provision

3.31 While the foregoing discussion has focused on the pricing of publicly provided infrastructure services, the same principles as noted above apply to the pricing of these services when provided by the private sector--e.g., allocational efficiency requires marginal cost pricing in both cases. A key question, however, is the government's role in pricing privately provided services. This would depend on several factors, such as the degree of competition in the market for the service, the relative roles of the public and private sectors in providing that service, and the need to accommodate objectives other than pure economic efficiency, e.g., protecting the poor. This issue is discussed below with reference to three types of situations that are particularly relevant to present or prospective participation of the private sector in the provision of economic infrastructure services in Indonesia.

3.32 First, for services for which a competitive market is feasible, and for which no subsidization is called for, there may be no need for any regulation of prices. In such cases, price determination could be left wholly to market forces. Accordingly, tariffs for a number of infrastructure services could be freed from public controls, including, for example, specialized telecommunication services (cellular mobile phones and VSAT services), terminal equipment, telex and radio services, and all types of infrastructure services provided in industrial estates and similar specific commercial locations. In addition, existing public enterprises providing such services should be fully commercialized or privatized. For these services, rather than exercise specific price controls, the role of the government could consist of ensuring, through appropriate antitrust provisions, that competition is not undermined by unfair, collusive practices among a few big companies.

3.33 Second, a mix of market determination and government regulation may be necessary for services that can potentially be provided competitively by the private sector but for which some subsidization of part of the service, for the benefit of the poor, may be desired. Urban passenger services are a case in point. The Government may desire to control prices for certain well-targeted, basic passenger services to ensure that they remain affordable to the poor. Prices for higher classes and types of service could be fully deregulated. By charging sufficiently higher prices for these superior services, private companies may be able to offset the cost of subsidizing basic services. If not, the Government may need to fund the subsidy, or else provide the subsidized service itself.

3.34 Third, in the case of services for which--because of "natural monopoly" characteristics--the public sector is the dominant provider, the price is necessarily determined by public regulation; however, if the regulated price is set efficiently and in a transparent way, it would encourage greater private participation in the provision of these services in a manner complementary to the role of the public sector. Examples of such complementary private participation are power generation to supply the PLN grid; long-distance telecommunication services; and berth operations in ports. Since the

public sector is the dominant provider and controls access to the distribution network or the major physical facilities, its LRMC evaluated at true market prices of inputs and finance furnishes the basis for regulating prices for the private sector. In the case of power generation to supply the PLN grid, the private sector price needs to be set in relation to LRMC specific to power generation (i.e., excluding the costs of transmission and distribution). In the case of long-distance telecommunication services and berth operations in ports, the private providers could directly charge users the LRMC-based prices and be required to pay "network" access charges to the telecommunications distribution agency (TELKOM) or the port authorities for the costs to the public agencies of providing access to the local telecommunications network or the general port facilities.

### C. Improving O&M of Infrastructure: Issues and Strategy

3.35 Adequate funding and implementation of operations and maintenance (O&M) activities are necessary to secure a satisfactory return on past investment in infrastructure; failure to provide required operational inputs or weaknesses in the execution of operations are reflected in the underutilization or inefficient use of infrastructure and a decline in the quality of associated services, while inadequate maintenance is reflected in accelerated deterioration of infrastructure and the need for frequent and costly repair or rehabilitation work. Similarly, the productivity of future capital investments would be influenced considerably by the adequacy of planning and provisions for the incremental O&M needs. In several cases, the need for new capital investment can be significantly reduced by improved O&M of existing infrastructure. Accordingly, an effective O&M strategy is an essential complement of an effective investment strategy for infrastructure development.

#### Recent Improvements in O&M Policies

3.36 O&M policies in Indonesia were reviewed in detail in a Bank report prepared during 1987/88; the report found major deficiencies in O&M management--both at the level of central planning and budgeting and at the operational level in individual sectors--and proposed an agenda for reform.<sup>14/</sup> Since then, the Government has made significant progress in several areas of O&M management. The importance of O&M has been articulated in high-level policy statements, notably the 1988/89 Budget Speech by President Suharto, promoting national recognition of the need to improve performance in this area. The build-up of a national policy according greater emphasis to O&M has been reflected in increased budgetary allocations to these activities in recent years. In the development budget, the share of maintenance and rehabilitation works in DIP allocations, that finance development expenditure by central government departments, has risen in several sectors, e.g., in irrigation and road transport; and INPRES transfers that finance many O&M activities carried out by regional governments have been increased appreciably. O&M activities are also receiving stronger emphasis in the allocation of resources in the routine budget, and procedures have been modified to facilitate O&M financing

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<sup>14/</sup> World Bank, Indonesia: Selected Issues of Public Resource Management, Report No. 7007-IND, 1988.

by allowing greater flexibility to agency and program heads in moving funds across routine budget categories.

3.37 Alongside increased budgetary allocations, actions have been initiated to strengthen the institutional framework for O&M management. In some sectors, including irrigation, water supply and other urban infrastructure, and rural roads, action plans to improve O&M have been formulated, with the help of donor agencies. These action plans seek to rehabilitate deteriorated infrastructure and upgrade regular O&M activities, both through alleviating funding constraints and through streamlining institutional arrangements and building absorptive capacities of the relevant agencies, especially at the provincial and local levels. Steps have been taken to clarify institutional responsibilities and promote inter-agency coordination in the development and maintenance of urban infrastructure. The framework for the planning and budgeting of maintenance and rehabilitation works on national and provincial roads has been improved with the development of a computer-based road management system. In irrigation, O&M plans and needs-based budgets are being institutionalized. Moreover, actions have been taken to improve cost recovery in some sectors, including the recent introduction of an irrigation service fee on a pilot basis.

### The Future Policy Agenda

3.38 The steps taken so far represent the beginning of a significant effort to improve the funding and implementation of O&M. The magnitude and complexity of the O&M problem require that this effort be increased and sustained over a number of years. The sources of the O&M problem are multiple, encompassing financial, structural and institutional factors. While some of these factors are sector-specific in their effect, others have systemic implications. Also, while some of the causes are amenable to short-term correction, e.g., financial policies, others can take much longer, e.g., institutional constraints. Accordingly, policies to improve O&M management need to be cast in the framework of a broad-based strategy, with a medium-term horizon. Main elements of such a strategy are discussed below, and summarized in Box 3.2.

3.39 Adequacy of Funding. While budgetary allocations to O&M have been increased in recent years, substantial additional resources will need to be provided to finance the large backlog of deferred maintenance resulting from past underfunding, support current O&M requirements, and provide for O&M relating to planned new investments. The resources required to fund the backlog of special maintenance and rehabilitation in the roads and irrigation sectors alone were estimated at Rp. 6 trillion (about one-fifth of general government consolidated expenditure and 5 percent of GDP) in 1988. Moreover, the increase in government spending needed to adequately meet the year-to-year O&M needs of these sectors, together with those of buildings and education and health services, was estimated at about Rp. 1 trillion (about 1 percent of GDP) in the same year, with an equivalent additional spending estimated to become necessary as the aforesaid rehabilitation works were completed.<sup>15/</sup> While

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<sup>15/</sup> These estimates were made in terms of 1986/87 prices; see World Bank, Indonesia: Adjustment, Growth and Sustainable Development, Report No. 7222-IND, 1988.

**Box 3.2: MAIN ELEMENTS OF O&M POLICY AGENDA**

**Adequacy of Funding**

- Maintain the recent reorientation of budgetary allocations to accord due priority to O&M.
- Strengthen cost recovery policies (see Box 3.1).
- Bolster resource mobilization at the local level, through both stronger cost recovery and tax effort.

**Planning and Budgeting Framework**

- Reduce fragmentation of responsibilities and sources of funding for O&M through clarification and consolidation of roles and funding channels.
- Improve coordination among responsible agencies at central and sectoral levels.
- Restructure budgetary classification of expenditures to facilitate identification of the magnitude and composition of O&M outlays.
- Review criteria for allocating transfers (INPRES grants) to regional governments in order to achieve better correspondence between the resources provided to regions and their O&M responsibilities and needs.
- Broaden the medium-term expenditure planning framework to include O&M implications of current and planned investments; to underpin this, strengthen project evaluation procedures to incorporate downstream O&M requirements.

**Sector Strategies and Policies**

- Prepare O&M strategies for individual sectors to serve as the framework for formulating coherent sector-specific policies: these strategies would assess sectoral O&M needs and priorities; evaluate adequacy of funding and available options; establish an agenda of major policy and institutional actions; and develop tools such as unit O&M costs of different activities to strengthen the basis for O&M planning and performance evaluation.
- Strengthen sectoral O&M data bases, especially the preparation and updating of asset inventories.

**Institution-Building**

- Decentralize responsibilities to local governments by enhancing their financial and administrative capacities.
- Enhance planning and implementation capacity of the Central Government through civil service reforms.

the assessed resource requirements for improved O&M are sizable, the actual increase in spending would, of course, need to be phased in, in line with the build-up of requisite institutional capacities. To ensure that adequate resources are made available to fund O&M activities as the capacities for efficiently implementing these activities expand, a three-pronged approach would be needed. First, the recent reorientation of budgetary policy to accord due priority to O&M would need to be maintained. Second, cost recovery policies need to be strengthened, as discussed in the preceding section; these should finance an increasing proportion of the O&M needs. Third, resource mobilization efforts at the local level, where the underfunding of O&M has generally been the severest, should be increased. In addition to improved cost recovery, this should include exploring ways to increase local tax revenue to support a general strengthening of local government finances.

3.40 Planning and Budgeting Framework. There are several aspects of the overall planning and budgeting framework that hamper effective O&M management. There remains considerable fragmentation in the allocation of responsibilities

and the sources of funding for O&M. The planning and implementation responsibilities are in many cases widely dispersed among agencies, with lines of division between them often blurred. The irrigation sector is a case in point. Six central agencies (the Ministries of Agriculture, Public Works, Finance, State Apparatus, and Home Affairs and BAPPENAS) play significant roles in the allocation of financial and manpower resources in the sector. Much of the responsibility for the implementation of programs rests at the local level, in the hands of provincial and district authorities, with water users associations (WUAs) acting as additional participants. Such dispersion of responsibilities makes the development and implementation of a coherent and coordinated approach to O&M especially difficult. The situation is further complicated by the fragmentation of funding across different sources. In the central budget, funding for O&M is provided through multiple channels: the routine budget; lump-sum SDO salary grants to regional governments; and DIP allocations and INPRES transfers to regional governments--with the latter split between block and sectoral grant programs--in the development budget. The allocation of transfers among the regional governments is based largely on population size. These governments, which carry a large part of the responsibility for O&M implementation in most sectors, supplement these resources to varying degrees with user charges and local taxes. Given the fragmented structure of the central budget, the criteria used for allocating transfers, and the relatively weak revenue generation at the regional level, total resources potentially available to the regions for supporting O&M activities may bear only limited relationship to their responsibilities and needs.

3.41 In addition to the fragmentation of O&M funding across different budgetary channels, coordinated budgetary planning is complicated by the lack of transparency in the classification of expenditures in the budget, which obscures the purpose for which the expenditures are intended. For instance, it is difficult to identify the O&M component of many outlays, both in the routine and development budgets, and also to decompose O&M outlays into major inputs, e.g., salaries, materials and supplies, etc. Moreover, the sectoral allocation of several categories of expenditures in the budget is unclear. As such, the present classification of budgetary accounts hampers the assessment of the adequacy of resource allocation to O&M, both overall and within sectors, and the balance between various O&M inputs.

3.42 The planning and budgeting of O&M activities are also constrained by the lack of systematic attention in current medium-term expenditure planning to the O&M implications of ongoing or planned investment projects. The five-year development plans do not systematically incorporate the O&M requirements associated with the program of investments, nor are these requirements separately forecast as part of the Government's general medium-term fiscal planning. In most cases, project evaluation procedures do not assess the subsequent financial and personnel requirements of the project. In the absence of a medium-term planning framework incorporating O&M expenditures, projects and programs can be undertaken without adequate knowledge of, and programming for, their O&M requirements, risking unbalanced growth of new investments and resources for their operation and upkeep.

3.43 The above points to the need for significant reform of the planning and budgeting framework to underpin improved O&M management. First, there is a need to improve coordination among the various agencies involved in the

financing and implementation of O&M in a sector, and clarifying and consolidating responsibilities where they may be blurred or excessively fragmented. At the central level, improved coordination is needed among the agencies responsible for allocating resources for O&M: namely, Finance; BAPPENAS; MENPAN; and Home Affairs, which carry responsibilities for the routine budget, the development budget, allocation of staffing, and INPRES allocations, respectively. At the sectoral level, coordination needs to be improved between line ministries and regional governments sharing responsibilities for O&M planning and implementation. Second, the structure of the budget needs to be improved. This would focus on two objectives: reducing the fragmentation of funding through consolidation of the existing multiple budgetary channels; and improving the classification of expenditures to allow clearer identification of the magnitude of O&M outlays and their composition by sector and input. Third, in order to achieve better correspondence between O&M responsibilities of regional governments and the financial resources made available to them, the criteria for allocating INPRES transfers needs to be reviewed to better reflect differences in regional requirements. Fourth, medium-term expenditure planning, currently focused on investments, could be broadened to include recurrent expenditures. This would provide an improved, more comprehensive planning framework for evaluating expenditure priorities, given resource availabilities; it would enable policymakers to explicitly take account of the O&M implications of new investment outlays, strengthen their ability to assess the appropriate pace of investment. To support such a planning framework, project evaluation procedures should be strengthened to include downstream O&M requirements.

3.44 Sector Strategies and Policies. At the sectoral level, the planning, funding and implementation of O&M activities can be improved by developing well-defined O&M strategies to serve as the framework within which annual sectoral programs can be formulated in a coherent fashion. As noted above, the development of O&M strategies has already been initiated in some sectors. This work needs to be satisfactorily completed and similar work initiated in other sectors. BAPPENAS could help by providing guidelines, establishing a timetable, and coordinating the effort. The sector strategies should: indicate the roles played by operations, routine and periodic maintenance, and rehabilitation in addressing sectoral objectives; for activities financed primarily by the government budget, establish guidelines or norms defining unit costs and personnel requirements of different sectoral O&M programs, to serve both as benchmarks for planning and as performance standards for supervision; evaluate the adequacy of current O&M funding levels, the funds required to rehabilitate deteriorated infrastructure, and the additional O&M implications of both new and rehabilitation investments; assess the O&M implications of non-investment related policy targets, e.g., improvements in operational efficiency and the quality of service; review sectoral cost recovery mechanisms and propose improvements; identify actions needed to enhance institutional O&M capacities, particularly in regional governments; and examine the desirability and feasibility of transferring some O&M functions to the private sector. The development of these strategies should be supported by strengthening the sectoral O&M data base, in particular the preparation and periodic updating of sectoral asset inventories.

3.45 While O&M problems are widespread, the nature and extent of the problems vary across sectors. The proposed sector strategies would address a broad range of O&M issues in developing a comprehensive sectoral planning and

policy framework, but there are some issues in individual sectors that will deserve particular attention. Some key O&M issues in the four major infrastructure sectors reviewed in this chapter are set out below.

3.46 In the water resources sector, there are major O&M issues in both irrigation and urban/industrial water supply. In irrigation, weak O&M are reflected in many indicators: the operational efficiency <sup>16/</sup> in some systems may be as low as 25 percent, about half of what should be possible; of the estimated 1.5 million hectares of irrigation systems rehabilitated over the last 15 years, only a third are in a suitable condition for efficient O&M; and irrigation systems often have a life of 5-10 years instead of 15-20 years assumed at the planning stage. Improved O&M management in the sector would require emphasis on the following: increasing the funding for O&M, through higher budgetary allocations of improved cost recovery (e.g., the development of the irrigation service fee noted above); further improving the balance between new investments and O&M and, within the subsector O&M budget, between rehabilitation/special maintenance and routine maintenance; reducing the administrative overheads of the subsector O&M budget (only about half is estimated to be currently spent at the field level); reducing the fragmentation of planning and implementation responsibilities among the subsector agencies, and improving the organizational set-up of Provincial Irrigation Services (PRIS) and the agencies at the local level; and better defining the role of WUAs in irrigation O&M and more effectively integrating them in the subsector.

3.47 Weaknesses in O&M in urban/industrial water supply are exemplified by the relatively low efficiency of public piped water systems--unaccounted for water is estimated at 43 percent nationally and even higher in Jakarta--and poor enforcement of policies on groundwater drilling and extraction. Key factors underlying these problems are the weak financial position and institutional capacities of the responsible local institutions. A strategy to improve O&M in the subsector would need to include, among others, the following: strengthening the financial position of the local institutions responsible for the O&M of public piped water systems, i.e., PDAMs, through improved cost recovery policies, along the lines discussed earlier; making the process of providing government grant and loan financing to these institutions more systematic; strengthening the accountability of these institutions and bolstering monitoring and reporting systems; developing the operational and financial management capacities of subsector agencies, especially PDAMs; considering the consolidation of PDAMs at the regional or provincial level, instead of district level, to take advantage of administrative and operational scale economies; and considering combining the management of surface and groundwater systems under one agency, to facilitate more effective policy formulation and implementation.

3.48 In the transport sector, the more serious O&M issues relate to the road and railway network. In the roads subsector, studies undertaken a few years ago indicated that about half of the national and provincial road network had major surface distresses, while only a third of district roads were in fair

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<sup>16/</sup> Defined as percent of total flow within a system that is used for cropping.

condition.<sup>17/</sup> In recent years, however, maintenance of roads, especially national and provincial roads, has improved with the reorientation of budgetary allocations toward road maintenance, supplemented by better planning and implementation of maintenance works with the adoption of the new road management system mentioned earlier and an increasing use of maintenance by contract. But several areas remain to be addressed effectively, especially concerning district roads. Moreover, O&M management remains weak in railways (Perumka) and urban bus services (Perum PPD), which is reflected in the poor quality and dependability of services and poor utilization of assets. Areas of emphasis in O&M management in the road and railway network would include: improving the quality of the road data base to support the new management system, and extending the benefits of this system--and of contract maintenance--to district roads; strengthening the technical and managerial capacities of district public works departments (DPUKs), which are responsible for district roads; improving cost recovery in the use of the road network and urban bus and railway passenger services, as discussed earlier; improving the enforcement of regulations relating to vehicle weight and axle load, supplemented by adjustments in vehicle registration fees as proposed in the last section, to protect roads from the excessive damage inflicted by overloading of trucks; according priority in PERUMKA expenditure plans to reducing the large backlog of deferred maintenance on infrastructure and equipment, relative to the creation of new capacity; giving increased autonomy to public enterprises engaged in the transport sector, complemented by measures to strengthen accountability and performance review and encouraging the entry of private operators in urban bus services.

3.49 Compared to the water resources and transport sectors, O&M problems are less severe in the telecommunications and power sectors. The latter sectors are managed by autonomous public enterprises and, therefore, are relatively protected from the administrative and financial fragmentation in the other sectors that are predominantly managed by government departments. Moreover, the better O&M performance of these sectors is supported by their relatively stronger cost recovery policies. Nonetheless, there are areas requiring improvement in O&M management even in these sectors. The underlying weaknesses arise not so much from overall financial constraint as from imbalances in resource allocation between O&M and new investments, and from organizational and managerial shortcomings. For example, in the telecommunications sector, inadequate allocation by TELKOM to O&M is reflected in the relatively low quality of telephone service. While, overall, there is significant overstaffing in TELKOM, maintenance functions are understaffed and the maintenance workers lack proper training. The relatively low operational efficiency is also reflected in an underutilization of capacity, even in the face of sizable excess demand, and in relatively high average costs of service. Policies to improve O&M in these sectors need to focus on: a better balanced allocation of resources between O&M and new investments by the concerned enterprises; development of institutional capacities for O&M commensurately with system expansion; organizational and managerial improvements to raise

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17/ World Bank, Indonesia: Selected Issues of Public Resource Management, op.cit.

operational efficiency and the quality of service; and strengthening of incentives to improve efficiency through closer performance monitoring and increasing competition by exploring avenues for private sector participation.

3.50 Institution-Building. The potential gains from improved planning and funding of O&M can be fully realized only if the resources allocated to these activities are utilized efficiently and effectively, which is a function of implementation capacities. On account of both the shortage of skilled staff and weaknesses in institutional structures, these capacities in many cases are rather weak, especially at the regional government level. Addressing sector-specific weaknesses in institutional capacities would be a major element of sectoral O&M strategies, as discussed above. However, there are some problems of a more systemic nature that would need to be addressed at the national level. The main needs are to decentralize responsibilities to local governments by enhancing their financial and administrative capacities, and to augment the guiding and monitoring role of the Central Government. Civil service reforms, both in central and local governments are essential for these improvements. These are discussed in Chapter 5.

## CHAPTER 4

### THE PRIVATE PROVISION OF INFRASTRUCTURE SERVICES

#### A. Introduction

4.1 A carefully developed strategy for encouraging greater private provision, including network development, could play a major role in ensuring the efficiency and adequacy of infrastructure availability in Indonesia during the 1990s. Successful implementation of this strategy would: (a) reduce the financing requirement for the public sector; (b) ease implementation constraints on the public sector; and (c) contribute to overall efficiency of infrastructure provision by encouraging greater competition and allowing enhanced flexibility of supply. This Chapter discusses the objectives and rationale for private provision of infrastructure, and reviews an appropriate policy and institutional framework, and specific instruments, for encouraging private provision of infrastructure services in Indonesia.

4.2 Section B reviews the current role of the private sector in infrastructure provision. Section C outlines the main objectives and the rationale for encouraging a greater role by the private sector. Section D then discusses how these objectives could be achieved in practice in Indonesia's circumstances--through changes in regulatory policies and the institutional framework, and the application of a range of possible instruments--in power, telecommunications, transport and water supply.

#### B. Private Participation in Infrastructure in Indonesia-- The Current Situation

4.3 Power. The state-owned National Electric Company (PLN) is responsible for large-scale power generation and most distribution economy-wide. Private enterprises are actively involved in three areas: captive power generation in industrial plants, small-scale power generation and distribution in rural areas, and in contracting out of PLN services such as equipment installation, maintenance, and customer administration. By far, the most important role is in the provision of captive power in the industrial sector. Captive generation currently accounts for nearly half of the total installed capacity in Indonesia. About two-thirds of industrial power requirements were supplied through these captive power plants in the 1970s when PLN suffered serious capacity shortages. Despite the rapid growth in PLN's capacity since then, captive generation capacity has continued to grow. Since the PLN grid supply is more efficient and cheaper than diesel-based captive generation, this growth reflects the inadequate reliability of PLN's power supply and its inability to respond efficiently to new industrial load requirements. The main challenge for the 1990s will be to reduce the dependence on captive generation by developing an appropriate regulatory framework that will allow private sector participation in grid based power supply using efficient technology.

4.4 Telecommunications. The government owns almost all telecommunications facilities and is the monopoly provider of basic services. Domestic telecommunications services are provided by the state-owned enterprise TELKOM, and all international telecommunications services are provided through the state-owned company PT. INDOSAT. Manufacturing of telecommunications equipment is dominated by a third state-owned enterprise, PT. INTI. However, there is limited private sector participation in providing services through revenue-sharing agreements with TELKOM. These include: cellular mobile radio telephone services and satellite network telecommunications services. New telecommunications legislation passed in 1989 modified TELKOM's domestic monopoly to allow provision of nonbasic services by private entities. A detailed regulatory framework for private sector participation in these services is now under preparation.

4.5 Transport. Government continues to provide and manage fixed facilities which are in the nature of public goods (such as the public road network) and those which serve the basic transport needs of communities (such as bus terminals, medium and small airports, small seaports and river terminals). Most other public sector fixed facilities are owned and managed by public enterprises, including seaports, airports, toll roads and ferry terminals. The private sector role in the provision of transport network has traditionally been limited to own-use facilities such as special industrial ports, private roads and airstrips, but this is now changing rapidly. Private consortia have demonstrated their capacity to participate in major network projects, notably through the construction and operation of toll roads and urban bus terminals under BOT (build-operate-transfer) arrangements. The first toll road involving private sector participation is now in operation while the first privately developed bus terminal is being constructed in Jakarta.

4.6 Public enterprises remain a major provider of revenue-earning transport services. In land transport, these include freight and passenger rail services and urban bus services. In maritime transport, there are three state-owned shipping lines which operate deep sea general cargo services, inter-island general cargo and passenger services, and bulk and other specialized services. In air transport, Garuda is the sole provider of long haul scheduled international services and, together with its daughter company Merpati, is the dominant operator of scheduled domestic services. The private sector has dominated provision of road transport services except for the principal urban bus services in major cities. The private sector is also the main provider of inland waterway transport services and shares the provision of inter-island ferry services. In maritime transport, the role of the private sector shipping lines has grown steadily during the 1980s, with the exception of the rapidly growing inter-island passenger market. Private companies have traditionally provided stevedoring services under the "landlord port" system, while INPRES 4/85 has permitted the emergence of a freight forwarding industry which is also dominated by private companies. In air transport, private operators have, until recently, played only a minor role in the provision of domestic scheduled services but have long been important operators of secondary, tertiary and specialized air charter services. Recent decisions to admit an additional domestic scheduled carrier (Sempati) and to allow private airlines to use jet aircraft on the longer domestic routes have enabled the private airlines to compete more actively with state-owned Garuda and Merpati.

4.7 Water Resources. The provision of water is largely in the public domain. Irrigation services are provided by the Government; municipal piped water is provided by a combination of the Central Government and local level public enterprises. In recent years, GOI has instituted a policy of turning over small public irrigation schemes to Water User Associations. Private sector is active in a major way in the extraction of groundwater. For example, in Jakarta, private groundwater extraction provides about four times as much water as the municipal piped water supply. The Directorate of Environmental Geology (DEG) in the Ministry of Mines and Energy is responsible for managing groundwater resources and issuing licenses for managing groundwater extraction. However, many private users circumvent these licensing requirements, and aquifers are being overdrawn.

4.8 It is clear that Indonesia already has made notable progress in encouraging private sector participation in many infrastructure services. The involvement in the provision of fixed facility (e.g., power plants, telecommunications network) is, however, relatively undeveloped and often inefficient (e.g., captive power plants). Given the growing demand for infrastructure services and the emerging constraints in the public sector to satisfy these requirements adequately, there is an important need for promoting a strong supportive role by the private sector in meeting the infrastructure challenge.

#### C. The Objectives and Rationale For Private Provision of Infrastructure Services

4.9 A combination of market failure considerations--pure public goods, externalities and natural monopoly--and the initial small size of the private sector, have led most developing countries including Indonesia, to rely heavily on the public sector to provide most basic economic infrastructure services. However, as Indonesia's economy and the demand for infrastructure services accelerated, the public sector's capacity to efficiently deliver these services has not kept pace. The constraints on public service provision have been caused by three principal factors. First, the public sector has taken on responsibilities for services that have gone well beyond the original justification for its role--by becoming a monopoly provider of many (power, telecommunications, air transport, railways), services and discouraging private sector entry, rather than concentrating primarily on those services that the private sector could not provide more effectively. The tests of market failure have not been applied rigorously in defining the role of public agencies in service provision. The absence of competitive pressures has hindered efficiency in service delivery. Second, public providers of services have been prone to managerial and administrative constraints, due to weaknesses in accountability, non-commercial objectives, and organizational, managerial and human resource constraints. Large public enterprises operating under such conditions and in a non-competitive market environment have tended to have lower efficiency of operations and slower pace of implementation of investment. Third, the decline of oil revenues and the resultant overall resource constraints has imposed an important additional restriction on new investment and service provision, especially given the large investment and O&M requirements in infrastructure.

4.10 International experience 1/ suggest that the private sector can play an important role in serving three main objectives: (a) improving the efficiency in service provision by introducing greater competition; (b) bringing in additional investment and financing, thereby reducing the burden on public finances; and (c) improving the managerial and technical skills for implementing complex infrastructure projects.

4.11 Efficiency. The relationship between efficiency and ownership is an old debate. The traditional argument is that private ownership ensures greater accountability to shareholders and hence better efficiency. But few would make such a strong case for greater efficiency based on ownership alone. Instead, international experience suggests that the private sector has some inherent advantages over the public sector--management flexibility and freedom of action, greater financial discipline and accountability to market forces, and the importance of profitability objectives 2/--that can lead to greater efficiency. Scattered cross-sectoral comparisons of private versus public efficiency (e.g. in financial institutions, power generation, maintenance of public assets, hospitals, sewerage services, urban bus services, etc.) suggest that the private sector may be substantially (e.g. 30-80 percent) more efficient than the public sector.3/

4.12 But the second factor that is seen to be increasingly decisive in determining efficiency is a deregulated and competitive market environment. World-wide experience with deregulation in the telecommunications sector is illustrative. Several countries have initiated major reforms and reorganizations of their telecommunications sectors over the past decade. They include among industrializing countries, Korea (competitive role for a second carrier), Malaysia (corporatization and partial privatization), Thailand (competition in value-added services, and a large build-operate-transfer project), Mexico (greater competition and privatization), Argentina (privatization and competition); and among developed countries, USA (break-up of private monopoly and competition), UK (privatization and competition), and

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1/ The Private Provision of Public Services in Developing Countries, Gabriel Roth, World Bank, 1987; The Private Provision of Public Services--A Literature Review, Elliot Berg Associates, for the World Bank, 1989; Restructuring and Managing The Telecommunications Sector, ed. Bjorn Wellenius et al., World Bank, 1989; Competition Policies For Industrializing Countries, World Bank, 1989.

2/ The economic argument for this rests on "principal-agent" problems, which are arguably much greater in public sector enterprises than in private sector ones. In developing countries, private ownership and management are closely linked; even when they are separated, as in large corporations in developed countries, there are other sources such as capital markets and banks which ensure fewer principal-agent problems than in public sector enterprises, which suffer from weak accountability to owners or institutional forces, political pressures, and multiplicity of commercial and non-commercial objectives in their operations.

3/ Elliot Berg Associates, op. cit.

New Zealand (privatization, competition).4/ To varying degrees, the deregulation measures have been accompanied by major improvements in efficiency, largely attributed to greater competition. Experience in Indonesia with maritime sector deregulation also provides strong evidence of efficiency gains (e.g. halving of freight rates, and better quality of services) from competitive markets and private sector participation.5/

4.13 Private Financing. The overall financing needs for infrastructure development in Indonesia are potentially enormous, and this is an important factor underlying the Government's rationale for private sector involvement. As pointed out in Chapter 2, economic infrastructure investment requirements to sustain an overall growth rate of about 6-7 percent per annum for the non-oil economy in Indonesia would significantly exceed the allocations provided in the past. Given overall public sector resource constraints and the need to protect other expenditure priorities (especially for poverty-related activities), mobilizing resources through greater private participation in infrastructure would be necessary. In particular, the private sector can provide incremental access to sizeable sources of capital from international capital markets in the form of equity and project-related (i.e. non-recourse) financing. Private participation can also provide a more convenient means for mobilizing internal resources (e.g., through the capital market) given constraints on public enterprises at the present time.

4.14 Private financing of large infrastructure projects under franchise has historically been important in developed countries in areas such as railways, power, ports, urban-transport, and water-supply. The major expansion of high-density road network in Europe in the 1960s and 1970s is a more recent example of the same approach. Faced with a choice of financing a costly road investment effort through the budget, or to lease out the roads on a toll basis (through concessions) and finance the projects through private capital markets, several countries opted for the latter and achieved a sizeable expansion of the road network within a relatively short period of time through a toll-roads/private concession system, as in France (4,400 Km.), Italy (5,066 Km.), and Spain (2,000 Km.).6/ More recently, the Build-Operate-Transfer (BOT) approach has been developed since the late 1970s as a way for developing countries with limited foreign borrowing capacity and budgetary restraints to acquire needed infrastructure.7/ The emergence of major international contracting firms, with their access to international capital and civil works capabilities, facilitated the process. BOT projects are underway in China,

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4/ International Experience in Restructuring The Telecommunications Sector, Annex 4 of Strategic Approaches To The Development of The Indonesian Telecommunications Services Sector, World Bank, 1991.

5/ Indonesia: Assessment of Impact of Deregulation Within The Indonesian Maritime Sector, World Bank, 1990.

6/ Toll Financing and Private Sector Involvement in Road Infrastructure Development, OECD, 1987.

7/ The Build-Operate-Transfer Approach to Infrastructure Projects in Developing Countries, World Bank, 1990.

Turkey, Pakistan, Philippines, and Thailand. The Indonesian government has already started on toll-road projects, and is beginning to invite BOT projects in several sectors.

4.15 Managerial and Implementation Capacity. The need to efficiently manage the delivery of services and speedily implement significant new capacity in road transport, power generation, and telecommunications in Indonesia is acute, given the growing shortages in services. Over the next decade, the implementation capacity rate of public sector providers of major services would need to nearly double over historical rates (i.e. average annual investment of \$13 billion a year, compared to a historical rate of about \$6.5 billion a year in the past 5 years) if reasonable targets for service expansion are to be achieved--this would be very difficult without bringing in private sector skills and participation.

4.16 Private participation could bring in much needed managerial, civil works and engineering capabilities. Infrastructure projects, such as major roads, power generation plants, telecommunications facilities, and modern ports call for efficient implementation of complex projects, requiring sophisticated management, financial, engineering and civil works capabilities to international standards. These human resource skills are in scarce supply in most developing countries. Private participation involving foreign partners can reduce these constraints.

4.17 Risks. To be successful, a program of private provision of services will require an appropriate and careful set of policies and instruments. Private sector participation runs significant risks in developing countries such as Indonesia, where the capital markets and term-financing markets are relatively underdeveloped, the legal system has gaps in handling complex commercial disputes and in protecting the public interest, and the public/institutional regulation of private monopolies is not well-developed. Four key areas of concern are: (a) private sector participation needs to be encouraged under transparent rules--the potential for transforming public monopolies to private ones are significant in the absence of clear, open, and competitive procedures by which private participation is to be decided, especially under natural monopoly conditions which characterize many infrastructure services; (b) the rationale for private sector participation in terms of expected additionality in efficiency or managerial and financial resources will need to be rigorously applied in designing and applying a particular framework of policies to encourage private participation--policies that do not achieve these ends run the potential risk of large hidden public costs (e.g. foreign indebtedness, government guarantees, high prices); (c) the government's institutional capabilities for ensuring expected gains from private participation, in areas such as promoting a competitive market, protecting the public interest and negotiating complex projects, are critical factors--weaknesses in such capacity can significantly reduce expected gains from private participation; and (d) given that the capital market in Indonesia is still relatively underdeveloped, policies to stimulate a growing and diversified capital market within a stable financial environment will be critical.

#### D. The Policy Framework For Private Provision

4.18 The possible policy instruments to encourage the private provision of infrastructure services in Indonesia can be grouped under two categories:

- (a) Where the service can be provided through competitive markets, the chief instruments are deregulation of public monopolies, changes in the regulatory framework to allow a competitive environment for substantial private sector entry, and possible privatization of all or part of public enterprises.
- (b) Where public monopolies are expected to remain the dominant service provider, leases, franchises, concessions, BOT schemes, and revenue-sharing arrangements are possible options.

4.19 A number of considerations would be important in deciding the appropriate choice of these options:

- the relative contribution of the option in achieving the stated objectives for private participation;
- the market structure underlying the infrastructure service; and
- the capacity of GOI to develop and implement the associated policy framework.

GOI would need to review the potential and constraints for private participation in each infrastructure sector and, on this basis, prepare action plans for improving the regulatory and institutional framework. Major options and issues are discussed below.

#### Encouraging Private Entry in Potentially Competitive Markets

4.20 Scope. The scope for enhancing the private sector's role is large in potentially competitive markets. Encouraging such a form of private provision of services would be the most important way of ensuring greater efficiency in service delivery, as well as the private financing of investment. Examples where the competitive provision of services by the private sector would be feasible are:

- Power Generation. Although power distribution is a natural monopoly, power generation is a potentially competitive activity. Private large-scale power generation exists in many countries, including the United States and several developing countries (e.g. Venezuela, Philippines, Chile and India). As noted, private generation of power is already substantial in Indonesia, but it is primarily for own-use in captive plants and is predominantly based on high-cost diesel-generation plants of relatively small individual size. Nevertheless, they could be economically used as a short-to-medium-term measure to supplement power supply through the grid-system to meet peak-load demands, and serve areas where PLN's grid-based supply might take time to achieve reliability. In rural areas, the private generation and distribution of power in specific locations is a potentially

competitive service. A much more significant longer-term measure would be to encourage private power generation to supply the PLN grid, especially for the Java system (see Box 4.1).

**Box 4.1: DEREGULATING ENTRY BARRIERS AND PROMOTING PRIVATE PARTICIPATION IN THE POWER SECTOR**

The most promising areas for the involvement of private investors in electric power are: (a) bulk power generation to supply the grid; (b) cogeneration by industry using low cost waste or by-products (bagasse, hot heavy stock from refineries); (c) power supply to industries in industrial estates; and (d) franchising for generation and distribution or distribution alone, in specific geographic areas such as Batan and Bintan islands for total supply and cities such as Jakarta, Bandung, Surabaya and Medan for distribution. In order to encourage investor confidence, rules that define the rights and obligations of the investor have to be formulated to augment the Electricity Act (No. 15/1985). One of the most important components of such rules would be the manner of determining the electricity price that will assure a reasonable return to the investors. Institutional arrangements to interpret and apply the rules in a manner that safeguard investor interests as well as the public good will also be needed. Suitable provisions for legal adjudication in the event of disagreement between the investors and the regulators would greatly enhance the climate for private investments. The regulatory environment for public as well as private sector enterprises in the sector should be largely uniform to encourage efficient growth of the entire sector by meaningful competition on level ground.

A possible reorganization that would permit significant private investments in power sector in the longer term would entail separating PLN's operations in Java into five semi-autonomous units. One of the units under this model would be responsible for all generation and the 500kV transmission facilities and would provide bulk electricity, at uniform rate, to four distribution units covering East Java, Central Java, Metropolitan Jakarta and West Java. The model would be similar to those that exist in the UK (CEGB plus Area Boards) and Thailand (EGAT plus MEA and PEA). The bulk generation unit should be allowed to set its bulk supply rates to the distribution companies to earn satisfactory return on investments when operating at acceptable standards of efficiency. The financial and operating results of such a unit could be put on a level comparable to the best accepted utility standards. Thereafter, the bulk generation unit could be separated from PLN and corporatized (PT Persero) or progressively privatized by offering shares to the public. With a strong record of financial performance and stable future prospects, such a company would be able to access local and overseas capital markets or enter into BOO/BOOT agreements without Government guarantees. The distribution units may need financial support to the extent that they need to maintain electricity prices at subsidized levels to satisfy the Government's social objectives. If such assistance is provided in a well defined and transparent manner, the distribution units could also develop into efficient commercial entities. Also, competition among such distribution companies in terms of performance indicators would promote greater efficiency. The pursuit of the proposed strategy could enable the Government to fund nearly a third of the total investments in the sector, consisting of all generation in Java and some distribution, by private investors.

- **Telecommunications.** While telecommunications network is a natural monopoly, there are at least three kinds of services where a competitive private sector role is possible--manufacture and supply of terminal equipment to end-users subject to standards; cellular telephone services, and specialized business services through VSATs and by accessing the existing network. Indonesia is already encouraging private sector participation, but the use of private services is still limited and competitive service provision is lacking. Private supply of equipment is permitted, but limited by the presence of a major public sector unit. Cellular telephone services and VSAT services are also provided by private sector companies, but are subject to revenue-sharing agreements and all assets are to revert to TELKOM after 10 years--not ideal conditions

for a competitive market environment. Going beyond these areas, there are considerable opportunities for opening up network access thereby allowing services to develop, such as a second long-distance domestic carrier (as in Korea) and expanding the role of INDOSAT (the long-distance public telephone enterprise) to provide certain domestic services.

- Transport services. The private sector has long been the dominant provider of road and inland waterway transport services and a major provider of shipping services. In Java and the other more developed regions, these industries are characterized by large numbers of relatively small operators, and standards of efficiency and service are generally quite good. More recently, the Government has expanded the role of private airlines by licensing an additional operator to offer domestic and regional international scheduled services and by relaxing restrictions on the use of jet aircraft. MOC is now actively promoting the participation of private companies in the development and management of public ports and airports, and in the provision of railway services. The potential efficiency benefits of private participation in such fields will generally be realized fully only if there is an adequate element of competition among operators, however, and in some important instances this currently appears unlikely. Thus for example, the proposal to allow one private group to develop and manage future container terminals at Tanjung Priok, Indonesia's principal port, threatens to create a de facto private monopoly at the hub of the country's non-oil export trade (see Box 4.2)

**Box 4.2: CREATING THE POTENTIAL FOR COMPETITION IN TELECOMMUNICATION AND PORTS SECTORS**

In the telecommunications sector, the provision of specialized services through the granting of licenses to two or more operators is likely to be more efficient, than the current system whereby license is provided to a single vendor under revenue-sharing arrangements with TELKOM. Another example is in the ports sector. Competitive provision of services is feasible and desirable by selecting at least two container service operators in competition with each other and with the public sector, within a single large port area (e.g., Tanjung Priok), rather than handing over the entire container operations to a single private service provider. This would have the advantages of allowing shippers a choice of terminals, establishment of competitive prices and quality of services, while permitting the Government to charge terminal operators for common services and obligations--e.g., long-term planning and investment in port facilities, navigation aids and harbor channels, and provision of services to general cargo shippers--obligations and costs that would remain in the public sphere which the private sector would be unwilling or unable to carry.

- Water Supply services are marked by decreasing costs and this is a natural monopoly sector with considerable public goods characteristics. The scope for private provision of such services in a deregulated and competitive environment is virtually non-existent.

4.21 Policy and Institutional Issues. The deregulation of entry barriers to private investment will require careful design of policies, and major changes in the role of public institutions. Indonesia's past experience in deregulating the maritime transport sector is illustrative--two packages of

reforms, one in 1985 and another in 1988, were necessary to make sweeping changes in the regulatory framework. Essentially, three main policy issues will need to be resolved in sectors where private investment is to be encouraged:

- the rules for private sector entry--a clear and supportive regulatory and legal framework will be essential to allow freedom of entry to the private sector under well-defined rules;
- pricing policies will need to be overhauled to allow an adequate return on investment, while promoting the efficiency of supply and demand (see Chapter 3 for details); and
- major changes will need to take place in institutional responsibilities for the sector--the sector ministries will need to shift their focus to providing an appropriate public policy and regulatory role; and the public enterprises that currently provide services will need to redeploy their resources to other areas (where their role would remain important), or will have to be reorganized.

4.22 The specific types of deregulation and institutional changes needed to encourage greater private participation will vary by sectors. An example of the application of these principles in the generation of power is provided in Box 4.1.

#### Private Participation in Natural Monopoly Sectors

4.23 Scope. Large capital costs, long-gestation periods and significant decreasing costs with scale characterize segments of many key infrastructure sectors--especially road networks, ports, railways, power distribution, telecommunications networks, and water production and distribution systems 8/--leading to "natural monopolies" in parts of these sectors. In addition, the weight of "public goods" characteristics of services in these areas are also large. Where such natural monopoly (and public goods) conditions prevail, the unregulated private provision of services provides no guarantee of greater efficiency in service delivery. In Indonesia, the private sector's ability to undertake long-term risks is limited, because the domestic capital markets and term-financing options are not yet well developed and the legal system has many gaps. Moreover, GOI's ability to regulate private monopolies is constrained by the lack of a sound policy framework in this area. As a result, the potential risks of private monopolistic behavior and economic inefficiency are significant. The Government will, therefore, need to adopt a cautious set of policies to encourage private participation in these activities.

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8/ Examples abound of decreasing costs with scale. In power distribution, it is almost always less costly to cover an area with one electricity grid than two or more overlapping ones. Telecommunications networks are subject to even greater economies of scale--because exchange equipment and long-distance cable are indivisible units whose costs fall with the number of subscribers. Road investments, large ports, railways, large-scale irrigation, and industrial/urban water supply services, all have similar characteristics.

4.24 However, there are many opportunities and options for encouraging the private provision of services especially in areas where cost-recovery is possible:

- concessions and franchises to the private sector to manage and run certain specific investments and services under public regulation, e.g. urban water supply, and electricity distribution;
- short-term contracting out, management services, and leases in a variety of public infrastructure service areas; and
- build-operate-transfer (BOT) or build-operate-own (BOO) schemes where private investment is encouraged in specific, divisible, infrastructure investments of a project type, e.g. toll-roads.

(a) Private Concessions and Franchises

4.25 Under private concessions or franchises, the public agency contracts with a private company not only to operate and maintain a service, and to bear the financial risks of doing so, but also to finance investment costs of the system and working capital. At the end of the contract--now often about 15-20 years--fixed assets return to the public authorities. In France, private water companies serve two-thirds of the population under concession and lease arrangements; in the U.K., the share was previously 25 percent, and the Government is now privatizing the rest. In the U.S., 25,000 investor-owned water-utilities make up 56 percent of the system.

4.26 Competitive Tendering and Indirect Competition. A strong element of competition needs to be built into franchising arrangements, to ensure greater service efficiency: through competition in the contract award procedures, and by introducing indirect competition between service providers. For example, in the urban water supply sector or in local electricity distribution schemes, while service provision in any specific area is a monopoly, the services of different local franchisees can be potentially compared to each other, establishing competitive benchmarks for measuring and improving their relative efficiency <sup>9/</sup> (see Box 4.3), even in natural monopoly sectors.

4.27 Effective Public Regulation. The most important requirement for efficient development of private concession systems in natural monopoly sectors is a sound public regulatory and institutional framework that ensures four main objectives: (a) clear public guidelines and procedures concerning the objectives of private participation and the norms to be observed in inviting, evaluating, negotiating, and concluding agreements--e.g. competitive public bidding to preserve the integrity of the concession award system; (b) protection of the public interest, especially by setting a framework for efficient pricing policies--e.g. the applications of economic cost and fair rates of return pricing principles; (c) changing the role of public institutions from one which involves direct service delivery to one which involves regulating the private delivery of services to serve the public interest; and (d) establishing well-defined legal remedies for observance of

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<sup>9/</sup> In France, there are 5 private water supply companies and municipalities are free to choose from these firms on a competitive basis.

**Box 4.3: POTENTIAL INDIRECT COMPETITION IN THE WATER SUPPLY AND ELECTRICITY DISTRIBUTION SECTORS**

If the Government adopts a policy of encouraging several private providers of bulk water supply or electricity distribution in different urban locations in Indonesia, it would potentially provide a benchmark for comparing performance and putting indirect pressures to improve service delivery and prices. Currently, the Government is considering involving the private sector in providing bulk-water supply through concessions and BOT arrangements in several locations--Umbulan Spring Bulk Water Supply Project; Lhok Seumawe Water Supply Project; and the Semarang Bulk Water Supply Project. In a Government sponsored study, 14 other possible locations were identified.<sup>1/</sup> The scope for creating substantial indirect competition in the private provision of water supply could therefore be significant in the medium to longer term, provided that these concessions are awarded through competitive processes. Similar potential for indirect competition would appear to exist for power distribution services, especially in major urban centers in Java.

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1/ See Private Sector Participation Study, for the Government of Indonesia, Ministry of Public Works, 1989.

contract terms and the protection of the public interest. In recent awards and/or proposals for such awards of private concessions in Indonesia, as in toll-road operation in Jakarta, BOO/BOT schemes in power generation, container berth operations in Tanjung Priok, and bulk water supply projects, none of these preconditions for a sound public regulatory and institutional framework have yet been established. In their absence, private sector participation in natural monopoly sectors runs significant risks--the result could be a high cost of service provision.

**(b) Contracting Out of Services and Leasing**

4.28 Service Contracts. Private management skills could be potentially very important in improving infrastructure service provision by public sector agencies--through improvements in civil construction contracting (discussed in Chapter 5); and through relatively short-term (e.g. 3-5 years) contracting out of services. There are important existing examples of such contracting out of services in Indonesia--(a) in the telecommunications sector, where exchanges and lines are installed by private contractors; (b) in the road construction and maintenance sector; (c) contracting out of bill-collection services (about 90 percent of all bill collections) in water supply in Surabaya; and water-revenue meter reading; and (d) village electricity cooperatives (KUDs) serving some 3,000 villages, mainly in Java, where the cooperatives handle metering, billing and light maintenance (Pola or Scheme 1) and/or installs housewiring as a contractor for the customer, with a license and a price schedule approved by PLN (Pola or Scheme 2).

4.29 The scope for extending such contracting out of services is potentially large--e.g. handling of urban refuse collection services and other urban services; operations and maintenance of water supply services and assets in rural and urban areas; maintenance of public buildings and assets such as rural roads; preparation of telephone directories; maintenance and operation of public phone booths and coinboxes; rural telephone cooperatives; and all types of public billing and collection services wherever a large number of

**Box 4.4: DIFFICULTIES WITH PUBLIC CONTRACTING PROCEDURES: SOLID WASTE MANAGEMENT (SWM) IN JAKARTA**

The apparently simple example of contracting out of private sector services in SWM in Jakarta illustrates the potential problems that lack of effective public regulation and public contracting procedures can cause.

Solid-waste management is a key urban public infrastructure service. Transportation of waste from local collection centers to final disposal sites is the responsibility of the municipality, DKI-Jakarta, and is the weakest link in the SWM cycle. Many areas are not served with secondary collection or collection depots are not emptied--leading to disposal of waste at informal dumps, with major consequences for surface and groundwater pollution. An added problem is that current final dump sites are nearing exhaustion, and new dump sites proposed will increase the distance for secondary transportation of waste to 25 km from the collection points. The main reason for poor secondary SWM services have been the inefficiency of municipal transportation services--poor maintenance of fleet (e.g. trucks last for 3-4 years) and low utilization of vehicles (only one shift is operated and only 2 trips per shift are completed).

Faced with this problem, secondary solid waste collection and transportation and street-cleaning services for 8 city-center areas (kelurahans) and the Monas Square were contracted out in 1988 to 5 private companies. Although the initiative was widely welcomed, and is generally thought to have been a major success in improving services in the selected areas, the costs of private service provision have been high--according to an evaluation report prepared by DKI, about 20% higher on average than city-wide costs of DKI. The private performance standards may have been high, therefore leading to higher costs. However, there were two problems: (a) the contracts were granted on a non-competitive basis--encouraging high costs; the agreed price was the contractors' estimate of cost plus ten percent profit margin; and the length of contracts was 1 year--inadequate for significant private investment and efficiency; and (b) no effective regulatory role was established for DKI or for any other agency to set performance standards, efficient pricing policies and efficient contracting arrangements.

Based on the experience gained, new arrangements are now being made for DKI to shift to an effective public regulatory role, to reduce the cost of private services and to improve service efficiency. DKI is now expected to establish competitive bidding procedures, and set clear task responsibilities, service standards, performance criteria, and financial and legal obligations for private sector operators. In addition, the pricing formula is being changed to a more efficient one (e.g. a performance based one--a fixed sum plus unit charge for waste quantities collected and actually disposed); and the contract period is to be extended to 3-5 years.

customers are served by public agencies, as in the telecommunications and power sectors. Improved and competitive tendering processes, and a shift in the role of public sector agencies, as in the case of concessions and franchises, (see Box 4.4) would be key to obtaining potential benefits of contracting out of services.

4.30 Leases. There is also substantial scope for medium-term leases (i.e. for a term of about 5-10 years, as opposed to long-term concessions for 15-20 years)--whereby the private sector takes a renewable lease over public capital assets, bears the responsibility for maintenance of the capital assets, provides working capital, and delivers services at agreed prices and service standards. This instrument has the potential for improving services and reducing the management burdens on public agencies, without the problems posed by private ownership or long-term concessions. Potentially, this could involve services in areas such as water supply services, public warehouses and public industrial estates. Few such leasing arrangements have been made in Indonesia;

a small component is under implementation in a Bank supported project to lease out trucks by the Jakarta municipality to private refuse collection contractors.

(c) BOO/BOT Projects

4.31 A specialized form of private financing of large infrastructure projects in developing countries is BOT projects. It is essentially the same concept as concessions, but restricted to specific, divisible infrastructure investments of a project-type. The title explains the scheme: private capital builds, owns and operates (BOO) and sometimes transfers (BOT) to the state, after a given period, roads, bridges, power plants, water supply and other facilities.

4.32 The Government has now invited proposals for BOO/BOOT plants in power generation, toll roads, and water-supply projects. A number of issues arise in this context to ensure that the proposed participation of the private sector through this route will lead to the desired economic and financial benefits:10/

- First, the BOO/BOOT concept (and its variants 11/) is a type of financial arrangement that enables a project company to be established by sponsors, typically construction companies, who put in small equity but principally obtain the bulk of financing (70-90 percent) from commercial lenders on a non-recourse basis (i.e. repayment liabilities do not rest with the sponsors or the host government, only against the project company and its assets and related contractual rights of the company).
- Second, although the attractiveness of the proposal rests primarily with private sector financial participation, without any need for financial commitment from the host government, in practice, BOOT projects of a significant size have not been possible in any developing country without extensive host government support, including financial support. The Government would therefore need to determine how much and what kind of support would be desirable.
- Third, the process of developing a BOOT project is complicated, time consuming and expensive--a recent project proposal in another developing country apparently cost the private sponsor \$7 million and five years and yet the project did not materialize. In Indonesia too, many proposals have been waiting for several years now. These

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10/ These issues related to BOOT projects are derived from a paper: The Build, Operate, and Transfer ("BOT") Approach to Infrastructure Projects in Developing Countries, Augenblick and Custer, PRE Working Paper, World Bank, 1990.

11/ The principal variants are build, own and transfer (BOT) or build, operate and transfer (BOT) which are used interchangeably with BOOT; build, own and operate (BOO) without any obligation to transfer; build, rent and transfer (BRT); and build, own, operate, subsidize and transfer (BOOST).

expenses and delays inevitably add to the costs of a project, when finally approved, and the Government should develop specialized institutional capability to deal with complex project proposals more efficiently.

- Fourth, one of the key challenges to be met in a BOOT project is how to provide adequate security to non-recourse or limited recourse lenders, especially because the project company has limited commercial interest outside the sector. Such security arrangements typically involve special commercial arrangements to protect lenders, as well as substantial host government support in terms of legislation, where required; logistical support; assured revenues; explicit tariff or pricing formula based on input and operating costs; loans and equity contributions from the government; legal, regulatory and fiscal assurances; government coverage against project related risks, force majeure risks, inflation risks, currency convertability assurance and foreign exchange risk; sovereign guarantees in some form or another; and protection against competition. Given the Government's interest in promoting BOOT projects, a "standard" security package to be offered could be developed so as to facilitate the process, preferably differentiated by each major sector since characteristics of typical projects will vary by sector.

4.33 These potential difficulties with BOO/BOT projects suggest that: (a) overall financial cost of such projects could be significantly greater than if they were financed directly by government borrowing, because BOO/BOT borrowing costs would be higher and the required return to equity would also be higher; (b) the total project cost may or may not be less than an equivalent government project (evaluated at market cost)--this would depend on the relative efficiency of private sector construction costs and overheads compared to those in government projects; (c) pressures against competitive bidding could impinge on the integrity of the bidding and contract negotiation process; and (d) the Government may need to get involved with complex and time-consuming negotiations.

4.34 The difficulties of BOT projects are illustrated by the recent proposal in Indonesia to invite the private sector to build two large power generating plants. The proposal appears to have been overambitious (i.e. technically complex project of a very large size, e.g. \$1.2 billion size); would require guarantees and concessions that are likely to pose difficulties; the technical site selection may have problems; and the two potential short-listed and pre-qualified promoters may have neither the financial nor the technical capabilities to promote the projects.

#### Managing The Trade-Offs Between Efficiency and Financing Objectives in Natural Monopoly Sectors

4.35 The Government is currently emphasizing long-term concessions and franchises and BOT schemes in natural monopoly areas (e.g. entire ports, toll-roads, bulk urban water supply, and power generation), rather than other alternatives, as its main approach. The benefits of such private investment will depend critically on meeting the additionality test of either providing needed infrastructure capacity that would not otherwise be provided by the

public sector, or providing infrastructure at lower investment and operating costs, given the likely constraints on public sector finance and management skills. These potential benefits need to be weighed carefully against the potential costs of private investment:

- the higher cost of funds mobilized by private borrowing and equity investment;
- the risks of exposure to debt repayment, foreign exchange and profit guarantees likely to be sought by private investors;
- the risks of non-performance in project completion and operation by private contractors; and
- the risks of inadequate coordination of the size, location and timing of private investments with the least-cost expansion plan for the sector.

Ensuring that private sector participation effectively serves the public interest under such circumstances will require the development of a sound policy framework that provides for an appropriate balance between the benefits and costs of private investment, presents a transparent basis for negotiation between GOI and private investors, and allows for adequate competition in the bidding process for the underlying service contract.

4.36 The key tests of additionality under a private proposal are: (a) long-term price/revenue assurances should not involve prices that would exceed, and preferably should be less than the cost 12/ of providing the incremental services by the public sector; (b) the quality and performance of services contracted should be better or at least equal to that provided by the public sector; and (c) risks of project failure, where they arise from factors directly within the control of project sponsors, should be wholly borne by the private sector investors and lenders.

4.37 The legal contract is the crucial place for the Government to obtain appropriate assurances on price, performance standards and risk allocation. A poor initial contract, and poor monitoring of the terms of the contract after its execution, can undermine intended gains from private sector involvement. The ability of the Government to obtain the best terms from private sector involvement will therefore rest heavily on its contracting ability. Given limited institutional capability in Indonesia, the Government may need to establish a specialized unit, possibly under the Ministry of Finance or BAPPENAS, which would: ensure that proposed projects are in priority areas, publicize internationally and invite pre-contract bids from as many competent

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12/ It is important to note that in any such comparison of the costs of a private sector project versus the costs of a similar public sector project, the costs of the latter should fully reflect the true cost of capital and equity provided by the Government. Very often, GOI provides below-market financing and/or requires no dividends to be paid on equity (e.g., in the case of financing for PLN). Such financing should be adjusted to market-based costs to arrive at the total cost of a comparable public sector project.

sources as possible (i.e. not limited to local firms); establish standard contract terms and standard Government security packages; establish pricing principles to be applied; establish criteria (e.g. price, quality, risk) to evaluate bids; provide guidelines on financing packages; and negotiate and monitor the terms of contracts. The objectives would be to ensure that private sector proposals are invited, evaluated, and contracted competently, and that the projects selected are economically, technically and financially sound. The role of individual sector agencies and public enterprises would remain important, especially in putting forward initial proposals and in ensuring the correct technical choices. But they would need specialized support from a central source. Provided that these conditions for sound project selection and contracting are met, the private provision of services in natural monopoly sectors may result in additionalities in financing (i.e., lower capital costs, with such costs financed largely by the private sector) and in efficient delivery (i.e., lower operating costs) of services.

## CHAPTER 5

### IMPROVING THE EFFICIENCY OF PUBLIC PROVISION OF INFRASTRUCTURE

#### A. Introduction

5.1 Improved pricing policies and private sector participation will play an important role in managing the demand for infrastructure services and reducing the pressure on the public sector. Nevertheless, the public sector will continue to play a dominant role in the provision of many infrastructure services. The projected expansion in public expenditure on infrastructure will pose a major challenge for the design, selection and implementation of programs and projects. The development of the public investment program will need to pay attention not only to traditional economic efficiency considerations, but also to minimizing adverse effects on the environment. In addition to appropriate pricing policies and greater competition from the private sector, the efficient public spending on infrastructure will require careful consideration of a number of interrelated factors:

- improving public sector management;
- enhancing project implementation capacity;
- ensuring environmental protection; and
- ensuring appropriate choice of location for infrastructure.

5.2 This chapter discusses the contribution of each of these factors in improving the efficiency of public provision of infrastructure. Because these factors cut across sectors, the analysis focusses on systemic problems while drawing on sectoral examples. The chapter is organized as follows. Section B discusses the improvements in public sector management needed to plan and implement appropriate infrastructure policies and programs. Section C reviews problems in project implementation and suggests options for improvement. Section D examines the environmental impact of infrastructure investment decisions and suggests ways of minimizing adverse effects. Finally, Section E discusses policies for appropriate location of infrastructure.

#### B. Improving Public Sector Management

5.3 Efficient provision of public infrastructure depends on improving the capacity of the public sector to plan and implement appropriate infrastructure policies and programs. This in turn entails deregulating public enterprises (PEs), providing greater responsibility to local level agencies, and improving program management capacity of the Central Government. Many of the infrastructure services (power, telecommunication, port services) are provided by public enterprises. In conjunction with policies for fostering greater competition, deregulating operation of these PEs will help to increase the quantity and quality of services, and reduce costs. Similarly, a well managed program of decentralization of responsibilities to the local Governments can improve efficiency by providing more opportunities for local initiative in planning, implementation and monitoring of infrastructure projects, and

strengthen accountability. Finally, while the deregulation of PEs and decentralization of responsibilities to the local governments will relieve the pressure on the Central Government, measures to improve its capacity for planning and implementation (concerning task for which it will remain responsible) will continue to be important. The main need here is to improve the quality and motivation of the civil service.

### Reform of Public Enterprises (PEs)

5.4 Problems in the PE Sector. Public infrastructure services are provided by three types of public entities: (a) state corporations, or PERUMs (e.g., power, telecommunications, ports, and the railways); (b) departmental agencies (roads and highways; irrigation), which are under the control of individual ministries; and (c) limited companies (e.g., PT Garuda in the airlines sector, and Jasa Marga in the toll road sector). While performance differs among individual enterprises, most of them suffer from financial difficulties and there is substantial scope for improvements in efficiency and standards of service delivery. This poor performance largely reflects systemic bottlenecks resulting from the existing policy framework for PEs. Key problems are:

- Multiplicity of objectives--most PEs suffer from conflicting efficiency and social objectives.
- Inefficient pricing policies that do not allow adequate recovery of financial costs. Typically, PEs are not provided with explicit subsidies from the budget to cover the cost of meeting social objectives (e.g., rural electrification), but are provided indirectly with nontransparent financial advantages.
- Limited managerial autonomy and accountability for performance.
- Excessive and often inappropriate interventions from central line agencies in awarding supply and service contracts, causing substantial delays in project implementation.

The experience of PLN provides a good example of how these generic constraints interact to reduce efficiency and constrain the availability of resources for investment (see Box 5.1).

5.5 Recent Policy Initiatives. Recognizing these problems, the Government has been developing a policy framework for PE reform based on the Presidential Decree No. 5 of October 1988. The major objectives of the reform program are to: (a) introduce organizational and managerial reforms in enterprises that will remain in the public sector to improve their efficiency and reduce their burden on scarce public resources; and (b) divest enterprises that need not remain under public ownership, in a phased and orderly manner. In preparation for these reforms, two ministerial decrees were issued in June 1989 which set out the financial performance criteria for public enterprises and outlined a number of options to improve their efficiency and productivity. A set of corporate restructuring strategies have been identified--ranging from change in legal status of the firm, to sale of equity on the bourse, to liquidation. This initial design for restructuring was accompanied by

instructions to the enterprises to prepare five-year corporate plans and annual programs. In addition, the respective roles for enterprise management, line ministries and the Ministry of Finance have been defined more clearly.

**Box 5.1: SYSTEMIC CONSTRAINTS ON PLN'S PERFORMANCE**

The growing demand for electricity in Indonesia will entail a major expansion program. PLN's ability to respond effectively to this challenge will depend critically upon its capacity to mobilize adequate financial resources and improve its operational efficiency and project implementation capacity. The most important factor affecting PLN's motivation and ability to operate efficiently is the lack of adequate corporate autonomy. The degree of discretion that management enjoys does not appear to be commensurate with the size of the enterprise, the multiplicity of its objectives and the need to implement a major expansion program. Management's inability to control major parameters affecting the company's performance, and the attendant dilution of authority and accountability have stifled initiative and attention to corporate interests. Combined with a public sector tradition of consensus seeking and deference to authority, this has led to a corporate culture in which risk-taking is avoided and innovative proposals are rarely put forward.

The source of the problem lies in the excess supervision and regulation to which PLN is subjected. In particular, a web of monitoring and approval requirements emanating from three Ministries (Mines and Energy, Finance and BAPPENAS), a Supervisory Board, and several interagency committees influence and intervene in major PLN corporate decisions, including those related to financing, investment, procurement and personnel compensation.

As currently practiced, GOI's supervision of PLN is based on line by line monitoring of performance against targets set in its annual work program and budget. A justification is required for any deviation in excess of 10 percent for any of the hundreds of line items in these documents. In addition to the annual reports, there is also a quarterly monitoring system based on a set of about 80 quarterly indicators, including about 30 budget categories and other service and operational statistics, such as sales, number of customers, transmission and distribution losses and number of accidents, all of which are disaggregated for PLN's 17 regions.

PLN's financial dependence on the Government is due to the latter's ownership position and the requirement that PLN pursues stated objectives. The full extent of the explicit and implicit financial flows between GOI and PLN is difficult to determine. In current terms, the GOI imposes costs on PLN by setting specific annual village electrification and consumer connection targets, keeping electricity rates generally low with substantial subsidies for the small residential and small industrial consumers, and setting fuel prices that are not aligned with their economic levels. On the other hand, GOI also provides financial support to PLN in various forms, including equity contributions, exemptions from duties and taxes on externally-financed imports, and protection from foreign exchange risks on foreign borrowings.

While PLN's autonomy in the area of materials procurement and contract administration has recently been expanded, the procedures remain complex and time consuming. Cumbersome procedures required for the award and implementation of supply and service contracts have often resulted in costly delays and unsynchronized implementation of PLN's investment program.

Source: Indonesia Power Sector Institutional Development Review, World Bank (Report No. 7929-IND, December 1989).

**5.6 Deregulating Public Enterprises.** Recent initiatives provide a good starting point for systematic deregulation of the PE sector. The Government is now proceeding with a phased implementation of its reform strategy. The success of this initiative will require: (a) setting clear objectives for enterprises which can be translated into monitorable targets; (b) selecting managers capable of operating a commercial venture and compensating them

adequately; (c) providing managers with sufficient autonomy to achieve agreed objectives, especially in areas of pricing, financing and procurement decisions; (d) holding managers accountable for results and linking incentives to performance; and (e) limiting the role of the government to specifying the policy framework for state enterprises, appointing managers, setting performance targets, and monitoring and rewarding performance.

5.7 Corporate plans can be used to agree upon medium-term goals and strategies for key PEs. If this is difficult, simple performance contracts can be negotiated on an annual basis between PE managements and the Government. Apart from enhancing accountability, the very process of discussing and negotiating agreements can be instructive for both the Government and the PEs. Once goals and targets are agreed upon, the PE management will need autonomy to operate and achieve the results expected of them. Appropriate guidelines include: (a) the proper role of Government would be to exercise strategic control while PE managers would have operational control over their enterprises; (b) the more competitive the environment, the greater the scope for PE autonomy; and (c) for PEs operating in a noncompetitive setting, the degree of autonomy may be less. Regulation of prices and control over personnel compensation may be necessary in such cases. There will still be a need to focus increasingly on key performance indicators rather than on detailed day-to-day controls.

5.8 Creation of a viable accountability system will be an essential ingredient of successful PE reform. Performance indicators would be few, easy to measure, and weighted in terms of relative importance. The performance monitoring, evaluation and reward system would be located outside the technical ministries which supervise PEs. This would ensure greater objectivity and the use of common standards wherever possible. To ensure motivation, the performance linked incentive system would need to follow up evaluation through the provision of bonuses for PE managers and staff, as is being done in some other countries. Nonmonetary incentives also could be used to motivate managers even in commercial PEs.

5.9 To achieve the proper balance between accountability and autonomy, it will be important to clarify the relations between the Government and PEs. In Indonesia, an oversight agency in the Ministry of Finance and supervisory units in technical ministries are already in place. The challenge is to ensure their competence and proper functioning. The oversight unit could play the performance evaluation role while the PE boards and supervising ministries would set goals and make contracts. This approach calls for an arms-length relationship between ministries and their PEs. If ministries and senior ministry officials are to negotiate goals for PEs and hold them accountable, they should not be involved in their day-to-day operations and receive benefits from PEs. Most of the ministry's policy-making and review function for individual PEs would move to the PE boards. PE management boards would be small, but professional in orientation, with members who understand the business, and who can question and guide the management.

### Decentralization

5.10 The main objective of decentralization is to improve efficiency of service by providing greater opportunities for local initiative in planning and implementation of public sector programs and projects. This is also

particularly important to achieve a better balance in regional development (see Section E). Several factors indicate progress towards decentralization in Indonesia. First, local governments have an identity of their own and they perform a wide range of functions at the grassroots level. Second, through the INPRES programs, local governments have been given authority to manage considerable budgetary resources and have developed considerable experience in project implementation. Third, local governments have also worked with central government staff, and donor agencies, and have developed some measure of institutional capacity. Fourth, through PP No. 14/87, the Government has decentralized selected public works functions. The Government intends to strengthen these moves towards decentralization in the future. Thus, in his 1988 Independence Day Speech, the President of Indonesia indicated that decentralization will be a major thrust of government policy during REPELITA V.

**Box 5.2: DECENTRALIZATION OF URBAN SECTOR INFRASTRUCTURE**

Under Law No. 5/1975 (recently reinforced by Ordinance 14/1987 and 6/1989), local governments have primary responsibility for provision and maintenance of most urban services excepting defined national and provincial facilities. However, the revenue authority and management/technical capacity of local governments are not commensurate with their expenditure responsibilities. As a result, central management remains dominant in the financing, formulation and implementation of urban investment expenditure. The fiscal system in Indonesia is highly centralized. Overall, only about 2-3 percent of public sector revenues are mobilized by local governments. Central Government grants finance about 65 percent of recurrent expenditures and about 85 percent of local government development expenditures. The Central Government implemented 65 percent of the urban development expenditure directly during REPELITA III. Furthermore, its activity is concentrated in a relatively few regions--notably DKI Jakarta, where 8 percent of expenditures have been centrally-managed in recent years.

It has become increasingly clear that: (a) the principal beneficiaries of government implemented urban infrastructure were the larger, economically stronger cities; (b) service planning by central agencies was unencumbered by assessments of effective demand and could not be underwritten by local governments through adequate service tariffs; and (c) local governments have had little meaningful involvement in setting local investment priorities. As a consequence, local governments have exercised minimal responsibility, and have little capability for ensuring adequate O&M. Moreover, they have little incentive to improve local revenue when the central government appears willing to increase the flow of grants and maintain the influence they provide.

The collapse of oil prices in 1986 imposed severe budgetary constraints on the government and provided impetus required to implement GOI's longstanding decentralization policy. However, no consensus has emerged over the pace at which a more decentralized framework for providing local urban services should take place. While the Government has recognized that the successful implementation of the decentralization strategy would entail fiscal decentralization as well as improvements in administrative capacity at the local level, concerted efforts to move on these areas remain to be made.

5.11 Emerging Problems. Although some progress has been made in strengthening local governments, there are several factors which stand in the way of full-scale decentralization (see also Box 5.2): (a) A clear definition of responsibilities by levels of government and by sectors is lacking; (b) the planning of projects continues to be undertaken primarily by the central technical ministries; (c) local governments are small organizations with limited staff and technical competence, and local personnel have limited career development prospects and training opportunities; (d) the move towards

decentralization may lead to conflicts of interests (e.g., sharing of power) and legitimate concerns (e.g., relocation of civil servants) which will tend to delay progress; and (e) central transfers still account for 75 percent of total revenues of local governments. The pattern of grant allocation provides limited incentives to local resource mobilization.

5.12 Prospects. The above factors will constrain the rate of progress towards decentralization. Nevertheless, there is scope for faster progress in sectors and regions which are more ready for moving ahead in this area. Involving local governments in the design and planning of infrastructure projects will enable them to take on increasing responsibilities by building on experience with implementation. This is a logical sequence and one in which central and provincial technical agencies can actively assist them. Such a shift will need to be supported by the following actions: (a) rationalization of the functions and organization of the central and local government will be essential to minimize institutional overlaps and conflicts; (b) the local revenue mobilization capacity will need to be substantially strengthened; it will be important to transfer an increasing share of Central Government funds as loans serviced by the locally-mobilized revenues; (c) central and local agencies will increasingly need to play the role of guides to local governments, providing them with technical assistance to improve their quality and standards of performance; (d) the planning and budgeting system in local governments will need to be streamlined to facilitate the proposed increased role in design and resource mobilization; and (e) reform of local personnel systems are needed to attract and retain better quality staff. Improving opportunities for career development and training should be complemented with stronger incentives for central staff to move to local governments. A beginning can be made to streamline the personnel system by improving job analysis, job descriptions and general information systems on a pilot basis and drawing lessons for replication on a national scale.

#### Improving Program Management at the Central Government Level

5.13 The growing number and complexity of development projects and programs during the 1980s has already strained the managerial capacity of the Central Government and these pressures will increase in the 1990s, in the face of rising population size and expectations. Coping with this growing burden will require progress in a number of areas including especially: (a) investment planning; and (b) institutional framework and coordination.

5.14 Investment Planning. Indonesia's five-year development plans provide a useful indicative summary of the Government's view of economic prospects and the implications for sectoral expenditure programs. They are, not intended to provide a basis for identifying detailed expenditure priorities. As a result, (a) they do not provide a comprehensive listing of project proposals and costs; (b) the broad sectoral allocations provided in the plans relate only to development expenditure by the Central Government, and exclude investments financed by local governments and public enterprises; (c) the full O&M implications of existing and new public infrastructure and programs are not explicitly incorporated; and (d) the sectoral plan allocations are not disaggregated on an annual basis, which makes it difficult to relate them to budgetary expenditures or to identify issues of project timing and phasing. At the same time, many line agencies (e.g., PLN, TELKOM and Public Works) maintain sectoral investment programs, both for their own planning purposes and for

budget submissions to BAPPENAS (Ministry of Planning). These programs include substantially more project detail than is available in the plan. However, they are not always consistent with the Government's overall investment priorities or expected financial and implementation constraints. Pressures to push ahead can therefore mount, especially if favorable external financing is readily available.

5.15 It is appropriate that the primary responsibility for preparing sectoral investment programs remains with the line agencies, which are in the best position to assess their detailed needs. Frequently, however, the existing planning capacity within line ministries is fragmented among individual directorates. In such cases, improved coherence of sectoral plans and programs will require strengthened ministry-wide planning capacity and improved cooperation among individual directorates. In addition, BAPPENAS will need to strengthen guidelines for project selection and its capacity for ensuring macroeconomic and intersectoral consistency. For this purpose, it would be useful to keep an inventory of project profiles that are updated on a regular basis. The standardized profile would contain five major components: a concise description of project content and objectives, an identifying title and project number, an estimate of total investment costs, a proposed annual phasing of investment costs, and an estimate of incremental recurrent costs (disaggregated between staffing and nonpersonnel inputs) arising from the project. If regularly prepared and updated, these simple profiles would greatly strengthen the data base available to fiscal planners on the magnitude and timing of costs associated with new and ongoing development projects.

5.16 The key to these improvements in fiscal planning is sound project appraisal capacity to ensure efficient project selection and design. In Indonesia, greater use of project appraisal techniques, with adequate provision for central review and quality control, could help to strengthen expenditure planning in three areas. First, the economic justification of projects would be subjected to more rigorous scrutiny. Second, there are areas where expenditure proposals could be better designed and possibly expanded. Third, cost estimates, including overall costs, time phasing and the breakdown between investment and recurrent costs, could be improved. This is an area where BAPPENAS could usefully guide and support the efforts of planning units in the sectoral agencies. This, in turn, will require substantial strengthening of planning capacity at the sectoral level with more staff trained in project appraisal and policy analysis (see Box 5.3).

5.17 Institutional Framework and Coordination. The capacity to plan and implement sectoral strategies and investment programs depends on institutional strengths and interagency coordination. Many projects and programs in Indonesia have become increasingly integrated, posing challenging, and sometimes overwhelming, problems of interagency coordination (see Box 5.4).

5.18 In most instances, institutional weaknesses reflect fundamental constraints which afflict the entire public sector. They include: (a) the general shortage of trained manpower and weak quality of those trained; (b) civil service policies, including the fragmented compensation system, which do not promote a high level of competence or full-time job commitments; and (c) the emphasis on management by controls that burdens higher-level officials, while most junior staff have limited opportunities to develop skills and

**Box 5.8: PLANNING AND PROGRAMMING TRANSPORT INFRASTRUCTURE**

Considerable attention has been given in recent years to improving the planning and programming of public expenditures on transport infrastructure and, in particular, on roads. A sophisticated computer-based road pavement management system (IRMS), designed to optimize the selection and programming of treatments for individual links, has now been implemented for the national and provincial road networks, while much simpler manual procedures are being implemented to improve the planning of works on district (rural) roads. However, serious deficiencies in data--and especially traffic counts--provided by regional governments continue to preclude the full benefits of this system being realized.

The capabilities of the IRMS system are now being further extended, inter alia through the addition of a module that will permit the evaluation of limited road widening schemes. However, as traffic on many key interurban roads approaches saturation level, more major capacity expansion--sometimes involving significant land acquisition--will be necessary. The IRMS will not support such types of investment decision-making and separate feasibility studies will thus be required. DGH plans to establish a separate feasibility study unit for this purpose and will shortly commission studies for a number of priority links; these will be designed to serve as examples of good practice, particularly as regards the incorporation of environmental impact analyses. Planned investments in toll roads are already supported by detailed feasibility studies, although these do not always give sufficient attention to possible options--such as the widening of existing roads--for providing additional capacity more cheaply.

The same basic planning and programming principles as adopted for roads infrastructure should also be extended to other transport subsectors, especially seaports, airports and railways. While the great diversity of investment needs precludes the adoption of standardized computer-aided systems such as the IRMS, MOC has in the past developed simple guidelines for the preparation, screening and appraisal of the more important types of project. However, these are not routinely applied and many projects are proposed for financing without any thorough economic appraisal of alternatives being conducted. Moreover, although most major investment projects proposed for foreign financing are subject to some form of quantified appraisal, such studies are not always conducted objectively and the resultant recommendations often appear supply-driven. Given the diversity, scale and complexity of investment proposals in the air, land and sea transport subsectors, addressing such problems will require continuing efforts to develop the capacities of planning units within MOC and the public enterprises under its jurisdiction.

responsibility. Indonesia has made important progress towards addressing these issues. For example, GOI has been making a strong effort to improve the quality and quantity of trained manpower. At the same time, work has started on a reform of the civil service that aims at improving the performance, responsibility and incentives. Because of the complex and sensitive nature of some of these issues (e.g., civil service reform), substantial progress will take a long time. As a result, the capacity of the Central Government to plan and implement major expenditure programs will continue to be a limiting factor in determining the size and composition of the public investment effort. This gives added importance to deregulating public enterprises and encouraging private participation in the provision of infrastructure.

5.19 However, with a concerted effort, it should be possible to make strong progress with improving interagency coordination. A number of general principles can be suggested in this regard.

- The importance of early involvement is demonstrated in all successful integrated programs. Agencies will have more incentive to identify with and contribute to a program if they have helped to formulate goals, cooperated in design, and agreed on their implemented tasks.

**Box 5.4: INSTITUTIONAL FRAMEWORK FOR WATER RESOURCE MANAGEMENT**

The Ministry of Public Works (MPW) is responsible for all surface water development throughout the country. MPW is empowered to collect data on water quality and quantity and make policies on water resource use. Within the MPW, the most important agencies for surface water management are the Directorate General of Water Resources Development (DGWRD) and its Directorate of Irrigation (DI). The DI works with local and provincial government officials, staff from the Ministries of Agriculture (MOA) and Home Affairs (MHA), and water users' associations (WUAs) to develop, operate, and maintain irrigation systems.

The Directorate General of Cipta Karya (DGCK) is in charge of overall nationwide planning and design for urban piped water for both domestic and nondomestic (industrial and commercial) uses. Cipta Karya is responsible for constructing new public water systems (BPAMs) and eventually transforming them into semi-autonomous water authorities (PDAMs), which are wholly owned by local governments. A Directorate of Environmental Sanitation (DtPLP) was created within DGCK in 1984 to take responsibility for sewerage and sanitation, as well as for drainage and solid waste.

The Directorate of Environmental Geology (DEG) in the Ministry of Mines and Energy is responsible for evaluating groundwater resources nationwide, for groundwater mapping, and for issuing of licenses for groundwater abstraction. In practice, since the DEG's resources are limited, the licensing authority is usually delegated to the local governments.

The most important constraint to effective water resource management is inadequate coordination and capacity of the concerned government agencies. While many aspects of irrigation management within a single scheme have been reasonably well defined, the more complex problem of managing water quantity and quality across different irrigation schemes, between urban and rural areas within a river basin, and among surface, groundwater and coastal water resources has received inadequate attention.

Coordination among the various agencies involved in water resource management is weak. For example, the work of DEG (groundwater management) is virtually delinked from the work of the DI (surface water management). The relevant agencies are all in need of vastly improved analytical, technical, financial and accounting skills, which are essential for developing and implementing a rational sectoral strategy. The data base on water resources is generally poor. Exchange of information between DGWRD and DEG is limited. As a result, the quality and effectiveness of water resource planning has suffered.

- Coordinating committees can be made more effective by balancing agency staff with representatives of the beneficiaries. This can improve bureaucratic accountability as well as involve interest groups with the power to support or subvert program goals.
- The appropriate level for effective coordination depends on the activity involved. Production of standardized services (power, telecommunications) needs liaison at the top of the hierarchy. People-oriented programs (water supply), require coordinating links further down the bureaucracy, to the local level.
- Finally, the effectiveness of coordinating committees depends as much on the quantity and quality of information available to them as on the power and abilities of their members. Cooperation can therefore be encouraged by sharing information.

**C. Enhancing Project Implementation Capacity**

5.20 Enhancing project implementation capacity will be of major importance in Indonesia, as the size and complexity of the infrastructure investment program increases. Project implementation delays and quality lapses have

enormous economic costs. World Bank estimates indicate that the cost of a two-year delay in project implementation--a common occurrence in Indonesia--could amount to 20 percent of the cost of investment. The cost of quality lapses in project implementation and the life cycle cost for O&M would also increase significantly.

**Recent Trends in Project Implementation**

5.21 A crude indicator of trends in project implementation is the disbursement rate, which measures funds disbursed as a ratio of commitments. As shown in Table 5.1, Indonesia's disbursement performance for World Bank projects has improved significantly over the past few years, and has been better than the Bank-wide average for all countries. The main contributing factor appears to have been the effectiveness of the Implementation Monitoring Committee in BAPPENAS (TP4DLN) established in 1987. Increased donor support (e.g., local cost financing of projects), simplified fund withdrawal procedures since 1987, and the use of special accounts for quicker funding of project expenditures loans since 1988 have also been contributory factors.

**Table 5.1: INDONESIA'S DISBURSEMENT PERFORMANCE**  
(percent of commitments)

| Annual Disbursement Rate /a                   | Fiscal Year |      |      |      |
|---|-------------|------|------|------|
|   | 1987        | 1988 | 1989 | 1990 |
| - Excluding fast-disbursing loans             | 18.4        | 23.0 | 27.3 | 29.1 |
| - All loans                                   | 18.4        | 25.5 | 31.6 | 32.8 |
| <u>Memo item (%)</u><br>Bank-wide IBRD/IDA /b | 22.7        | 23.7 | 25.0 | 26.1 |

/a Three year moving average.

/b All loans.

5.22 The recent improvement in project implementation will, however, need to be sustained through more fundamental improvements in five key areas: (a) implementation planning and management; (b) budgeting and finance procedures; (c) land acquisition procedures; (d) procurement procedures; and (e) the design and selection of technical assistance (TA). Specific recommendations are set out below in each of these areas. The two broad thrusts of these recommendations are: first, GOI central planning and finance agencies will need to reduce their approval requirements and delegate greater authority to the project implementing agencies; and second, policy attention should be directed instead to simplifying procedures for land acquisition, procurement and hiring of TA service.

## Implementation Planning and Management

5.23 Implementation Start-Up. Going ahead with implementation before projects are fully ready is often the source of delay in project completion in Indonesia. Actions to improve project start-up include: (a) adequate staffing of project implementation units; (b) timely completion of the designs and contract documentation; (c) completing the legal and administrative arrangements, especially for inter-agency projects; (d) finalization of legal and compensation arrangements for land acquisition; (e) arrangements for the project funding throughout the project period; (f) procurement planning for important steps, including the selection of consulting engineer; (g) contract packaging; and (h) procurement scheduling with determination of "procurement lead times" from initiation of procurement action to commissioning and handover. Project launching workshops are an important instrument to achieve the above goals by bringing together officials involved in various stages of project implementation to clarify roles and disseminate the implementation schedule and procedures to be followed.

5.24 Managing Large Projects. Once initiated, the management of large infrastructure projects is relatively easier because widely applicable technical solutions can be "blue printed" in advance and external consultants can help with trouble shooting. Experience with large projects in Indonesia (e.g., power, highways and irrigation) shows that completion and commissioning have generally been successful. However, care has to be taken that: (a) appropriate balance is achieved between investment and cost effective O&M of facilities after construction (the life cycle cost of O&M can be as great as the capital cost of development); and (b) realistic financial requirements are allocated to avoid costly completion delays.

5.25 Decentralization of Project Implementation. In sectors such as urban services and rural facilities, GOI's policy is to decentralize project implementation and O&M to local governments. In addition to strengthening financial and administrative capacities of the local governments (see Section B), there is also a need to introduce simplicity in the design of projects with well defined and few objectives and based on proven and appropriate technologies/approaches.

## Budget and Finance Procedures

5.26 Project implementation in virtually all sectors is hampered by a wide range of problems in the areas of budgeting and finance. These result chiefly from the fragmented nature of the budget system noted in Chapter 3. As in the case of O&M, investment funding is channeled through a number of important sources, the most important of which include: (a) the DIP allocations to central sectoral departments; (b) INPRES grant funding for regional governments, which is split between several different block and sectoral grant programs; and (c) external loans channelled through the BLN or special accounts. There are also other financing accounts, such as the RDI, which are supplementary to the official budget. The fragmented nature of budgetary allocations makes it difficult to assess the adequacy of resources for a project, often resulting in delays in the release of funds. Monitoring of project implementation progress is similarly constrained. Consolidation of these accounts into fewer budget channels would greatly simplify and facilitate sectoral expenditure planning, monitoring, and project implementation. As an

interim step, the following specific measures can be taken to improve financial procedures within the existing budgetary framework.

- Guidelines on Budget and Finance Procedures. Working knowledge about budgeting and finance procedures is uneven. Comprehensive guidelines on budget and finance procedures (including loan agreements and procurement and disbursement procedures for donor-assisted projects) could be prepared in a single document and disseminated to all project agencies.
- Improved Budgetary Procedures. Greater powers could be delegated to project agencies to shift funds within expenditure categories, supported by post-audit control.
- Timely Release of Budget Funds. In 1989/90, a revolving fund system (UYHD) was introduced. Under this arrangement, the project treasurer may request an advance to cover the expected expenditures. This system is expected to improve the timely start of works. Nevertheless, to expedite preparation and approval, further simplification of documentation would be important.
- Expediting Payments. In addition to timely release of budget funds, care will need to be taken to ensure that actual payments to suppliers and consultants are made with minimum delays, following satisfactory delivery of contracted supply/service.

5.27 Project Monitoring Systems. Many elements of a project implementation monitoring system are already in place. MOF maintains data on the release of funds from DIPs to project agencies. BAPPENAS has a project reporting and monitoring system. Agencies such as DGWRD and Bina Marga have developed management information systems which will provide more up-to-date data on the status of project implementation--physical and financial progress by contracts. However, these systems do not produce standardized managerial reports. The need to have a standard reporting system has been recognized and the Ministry of Public Works (MPW) has been chosen for developing a procurement/disbursement monitoring system called Procurement Monitoring Database (PMDB). When PMDB is successfully implemented within the MPW, it could also be adopted and implemented in other ministries.

#### Land Acquisition Problems

5.28 Land acquisition for projects, particularly in Java and in or around major towns, is a protracted and time-consuming process. The main reasons are:

- Administrative Procedures. There are two major causes of delay. First, the procedures laid down by the national land board (BPN) require each project application for land be sent through the Provincial governor and the Bupati to the kabupaten team. Since both officials are represented, time could be saved if applications were sent directly to the kabupaten teams. Second, there is only one team in each kabupaten. Where development activity is intense, this team becomes overburdened and delays ensue. Creation of additional land acquisition teams would speed up the process, while simplifying administrative procedures for land acquisition.

- Land Records. Land maps, cadastral surveys and land title and registration records, which are important tools for land acquisition, are not available in many parts of Indonesia. GOI started a land registration program in the 1970s, but progress has been slow. An accelerated program using simplified procedures is essential to improve project implementation, especially in land intensive projects.

5.29 Mapping, Surveying and Rights of Way. Due to the poor availability of land maps and cadastral surveys, mapping and survey activities need to be carried out prior to acquisition of project land. This delays the preparation of right-of-way (ROW) drawings by the engineers. Systematic aerial photography in advance would cut down such delays. Procedures for clearance of aerial photography also needs to be streamlined. Final legal responsibility for the completeness and accuracy of land records, however, rests with BPN. While continuing efforts to strengthen its departmental capability, BPN should grant permission for project units to assist in the process, establish guidelines for how such work should be carried out, and oversee its implementation by project units.

5.30 Price Negotiations. Negotiations of land acquisition is a protracted, long-drawn process. Usually, low prices are offered and local authorities are tempted to use pressure to get the landowners to agree. The resulting delays in land acquisition could be reduced by more realistic price assessment, budgeting and payment

### Procurement

5.31 The lengthy procurement process is a major obstacle to timely execution of projects in Indonesia. During 1980s, procurement of smaller works and their completion time improved markedly. Some decentralization of implementation responsibility has contributed to this improvement. However, inordinate delays in processing of large works contracts (ICB and LCB)<sup>1/</sup> and goods contracts (ICB) still remain (see Boxes 5.5 and 5.6). Improvements in procurement of large civil works contracts above Rp 1 billion and equipment procurement should receive the main attention of GOI. A feasible target would be to aim, on average, to complete LCB procurement of large civil works contracts in eight months, ICB procurement of large civil works contracts in 12 months, and ICB procurement of equipment (including delivery)<sup>2/</sup> in 12 to 15 months. Time savings of these amounts (averaging around 8-10 months) would translate into very substantial savings through reduced commitment charges, reduced price escalation, earlier completion of projects and timely generation of benefits. Achievements of these targets will require advance procurement planning, use of standard bidding documents, and streamlining of established procurement procedures and practices.

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<sup>1/</sup> ICB and LCB denote 'international' and 'local' competitive bidding, respectively.

<sup>2/</sup> Except for special plant and equipment, which have to be manufactured specially and have their own lead time.

**Box 5.5: PROCUREMENT DELAYS**

| <u>Type of Procurement</u>                             | <u>Time for Completion /a</u> |
|--|-------------------------------|
| <u>Small Contracts</u> up to Rp 500 million (LCB)      | 3 - 4 months                  |
| <u>Medium Contracts</u> up to Rp 1,000 million (LCB)   | 4 - 6 months                  |
| <u>Large Contracts</u> over Rp 1,000 million (LCB)     | 10 - 14 months /b             |
| <u>Large Civil Works Contracts</u> (ICB)               | 17 - 22 months                |
| <u>Large Equipment Contracts</u> (ICB), up to delivery | 18 - 30 months                |

/a Time taken from prequalification notice to contract signature, except for equipment which is up to delivery.

/b Larger time for contracts above Rp 3 billion needing EKIIN reviews.

- Initiation of Procurement. The procurement process needs to be advanced as far as possible before the approval of annual DIPs by BAPPENAS. While project agencies cannot sign contracts for which full financing is not assured, bids could be prepared, solicited and evaluated before the financing is available. This would improve the quality of annual works by allowing them to start in April or May each year, instead of pushing the bulk of construction into the rainy season, which causes completion delays and affects quality.
- Model Bidding Documents. Some progress has been made in the use of model bidding and contract documents (e.g., within Directorates of MPW and PLN) but their use is not yet mandatory. Development and mandatory use of such model documents generally would be relatively easy and: (a) save time and resources; (b) eliminate or minimize the difficulties which arise from different interpretation of GOI procedures (KEPRES 29); and (c) lead to greater consistency and reliability of the tender process.
- Procurement Procedures/Regulations. For donor-assisted projects, there is a need to minimize differences between Government procedures and Donor<sup>3/</sup> guidelines for procurement. The persistent problems are:
- Prequalifications. The Government requires a minimum of ten firms to be invited to bid for each contract. For smaller works, it would be more efficient to limit bids to a short list from a roster of approved contractors. For large and complex contracts, special prequalification could be required.
- Restricted Bidding Lists. Provincially restricted bidding lists should be avoided, as this often causes additional cost, delay and poor quality of finished works. The very low threshold

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3/ Most donor's guidelines are close and generally consistent with the Bank's guidelines.

**Box 5.6: IMPACT OF PRESENT PROCUREMENT POLICIES ON PLN AND TELKOM'S PERFORMANCE**

**PLN.** Cumbersome government procedures required for the award and implementation of supply and serv. contracts have resulted in costly delays and unsynchronized implementation of PLN's investment program. The issue is that such delays have nothing to do with the merits of the projects themselves, or with PLN's technical capacity to implement, and therefore constitute an unnecessary drag on the efficiency of the entire sector.

Under the current arrangements, PLN's procurement authority is regulated on the basis of the sources of funds and the size of the contract:

- (a) for purchases financed internally by corporate funds, PLN management has authority up to a ceiling of Rp 3 billion, subject only to post-audit by BPKP (state audit agency). Contracts over Rp 3 billion must be cleared by EKUIN prior to award and are subject to both pre- and post-audit by BPKP;
- (b) for procurement under DIP (development investment fund) or Rupiah cofinancing schemes, PLN has authority up to Rp 500 million. Tenders amounting from Rp 500 million up to Rp 1 billion are to be awarded by the Director General of Energy; those from Rp 1 billion to Rp 3 billion by the Minister of Mines and Energy (MME); and those in excess of Rp 3 billion must receive clearance from EKUIN prior to award;
- (c) contracts financed by multilateral credits are awarded following procedures set in the respective project agreements, and are reviewed and cleared with the MME, EKUIN and BAPPENAS;
- (d) further, letters of credit, import licenses, funding confirmations and other requirements necessary for contract implementation are subject to processing by Bank Indonesia, Ministry of Trade, Ministry of Finance and Customs.

The overall effect of these requirements is that the normal time required for GOI/PLN to award an equipment contract after receiving bids is 12-14 months. If PLN had full autonomy in procurement matters, this time could be reduced to 3-4 months. Consequently, project implementation durations are 9-10 months longer, with the attendant adverse effects on cost and efficiency.

**TELKOM.** The procurement policy of TELKOM suffers from inefficiency and high costs because procurement is not done by international competitive bidding (ICB). In the past, GOI/TELKOM have made extensive use of bilateral assistance. Under these circumstances, equipment purchases were often tied to the funding, resulting in high network expansion costs. This cost, estimated at \$3,500 per line added, is about double the unit cost typically prevailing in less developed countries under Bank-assisted projects where planning is internalized and procurement is largely done through ICB. More seriously, it has also led to the introduction of nine different switching systems in the country, each of which require different O&M procedures, staff training, interconnection equipment and spare parts. This had had a serious adverse impact on network O&M. The adoption of competitive procurement strategies would, therefore, have significant cost savings and improve the network efficiency.

Sources: Indonesia Power Sector Institutional Development Review, Report No. 7927-IND, World Bank, December 1989; and Indonesia Telecommunications Sector Study, Report No. 7842-IND, World Bank, June 1990.

(Rp 20 million), above which formal bidding is required, delays procurement of urgent maintenance works. Such thresholds should be reviewed and adjusted regularly.

- **Retendering.** Regulations require retendering if less than three conforming bids are received. Accepting even a single responsive bid would in most cases be more cost effective than rebidding, which can lead to implementation delays without lowering costs.

- Evaluation of Bids. Critical delays occur during the evaluation of bids and award recommendation. The present practice of evaluating all bids in detail puts a heavy demand on the time of the staff. Standing review committees (including representatives from MOF and BAPPENAS) within each Directorate General would facilitate the review process.
- Contract Implementation. Use of ICB generally results in lower costs and better quality of finished work. Most implementation problems apply to smaller and medium-sized works let out under LCB. The main areas for improvement in LCB contracts are: (a) multiyear contracts to reduce supervision burdens; (b) packaging of small scattered works into single or multiyear contracts; (c) establishment of quality control assurance units; and (d) modification in contract conditions to deal with unforeseen events. However, contracts should otherwise be followed strictly in line with stipulated conditions.

### Consultant Services

5.32 Efficient TA Design, Selection and Effectiveness of Consultants. The design of a consultancy assignment is the crucial step for ensuring the efficiency of consultant services and should be as clear and specific as the nature of assignment permits. The preparation of TOR for infrastructure projects and consultancy agreements has improved. However, long delays (12-18 months) still arise in the selection process because of GOI's stringent regulations on review and approvals. Key bottlenecks are: (a) preference given to specific firms; (b) "forced marriages" between foreign and local firms; assigning the lead role to local firms even when they are not competent; and (d) rigid application of fixed billing rates. These practices need to be avoided to improve the effectiveness of TA. There is also a need to improve supervision and performance evaluation of consultants.

5.33 Domestic Consultants. Domestic consultants are playing an increasingly important role. A nucleus of competent firms exists in civil engineering capable of taking the lead for design and construction supervision of medium sized projects and the lead role for less complex large projects in joint ventures with foreign firms. The two main areas of concern are: (a) the mushrooming of small firms, often headed by nonprofessionals, working almost exclusively on locally funded projects and obtaining contracts more on the basis of contacts than on competence; and (b) presence of retired government officials, who are not professionally competent, as TA teams. Such practices would need to be discouraged, because they constrain professional development of the local consulting firms.

5.34 Contracting Procedures. The common delays (often four to six months) in finalization of TA contract agreements after award is of concern. Delegation of authority (except for large or special assignments) by BAPPENAS to ministries and project agencies, to evaluate and finalize consultancy contracts, would be a step forward. The other major problem in contracting is "fixed billing rate ceilings". This practice tends to exclude recruitment of the most competent consultant, particularly for technically demanding and complex assignments, thereby jeopardizing the quality of output. In selecting consultants, technical evaluation, not the service charge, should be the dominant factor.

## Construction Industry

5.35 The local construction industry has grown rapidly in Indonesia, to encompass 100 percent in all small and medium works and a significant share of large civil engineering works. Even so, it has failed to keep pace with the increasing demands and complexities of services needed. GOI is fully aware of the problems and has carried out a number of reviews, with assistance from international agencies. The Government has encouraged joint ventures with foreign firms, established postgraduate courses/seminars in the universities, and established a Construction Bureau in MPW to guide and coordinate the development of construction industry.

5.36 Additional steps are, however, necessary to enhance the effectiveness of the domestic construction industry. These include: (a) creating an enabling environment primarily through improved public contracting procedures; (b) restructuring publicly-owned construction companies into competitive enterprises; (c) development of professional trade associations and institutions in the construction industry to provide effective services to members, set technical standards, and represent the industry; (d) improving the business environment for contractors by developing the insurance market and the guarantee system, improving leasing arrangements for construction equipment, and developing national standards for construction quality; (e) development of construction manpower and a system of labor certification; and (f) support to research and development facilities.

### D. Infrastructure and Environmental Management

5.37 Infrastructure development in Indonesia, as elsewhere in the world, has potentially enormous impact on the environment: it can exacerbate or ameliorate sustainable development prospects, depending on the type of infrastructure and the extent to which environmental considerations are factored into the planning, delivery and pricing of services. Infrastructure planning must include the environment as a key variable in all major projects, from the design stage to implementation and monitoring. Much greater emphasis also needs to be placed on pricing policies in the provision of infrastructure services to achieve environmental objectives. Regulatory systems in Indonesia face serious institutional constraints and cannot be expected to yield widespread environmental benefits in the near term. Over the longer term, a combination of market-based and regulatory systems will be required.

#### How Infrastructure Affects the Environment

5.38 Transport. Road construction can have costly environmental effects. Expansion of areas covered by road pavement can lead to flooding, siltation and decline in the natural recharge of groundwater aquifers. Road construction in or near protected areas may disrupt natural habitats and lead to economic development that destroys protected areas. It can also exact a high toll in human terms because the acquisition of rights-of-way will usually require relocation and resettlement, especially given the population densities in Java and parts of the outer islands. Port and shipping development can lead to the loss and destruction of environmentally valuable marine resources, such as mangrove forests. Dredging, often of hazardous materials, in turn can have severe effects on marine ecosystems.

5.39 Water Supply and Sanitation. The lack of proper sewage disposal facilities has been associated with outbreaks of serious, often fatal illnesses in Jakarta, especially for the poorer segments of the population. In urban areas, excessive groundwater extraction has led to environmental damage such as saline intrusion, land subsidence and depletion of aquifers. Although private extraction of groundwater is a licensed activity subject to collection of tariffs, in practice many users avoid licensing. The problems extend to damage to building foundations, flooding and loss of access to potable water. Irrigation projects could also lead to significant environmental problems. First, high and excessive use of irrigation water, due to it being a virtually free good, has had major adverse effects--irrigation return flows have degraded the quality of river waters due to salinity and the presence of pesticide, and other pollutants. Second, irrigation projects involving dams have caused major resettlement problems (see Box 5.7). The result is often serious disruption in the livelihood of the affected people, as tenure systems and arrangements are not well developed and legal and administrative advice is often not adequate.

**Box 5.7: KEDUNG OMBO MULTIPURPOSE DAM**

1. Construction of the Kedung Ombo Dam on the Serang River in Central Java is now reaching completion. One of the several large dams supported under Bank loans since 1988, the project will increase food production by improving existing irrigation systems for more than 84,000 ha and providing more than 25,000 ha of new irrigation. This will benefit about 120,000 families directly. In addition, the project will help to control floods in rural and urban areas, supplement water supplies for about 300 settlements, generate about 74 GWh of power for the national grid, and support improvements in overall soil and water management of the project area.
2. Positive and neutral impacts. As all large dams, Kedung Ombo has diverse and significant environmental impacts. Many are positive: increases in the carrying capacity of land through agricultural intensification, reduction of flood danger, improvement of clean water supplies, and increased potential for employment over the long-term. Other impacts that are negative in the case of many large dams appear to be neutral in the case of Kedung Ombo: no significant loss of archeological properties; no loss of wildlands or wildlife habitat; no significant loss of biological diversity; no blocking of fish migration or other disruption of riverine fisheries; no special dangers due to tectonic activity.
3. Negative but mitigated impacts. The project has also created negative impacts associated with most large dams. Most are subject to mitigation efforts that are relatively straightforward: dam safety has been safeguarded through special inspection efforts; the serious problem of controlling sedimental nutrients is being addressed through a range of efforts including greening activities and introduction of better upland soil conservation practices; expected growth of aquatic weeds will be monitored and controlled; and the spread of water-related diseases such as malaria, already present in the area, is subject to an intensive surveillance and treatment program.
4. Resettlement. By far the most serious negative environmental impact of Kedung Ombo has been the dislocation of about 5,500 families from the reservoir area. The original resettlement plan envisaged transmigration of 75 percent of the affected families. By the time the dam was nearing completion in late 1988, however, it became clear that only about 50 percent of the families had in fact transmigrated and that others were expressing a preference to be resettled nearby. Some families refused to accept offered compensation. In addition, the offer of a single resettlement option was considered restrictive by most families and by some as an unfair obligation. Weaknesses in the assessment, award and payment of compensation compounded the problems. A result was that resettlement could not be completed before authorities began filling the reservoir. At that stage the resettlement plan was revised with an intent to resettle a large number of the remaining families close to the reservoir. Implementation of this revised plan is already underway and is expected to resolve the problems, though at present about 800 families have yet to move, about half of them as yet refusing to accept compensation. In future projects, it is expected that such problems can be avoided through EA procedures requiring the early preparation and implementation of resettlement plans with the direct involvement of NGOs and affected local people.

5.40 Power. Electric power could also cause significant environmental damage. Power generation in Indonesia is presently dominated by the use of oil, diesel, and petroleum products, which could produce significant air and water pollution if mitigating measures are not implemented and monitored. Future reliance on coal as a power source is likely to add solid waste as an additional byproduct of power generation (see Box 5.8). The major direct effects of this pollution would be on human health. Furthermore, infrastructure investments of this type clearly have implications in terms of land acquisition, and resettlement similar to those mentioned for transport and irrigation.

**Box 5.8: JAVA THERMAL POWER PROJECT**

1. Sustained economic growth and improvement in the quality of life for Indonesians will require continuing increase in domestic energy consumption. The Bank has already supported GOI under 18 electric power projects toward this end. The next such project under consideration would support a major expansion of the existing coal-fired steam power station at Surabaya in West Java. Objectives of this project would be to (a) meet the expected growth in demand for electricity power in Java, (b) assist preparation of future power projects, and (c) require improved cost recovery. For EA purposes, it is classified as an "A" project likely to have diverse and significant environmental impacts, therefore requiring a full EA study completed prior to appraisal. Identified potential impacts include (a) stack emissions affecting air quality, (b) liquid effluents affecting surface and sea water quality, (c) solid wastes affecting land use and (d) land requirements for transmission lines.

2. Air Quality. Several types of stack emissions and mitigatory measures have been identified:

- (a) Particulate matter emissions including ash and dust can be reduced by 95.5 percent with properly installed and operated electrostatic precipitators. Other design features including choice of optimal stack heights, probably 250 meters, are also crucial.
- (b) SO<sub>x</sub> emissions will be controlled mainly by the low-sulphur coal that will be burned. Stack heights of 250 meters will also help.
- (c) NO<sub>x</sub> emissions will be controlled by the use of properly designed burners and a low excess-air combustion system.
- (d) Air quality monitoring stations will be installed as a part of the project.

3. Liquid Effluents. Several liquid effluents have also been identified:

- (a) Condenser cooling water discharge could increase sea water temperatures and damage marine ecosystems, possibly including fish species important for nutrition and livelihood of local people. Designs will be required to limit the temperature rise to within 2° Centigrade to reduce the adverse impact on marine life.
- (b) Chemical, oil and sanitary effluents will be treated in properly designed waste water and sewage treatment systems included in the project designs.
- (c) Coal and other runoffs and leachates will be held in suitable retention ponds and neutralized prior to discharge into the drainage system. Special care will be required to ensure the adequacy of the pond designs and monitoring of their operation and maintenance.

4. Solid Wastes. Ash will be disposed of dry and either used directly (.e.g, for cement or landfill) or held in an existing disposal area adequate for at least 18.5 years. Dust suppression measures will be incorporated in designs for coal handling and ash disposal.

5. Transmission. Transmission lines will be routed so as to avoid human settlements and forest areas. Land required for transmission towers will be acquired under procedures acceptable to the Bank and no major resettlement is required.

## Objectives and Instruments of Environmental Policy

5.41 In the past, policymakers in Indonesia, as in many other developing countries, have traditionally viewed policies for environmental improvement as being in conflict with policies for fostering economic growth. This view has led to much neglect in the environmental area. The problem is compounded often by the inability to quantify some of the environmental concerns, resulting in a lack of consensus on the scope and nature of the perceived problem. The often slow accumulation of ecological damage adds further uncertainty. The perceived trade-off between environmental improvement and economic growth can be exaggerated. Policies that are environmentally sensitive and appropriate will lead to sustainable economic growth over the longer term. Appropriate allocation of resources to environmental maintenance and investment will eventually lead to greater economic efficiency and environmental improvements, together generating greater value added.

5.42 There is significant scope in Indonesia for environmental policy improvements, especially pertaining to infrastructure sectors. The main instruments are: (a) incorporating environmental considerations into the design of public infrastructure projects; and (b) mitigating negative externalities of public and private infrastructure projects through regulatory, pricing and fiscal policies; and (c) using infrastructure investment to mitigate the environmental damage of other activities.

5.43 Infrastructure Planning and Service Provision. The physical design of public infrastructure projects must integrate environmental effects of the investment from the design stage through project implementation. This will ensure ecological rationality and consistency. Public infrastructure planning must also be in full compliance with appropriate environmental standards and procedures. For projects that impinge on ecologically sensitive habitats, as well as for projects which generate large externalities, the definition of the project area must be expanded significantly over that conventionally used in order to capture full costs. In general, one should also avoid siting projects in or adjacent to ecologically sensitive areas, especially those found in the outer islands, to avoid environmental degradation and loss of biodiversity caused by new activities being drawn into the area on account of the infrastructure investment.

5.44 When infrastructure investments require land acquisition, special attention must be given to the affected people. A time bound settlement plan must be prepared and presented. Those displaced by a project must be provided at minimum with the means to restore their prior living standards, earning capacities and production levels. The affected population must be consulted and involved in the planning and implementation of resettlement activities and principles of equity must be adhered to. In particular, land valuation and compensation principles must be developed and ratified.

5.45 Environmental Assessment of Projects. In applying the principles enunciated in the preceding section, a first key step would be to measure and reflect all costs, direct and indirect, of infrastructure projects and identify both the beneficiaries and those who would be adversely affected by such projects. A key instrument in this regard is detailed environmental assessment (EA) of major projects. GOI has initiated such a process, but much remains to be done to make it operationally effective.

5.46 The Environmental Management Act of 1982 established the legal basis for environmental assessment in Indonesia and a series of subsidiary regulations and ministerial decrees beginning in 1986-87 provided operational guidelines for systematic implementation on environmental matters. The first of these was the Environmental Assessment Regulation (AMDAL). A process has also been established for determining which projects already completed require EA, mitigatory measures and monitoring. This only applies to post-1986 projects. The new Environmental Impact Management Agency (BAPEDAL) is charged with responsibility for overall guidance of the AMDAL process, though as yet it has neither the clear mandate nor the staff capacity to do this effectively.

5.47 Execution of EA for infrastructure projects is the responsibility of the agencies and the enterprises responsible for their development. Review and evaluation of EA is carried out by central and regional commissions appointed, respectively, by the concerned minister or governor depending upon project size and the locus of responsibility for implementation. The overall patterns of responsibility have clarified during the past year and capacities are now developing to produce useful EA results, but much further progress is required. Among the most important requirements are procedures including: (a) project screening criteria that are subsector specific and relatively easy to implement; (b) subsector specific criteria for allocation of projects to national and provincial level review; (c) subsector specific checklists of environmental impacts to be addressed in preliminary reviews and EAs; (d) specific guidelines for environmental management and monitoring plans based on preliminary reviews and EAs; and (e) identification of technical support staff and training requirements for efficient operation of the sectoral review commissions.

5.48 Several difficulties are emerging with the EA process: (a) inadequate coordination between local and national bodies on EA; (b) the EA of post-1986 projects is accumulating too rapidly to be reviewed adequately, partly as a result of donor financing; (c) there is often no clear assignment of overall responsibility for EA and impact mitigation; and (d) environmental standards have yet to be issued in many cases. Problems are exacerbated by the weak capacities of some central commissions and most regional commissions responsible for EA review and evaluation.

5.49 Much remains to be done before EA in Indonesia can be considered a well integrated part of the project cycle. Key actions to accelerate this process include:

- The preparation and evaluation of EA should be kept separate to ensure impartiality. The evaluation roles of BAPEDAL and commissions at the central and regional levels must be clarified for these purposes.
- Elaboration of subsector specific guidelines is required for consistency and timeliness of the EA process.
- Donor financing should aim to strengthen institutional capacity for evaluation of EAs, planning of mitigation measures and monitoring of impacts. This should be supplemented by appropriate training to strengthen capacity to perform EAs.

- Guidelines for assigning project responsibility, backed by a system of incentives and sanctions, are required to improve the consistency and technical quality of projects.

5.50 Pricing and Regulatory Policies. Although Indonesia has made good progress with developing regulatory policies for environmental management, their implementation is constrained by institutional weakness. However, pricing policies can play an important role in managing adverse environmental externalities. An underlying cause of environmental problems is the failure of producers and consumers to internalize environmental costs, which are therefore not reflected in market prices. Subsidized public services increase this distortion in price signals, leading to wasteful consumption, inefficient production and excessive environmental costs.

5.51 User charges will have to play a major role in ensuring the efficient and sustainable use of water resources. In the urban water supply sector, ground-water tariffs have been set well below piped water supply rates, encouraging excessive extraction of groundwater. Similarly, excessive use of irrigation water in Java results from irrigation water being a virtually free good. Pricing policies are also a powerful instrument to reduce environmental damage in the energy sector. The subsidization of polluting fuels, such as kerosene and diesel, has led to excessive use in road transport and deteriorating air quality. An appropriate response would be to raise the price of these types of fuel relative to gasoline, while using regulations to speed up the planned phase-in of unleaded fuels in new vehicles.

5.52 Instituting an environmental tax may also be justified where there are serious social costs of private activity. Urban congestion pricing could be applied to reduce traffic densities and improve traffic efficiency in major urban centers. The Singapore Area Traffic Licensing Scheme of 1976 is the best known example of successful urban congestion pricing.<sup>4/</sup> This scheme mandated a license for access to the central business district during peak hours, with exemptions for buses, motorcycles and car pools. The scheme has (a) reduced peak traffic densities; (b) raised revenues for financing of urban services and infrastructure projects; (c) curtailed fuel consumption and; (d) reduced air pollution levels significantly. Such a scheme could be developed for Jakarta in conjunction with improved provision of public transportation.

5.53 Public Investment. Complementing the above strategy, in some key areas the public sector would need to expand certain basic infrastructure services in order to reduce environmental degradation. There are several examples. In the absence of waste water treatment in most of Indonesia, flushing of city waterways and canals has been the traditional solution to waterborne waste. This merely carries the offending pollutants to another location. In Jakarta, this has led to severe pollution of Jakarta Bay and the near total loss of fish and other marine life. The private sector is unable to provide such services because of the public goods characteristics of water.

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<sup>4/</sup> Jones, Peter M. "The Restraint of Road Traffic in Urban Areas: Objectives, Options and Experiences", Transport Studies Unit Discussion Paper No. 3, Oxford University 1989.

Another key example is solid-waste disposal in urban areas. The lack of adequate public services has led to private dumping of waste, which has caused significant pollution of groundwater.

#### E. Location Aspects of Infrastructure Development

5.54 Policymakers in Indonesia, as in other countries, are concerned with regional imbalances in growth (e.g., Eastern Indonesia vs. Java), and with the perceived excessive concentration of economic activities in or around major urban centers (e.g., Jakarta), especially since it leads to potentially large negative externalities--pollution, urban congestion and excessive rates of rural-urban migration. Many countries have attempted to achieve more balanced regional development and a reduction in the negative effects of excessive urban build-up through industrial regulation and infrastructure location policies--that deliberately attempt to spread the location of industries and infrastructure away from major existing centers to other locations. However, there are potentially high costs associated with such policies--inefficient industrial location that may lead to high costs and uncompetitiveness for private sector firms; low rates of return to costly investment in underutilized infrastructure facilities; and lack of adequate infrastructure services in existing growth centers. Regional balance can be better promoted by alternative policies that rely mainly on the use of market mechanisms and decentralized planning. Only in a small number of special cases, where market failure and poverty reduction objectives are paramount, direct intervention could be justified.

#### Regional Balance in Economic Growth and the Availability of Infrastructure

5.55 Trend in Regional Development. Economic growth has taken place at rapid and relatively uniform rates in all regions in Indonesia (Table 5.2). Structural change has likewise been rapid; in over one-half of all 26 provinces in 1971, agriculture accounted for more than 50 percent of GDP; by 1983, only four very poor and isolated provinces had agricultural product shares in excess of 50 percent.<sup>5/</sup> Nevertheless, considerable differences persist in the levels of per capita incomes and the incidence of poverty across regions in Indonesia. The poorest provinces of East and West Nusa Tenggara had per capita incomes of about one-half the national average, whereas Jakarta and East Kalimantan had per capita income levels more than double the national average. The regional variation in poverty incidence suggests that the proportion of poor amongst total population is higher in Sulawesi and other eastern areas, slightly higher in Java, and relatively lower in Sumatra and Kalimantan.

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<sup>5/</sup> Regional Development in Indonesia--Patterns and Issues, Hal Hill and Anna Weidemann, in Hal Hill ed. Unity and Diversity - Regional Development in Indonesia Since 1970.

**Table 5.2: PROVINCIAL GROWTH RATES PER CAPITA, 1971-87**

|                 | 1971-75 | 1976-82 | 1983-87 |
|-----------------|---------|---------|---------|
| Sumatra         | 3.4     | 4.7     | 3.4     |
| Java            | 8.8     | 6.4     | 4.7     |
| Kalimantan      | 7.9     | 5.5     | 4.1     |
| Sulawesi        | 8.3     | 7.7     | 3.0     |
| Eastern Islands | 10.4    | 5.3     | 3.7     |

Source: Hal Hill.

5.56 Regional Distribution of Infrastructure. A major objective of the Government over the past two decades has been the provision of basic infrastructure services to all regions of Indonesia (Table 5.3). The road network has expanded fastest in regions that were relatively less well endowed to begin with. In the case of the power sector, per capita consumption has expanded at very high, and more or less equal, rates among the main regions in Indonesia. Even in the case of telecommunications services, the regional spread of services has been relatively rapid. The provision of basic transport and communications infrastructure to many parts of the country has improved access to domestic and international markets, expanded employment opportunities, facilitated the introduction of new technologies and increased intraregional trade.

5.57 Even so, wide differences in the levels of regional distribution of infrastructure remain, although the access is much less skewed in per capita terms. Java and Bali, followed by parts of Sumatra, enjoy a relatively superior supply and quality of roads, power systems and telecommunications facilities. By contrast, Kalimantan, Irian Jaya and the Eastern Islands are less well served by modern infrastructure facilities. Within Java, the supply of electricity, all-grade roadways, sewage systems and telecommunications facilities is concentrated in the major coastal cities. In Irian Jaya, Kalimantan and the islands east of Sulawesi, there are few paved roads outside of mining centers and provincial capitals; hardly any villages have access to electricity or running water, telephone hookups and potable water supplies.

#### Regulatory Approaches to Urban Deconcentration

5.58 Given the broad dimensions of regional growth, poverty and infrastructure development in Indonesia, an important policy issue is how the regional imbalances in growth and poverty alleviation can be reduced, and what role should infrastructure location decisions play in this task. Regulatory approaches to regional development and urban deconcentration have been tried in many countries. While the selection of policies vary across countries, the most common include: (i) prohibitions on further investment in the major metropolitan areas; (ii) provision of tax credits, low-cost credit and other fiscal incentives to industries locating in backward regions; and

**Table 5.3: INFRASTRUCTURE ACCESS: A REGIONAL PERSPECTIVE**

|                 | Roadways                |                                 |                         | Telephone                   |                       |                         | Energy Use                       |                       |                         |
|-----------------|-------------------------|---------------------------------|-------------------------|-----------------------------|-----------------------|-------------------------|----------------------------------|-----------------------|-------------------------|
|                 | Length of roads km 1986 | Per cap. length of roads Pop/km | Growth rate (%) 1969-86 | No. of licenses issued 1987 | Per cap. Pop/Lic 1987 | Growth rate (%) 1970-87 | (Electricity sold (000 MWh) 1987 | Per cap. Pop/MWh 1987 | Growth rate (%) 1976-87 |
| Jakarta         | --                      | --                              | --                      | 276,062                     | 31                    | 10.8                    | 5,276                            | 2                     | 15.8                    |
| Java/Bali       | 62,898                  | 1,536                           | 4.6                     | 309,166                     | 318                   | 7.2                     | 8,459                            | 12                    | 17.3                    |
| Sumatra         | 65,025                  | 519                             | 4.9                     | 142,960                     | 243                   | 7.8                     | 2,113                            | 16                    | 19.6                    |
| Sulawesi        | 34,845                  | 340                             | 6.5                     | 37,977                      | 318                   | 7.3                     | 558                              | 22                    | 16.0                    |
| Kalimantan      | 21,571                  | 370                             | 8.5                     | 24,205                      | 339                   | 8.9                     | 532                              | 15                    | 18.1                    |
| Irian Jaya      | 6,473                   | 220                             | 22.2/ <sup>a</sup>      | 7,497                       | 195                   | 5.4                     | 74                               | 20                    | 11.7                    |
| Eastern Islands | 23,221                  | 369                             | 8.7/ <sup>a</sup>       | 18,844                      | 486                   | 10.2                    | 63                               | 139                   | 16.3                    |

<sup>a</sup> 1979-86.

Source: Central Bureau of Statistics, Statistik Indonesia, various issues.

(iii) provision of highly subsidized basic infrastructure. Experience suggests that such an approach is unlikely to be effective and may reduce growth and employment (see Box 5.9).

**Box 5.9: A REGULATORY APPROACH TO URBAN CONCENTRATION: THE KOREAN EXPERIENCE**

In response to perceived over-crowding in Seoul, the Korean government passed a 1977 Industrial Location Act which prevented new factories from locating in central Seoul and empowered the Government to issue relocation orders to some older establishments. Tax breaks, loan guarantees, relocation grants and other incentives were offered to industries that moved. Large public investments were made in infrastructure and education in new industrial towns.

One of the main new industrial towns was Banweol, established in 1978, less than 30 kilometers from Seoul. One thousand plant sites were prepared for small and medium sized establishments, but the occupancy rates were low for several years, until the Government allowed large scale establishments there. Many small and medium sized firms that moved to Banweol suffered excess capacity and financial losses. These firms found that their costs were higher than anticipated and that their access to input and sales markets had worsened. They had difficulties attracting skilled workers who lived mainly in Seoul and were reluctant to commute to Banweol. Firms had difficulties obtaining business information because of poor telephone services.

5.59 Regulatory policies have had limited success because they tend to conflict with market-forces motivating choice of location by the industry or firm. Private industrial location decisions are based on a broad set of factors including access to main population centers, suppliers and ports. In addition, there appears to be a natural cycle whereby small, labor intensive firms are formed in city centers and then, as expansion needs develop, the firms shift to outerlying urban areas located no more than 10-15 km from the central business district. By contrast, industries based on primary product processing tend to locate near their source of raw material supply. Restrictions on new-industry start-ups in crowded cities raise the risk of disrupting this nurturing, evolutionary function of city-centers and, at an extreme, may cause firms to cancel expansion plans.<sup>6/</sup>

<sup>6/</sup> Kyu Sik Lee, Location Aspects of Infrastructure Development, background paper, World Bank, 1991.

5.60 Fiscal subsidies, tax breaks and targeted credit have had little lasting effect on urban settlement. Besides being subject to abuse, such devices erode the tax base, lead to the adoption of excessively capital intensive technologies and tend to attract the more footloose firms keen to shelter tax liabilities or seek financing for uneconomic ventures--hardly the type of enterprise one would wish to encourage to serve as the nucleus of a new town development program.

5.61 Providing subsidized, modern infrastructure to a location deemed to be viable by regulatory fiat, and supported by fiscal incentives and transfers, is a high risk strategy. In the absence of clear signs of development potential, the provision of highly subsidized, modern infrastructure has often led to poorly designed investments that are underutilized and poorly maintained.

### Factors Underlying Efficient Infrastructure Location Decisions

5.62 Public policies to achieve appropriate infrastructure location would need to be guided by four closely related objectives: efficiency, regional development, environmental protection and poverty alleviation. While in the past oil revenues allowed the Government to expand basic infrastructure rapidly across all regions, based primarily on regional balance considerations, the constrained financial resources and implementation capacity in the 1990s will place much greater challenges on GOI in meeting regional equity concerns while ensuring the efficiency and sustainable development objectives.

5.63 Efficiency Concerns. It is frequently claimed that excessive and much more expensive infrastructure investments are demanded and made in cities at the cost of small towns and rural areas (i.e., in Jakarta rather than in other secondary cities, and rather than in rural areas in Java or elsewhere). The appropriate strategy would be that all infrastructure location decisions, whether for large cities, small towns, or rural areas, should be subject to a full benefit-cost analysis, and projects chosen on the basis of the highest rates of economic return.<sup>7/</sup> In addition, public pricing policies in providing such infrastructure services should, in most instances, fully charge users for costs (see Chapter 3).

5.64 Regional Balance Concerns. The pursuit of an efficient infrastructure investment policy could nevertheless contribute to regional imbalances in growth, with the relatively well-served regions advancing faster than the less-served regions. International experience suggests that whenever there is excessive centralized government structures and decision-making, as in Mexico and Thailand, countries almost always overinvest in certain areas (e.g., capital cities and regions) at the expense of potential in other areas. Indonesia also has a highly centralized form of government. Private investment tends to locate in the primary cities and regions, such as Jakarta and Java, because it is easier to obtain the licenses and permits and other approvals from the government. Central government also tends to make all the decisions on where to locate and to finance infrastructure investments, overlooking important opportunities for sound investment at local levels. The

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<sup>7/</sup> See: Urban Efficiency, Productivity, and Economic Development, Edwin Mills, 1991.

appropriate strategy to foster regional equity therefore is to strengthen local governments, decentralize investment decisions, and to decentralize and deregulate government licensing and approval processes.

5.65 Indonesia is already following such a strategy. But, as noted earlier, concerted efforts will need to be made to improve the policy framework and institutional capacity at the local level. A policy framework which provides neutral treatment to all regions would also need to remove a number of biases which favor investment in the metropolitan areas of Java, including: (i) nationally uniform pricing policies for electricity, fuels and infrastructure services which reduce infrastructure investment in remote and sparsely populated areas; (ii) restrictive trade policies (e.g., for rattan and for a number of agricultural products), which cause trade to flow through Java ports rather than from other ports; and (iii) centralized investment approval requirements which, in practice, imply that firms must maintain a presence in Jakarta in order to secure project approvals.

5.66 Location and Environment. Since much of the infrastructure investment now demanded will be in support of urban-based manufacturing, this may lead to rapid migration of the rural population to the cities--a problem that Indonesia has avoided with some success in the past. The combination of rapid urban growth with a potentially rapid influx of migrants would exacerbate the already serious problems of urban pollution and congestion, leading to potentially unsustainable long-term development. As noted in Section D, the main strategy to control urban congestion and pollution lies in: (a) imposing full user costs of infrastructure services; (b) adequately pricing key products, such as fuel; and (c) imposing appropriate charges to offset the social cost of urban congestion. Simultaneously, the fiscal revenues could be employed to finance investment in urban services (e.g., urban mass transit, slum upgrading, solid waste disposal) to protect the environment.

5.67 Poverty Alleviation Considerations. There may, however, be certain provinces where central government-financed special programs would be required to alleviate chronic poverty. The prospects of identifying economically viable infrastructure investments in these areas is limited, as they tend to be more sparsely populated areas in which subsistence agriculture is the dominant form of economic activity. In these regions, most infrastructure investment will serve more as a welfare tool. The appropriate assistance strategy would be to concentrate investments on human resource development to improve labor skills and long-term mobility, basic infrastructure such as rural roads and water supply, and development of income-generating activities geared to local market conditions.

## CHAPTER 6

### PUBLIC INVESTMENT IN INFRASTRUCTURE--SECTORAL PRIORITIES

#### A. Introduction

6.1 The previous chapters developed the main elements of a sound infrastructure development strategy, which involves a balanced combination of resource mobilization, pricing, regulatory and institutional development policies. Against the background of the overall strategy, this chapter reviews the public investment requirements and priorities for the four infrastructure sectors--power, telecommunications, transport and water (Sections B-E). Physical targets are identified where possible (power and telecommunications), and indicative sectoral investment allocations by broad program components are suggested. These allocations are consistent with the investment allocations and the financing plan reviewed in Chapter 2.

#### B. Power Sector

##### The Demand for Electricity

6.2 Despite the rapid growth of the power sector in Indonesia during the 1970s and the 1980s, several studies have shown that the demand for electricity is still large and that there is a potential for rapid growth in PLN's sales as supply capacity expands. This is supported by the fact that even though PLN's sales grew by over 13 percent per annum during the 1980s, additional growth in electricity consumption was supported by expanding use of captive generation by industry, and the proliferation of informal microenterprises in rural areas. The rapid growth in PLN's sales originates from three sources: (a) growth in consumption by existing customers as a result of rising output and income; (b) extension of supply to new areas for residential and other users; and (c) gradual replacement of diesel-based captive generation.

6.3 Taking into account the above sources of growth, PLN estimates that the sales of electricity from its grid will continue to expand as shown in Table 6.1. This forecast incorporates the following main postulates: (a) a sustained overall GDP growth rate of 6-7 and industrial sector growth rate of 10-11 percent per annum in the 1990s, combined with a transition towards a more efficient pattern of electricity consumption based on long-run marginal cost of supply; (b) an increase in the share of electrified households from 28 percent (62 percent urban, 16 percent rural) in 1990 to 40 percent (75 percent urban, 25 percent rural) in 1995; and (c) a gradual increase in the share of total industrial electricity requirements provided by PLN. Overall, the share of industrial customers in PLN's total sales is projected to increase from 49 percent in 1990 to 52 percent in 1995, while that of households is projected to decline from 33 percent to 31 percent over the same period, with the rest accounted for by commercial and public customers.

**Table 6.1: PLN'S SALES FORECAST 1991/92 - 1998/99 <sup>a/</sup>**  
(TWh)

| Year             | Java-Bali | (%)    | Outside Java<br>- Bali | (%)  | Indonesia | (%)  |
|------------------|-----------|--------|------------------------|------|-----------|------|
| 1990/91 (Actual) | 22.1      | (18.0) | 5.4                    | 14.9 | 27.5      | 17.4 |
| 1991/92          | 23.6      | (6.8)  | 6.2                    | 14.8 | 29.8      | 8.4  |
| 1992/93          | 27.5      | (15.2) | 7.0                    | 12.9 | 34.5      | 15.8 |
| 1993/94          | 32.8      | (19.2) | 8.0                    | 14.3 | 40.8      | 18.3 |
| 1994/95          | 39.2      | (19.5) | 9.0                    | 12.5 | 48.2      | 18.1 |
| 1995/96          | 43.6      | (11.4) | 10.2                   | 13.3 | 53.8      | 11.6 |
| 1996/97          | 48.7      | (11.6) | 11.6                   | 13.3 | 60.3      | 12.1 |
| 1997/98          | 54.3      | (11.4) | 13.1                   | 13.3 | 67.4      | 11.8 |
| 1998/99          | 59.8      | (10.2) | 14.8                   | 13.3 | 74.6      | 10.7 |

a/ PLN has developed three demand scenarios--low, medium and high. These projections correspond to the medium growth scenario.

Source: PLN

#### Power Generation Requirements

6.4 PLN's installed generating capacity in 1990/91 was about 9,180 MW of which about 6,363 MW was in Java. Table 6.2 shows a breakdown of the generating capacity by primary fuel sources in Java and outside Java as of March 31, 1991.

**Table 6.2: PLN'S GENERATING CAPACITY (1990/91)**  
(MW)

| Type               | Java-Bali    | Outside<br>Java-Bali | Total        | Share<br>%   |
|--------------------|--------------|----------------------|--------------|--------------|
| Steam (Coal)       | 1,600        | 130                  | 1,730        | 18.9         |
| (Oil)              | 1,900        | 285                  | 2,185        | 23.8         |
| (Gas)              | 0            | 25                   | 25           | 0.3          |
| Gas Turbines (Oil) | 586          | 159                  | 745          | 8.1          |
| (Gas)              | 80           | 235                  | 315          | 3.4          |
| Diesel             | 92           | 1,673                | 1,765        | 19.2         |
| Hydro              | 1,965        | 310                  | 2,275        | 24.8         |
| Geothermal         | 140          | 0                    | 140          | 1.5          |
| <u>Total</u>       | <u>6,363</u> | <u>2,817</u>         | <u>9,180</u> | <u>100.0</u> |

Source: PLN.

6.5 Based on the demand projections in Table 6.1, the installed capacity in the Java-Bali system is projected to grow to over 11,000 MW in the next five years, and to over 15,000 MW by the end of REPELITA VI. In achieving these targets, power generation needs to be focused on least-cost options. A comparison of economic costs indicates that natural gas, as compared to oil, nuclear and geothermal, is the least-cost alternative for power generation.<sup>1/</sup> As noted in Table 6.2, PLN's power generation is still based to a large extent (51 percent) on petroleum products. To achieve the substitution of natural gas for petroleum products, GOI will need to ensure that petroleum product prices reflect their economic values.<sup>2/</sup> The least cost generation expansion plan prepared by PLN and reviewed by the Bank, establishes the following targets for the generating capacity in Java, by fuel sources, for the end of REPELITA VI period. (See Table 6.3). The share of gas as a primary fuel will grow from about 4 percent in 1990/91 to about 30 percent by 1995/96, and to 36 percent by 1998/99.

**Table 3.3: GENERATING CAPACITY IN JAVA - BALI  
(MW)**

| Type                 | Capacity<br>(March 31, 1996) | Share<br>(%) | Capacity<br>(March 31, 1999) | Share<br>(%) |
|----------------------|------------------------------|--------------|------------------------------|--------------|
| Steam (Coal)         | 2,400                        | 21.0         | 6,600                        | 43.2         |
| (Oil)                | 1,400                        | 12.3         | 1,200                        | 7.8          |
| (Gas)                | 400                          | 3.5          | 400                          | 2.6          |
| Gas Turbines (Oil)   | 511                          | 4.5          | 421                          | 2.8          |
| (Gas)                | 80                           | 0.7          | --                           | --           |
| Combined Cycle (Gas) | 3,678                        | 32.2         | 3,678                        | 24.1         |
| Hydro                | 2,580                        | 22.6         | 2,624                        | 17.1         |
| Geothermal           | 360                          | 3.2          | 360                          | 2.4          |
| Diesel               | 6                            | 0.0          | 6                            | 0.0          |
| <u>Total</u>         | <u>11,415</u>                | <u>100.0</u> | <u>15,289</u>                | <u>100.0</u> |

Source: PLN.

6.6 The generation requirements outside Java would similarly grow rapidly, from about 2,800 MW in 1990/91 to 4,500 MW by 1995/96 and to 6,500 MW by 1998/99. For the country as a whole, the required power generation capacity is projected to grow from about 9,200 MW in 1990/91 to about 21,800 MW by 1998/99.

<sup>1/</sup> See Indonesia: Energy Options Review, Report No. 6583-IND, World Bank, August 1987.

<sup>2/</sup> See Indonesia Energy Pricing Review, Report No. 8684-IND, World Bank, October 1990.

## Investment Requirements for the Power Sector

6.7 The investment requirements associated with the above expansion in Indonesia's electricity generation capacity are shown in Table 6.4. This plan

**Table 6.4: INVESTMENT REQUIREMENTS FOR POWER GENERATION**  
(In 1991 US\$ million)

|                         | 1992/93      | 1993/94      | 1994/95      | 1995/96      | 1996/97      | 1997/98      | 1998/99      |
|-------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Diesel                  | 75           | 152          | 76           | 95           | 76           | 57           | 79           |
| Gas turbine             | 75           | 11           | 11           | 6            | 0            | 49           | 70           |
| Hydro                   | 366          | 580          | 759          | 846          | 969          | 949          | 636          |
| Steam oil               | 25           | 0            | 0            | 0            | 0            | 0            | 0            |
| Steam coal              | 556          | 576          | 467          | 270          | 189          | 181          | 339          |
| Geothermal              | 89           | 43           | 14           | 11           | 16           | 11           | 5            |
| Combined cycle          | 805          | 864          | 272          | 31           | 0            | 27           | 26           |
| <b>Total</b>            | <b>1,991</b> | <b>2,206</b> | <b>1,599</b> | <b>1,259</b> | <b>1,250</b> | <b>1,274</b> | <b>1,155</b> |
| <b>Memo Item:</b>       |              |              |              |              |              |              |              |
| - In current US\$ (b)/a | 2.1          | 2.4          | 1.8          | 1.5          | 1.5          | 1.6          | 1.5          |
| - in current Rp (tr.)   | 4.2          | 5.0          | 3.9          | 3.4          | 3.6          | 4.0          | 3.9          |
| - % of GDP              | 1.8          | 1.9          | 1.4          | 1.0          | 1.0          | 1.0          | 0.9          |

/a Using MUV deflator.

Source: PLN and World Bank staff estimates.

assumes a major private sector role in bulk electricity generation in Indonesia starting in 1994/95. PLN has also formulated an investment plan for the expansion of the transmission and distribution facilities, to meet the expected growth in demand (see Table 6.5). The basis for the plan is derived from: (a) segregated area-wide demand projections, consistent with aggregate demand projections; (b) supply agreements and applications for supply from industrial consumers; (c) targets for the expansion of supply to urban and residential consumers; and (d) detailed load flow studies to ensure the integrity and reliability of transmission system.

### Key Issues in the Power Sector and PLN's Development Program

6.8 The formulation of PLN's development program will need to be based on a careful consideration of a number of key considerations:

- The updated sales forecast has necessitated a substantial revision in the projected financing requirements for PLN's long-term development program. Even if the program could be fully financed and implemented by PLN, the recent acceleration in economic growth, which had not been foreseen, combined with the long lead time required for power generation investments, is likely to lead to a situation in which demand for electricity from PLN will outstrip its ability to supply, at least until 1993/94, when PLN's capacity could catch up with requirements if the projected program were to be fully implemented.

**Table 6.5: INVESTMENT REQUIREMENTS FOR TRANSMISSION AND DISTRIBUTION FACILITIES**  
(in 1991 US\$ million)

|   | 1992/93      | 1993/94      | 1994/95      | 1995/96      | 1996/97      | 1997/98      | 1998/99      |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Transmission                              | 281          | 256          | 285          | 389          | 351          | 316          | 399          |
| Substation                                | 132          | 140          | 140          | 170          | 192          | 204          | 227          |
| Consumer connections                      | 126          | 121          | 127          | 130          | 133          | 139          | 145          |
| MV lines                                  | 285          | 360          | 401          | 430          | 456          | 463          | 470          |
| LV lines                                  | 189          | 205          | 224          | 219          | 235          | 232          | 231          |
| Distribution transformers and substations | 136          | 181          | 229          | 224          | 242          | 233          | 238          |
| <b>Total</b>                              | <b>1,149</b> | <b>1,263</b> | <b>1,406</b> | <b>1,542</b> | <b>1,609</b> | <b>1,587</b> | <b>1,710</b> |
| <b>Memo item:</b>                         |              |              |              |              |              |              |              |
| - In current US\$ (b)/ <sup>a</sup>       | 1.2          | 1.3          | 1.6          | 1.8          | 1.9          | 2.0          | 2.2          |
| - In current Rp (tr.)                     | 2.4          | 2.9          | 3.5          | 4.1          | 4.6          | 4.9          | 5.7          |
| - % of GDP                                | 1.0          | 1.1          | 1.2          | 1.3          | 1.3          | 1.2          | 1.3          |

<sup>a</sup> Using MUV deflator.

Source: PLN and World Bank staff estimates.

- The substantial growth in the power sector's investment requirements during the 1990s will present a major challenge. The key issues are: (a) the ability of PLN to mobilize these required resources and implement the underlying physical program components efficiently; and (b) GOI's policy framework for private participation. Under the present institutional arrangements, PLN's capacity to implement this program will be constrained both by its inability to mobilize the necessary resources as well as inadequate institutional capacity. At the same time, securing private participation in an efficient manner will require substantial changes in GOI's policy (see Chapter 4).
- Finally, the need to maintain fiscal discipline, especially in the next 2-3 years, will constrain GOI's ability to fund PLN's full investment program from budgetary resources.

6.9 There are three main implications of these factors. First, measures are needed to manage the demand supply imbalances in the short- to medium-term. To minimize the adverse economic consequences of a possible shortage of electricity, the GOI and PLN are pursuing a series of measures to balance supply and demand in the medium term in a least-cost manner. These measures include: (a) coordination with captive generating capacity available with private suppliers to augment the public supply; (b) encouragement of private investments in large new power plants to meet specific industrial requirements as well as feed into PLN's grid; (c) curtailment of the replacement by PLN of existing captive generation; and (d) improvement of the availability and reliability of existing plants. In addition to the above measures, greater emphasis on demand side measures such as load management, efficient energy conservation, interruptible supply agreements, cogeneration and efficient pricing will need to be pursued.

6.10 A second implication is the need to reevaluate the targets for PLN's supply areas and rural electrification. Given budgetary as well as project implementation constraints, especially over the next few years, there is an important need to prioritize electricity expansion programs. This might entail rephasing some of the planned expansion in the outer islands, while protecting investments in Java where the demand-supply imbalance for electricity appears to be more serious.

6.11 A third implication is the need to formulate an appropriate electricity development strategy for the longer term, especially taking note of the long gestation lags in the implementation of power generation investments and the long-term nature of the needed institutional developments. As PLN has already recognized, balanced electricity expansion strategy for the 1990s calls for a combination of policies that will allow: (a) significant private participation in electricity generation; and (b) appropriate institutional reforms to provide greater financial and operational autonomy to PLN.

6.12 Possible actions to promote private sector participation were suggested in Chapter 4 (Box 4.1). It is possible to promote bulk-generation by private producers to supply the grid (BOO/BOOT) as is currently being promoted by the Government. Also possible are franchising, in delineated geographic areas such as Batan and Bintan Islands, and establishment of privately owned power supply companies for the proposed industrial estates. All these actions would reduce the need for public investment through PLN. However, they may not create an efficient and sustainable sector organization that would progressively depend largely on private sector. Hence a reorganization of PLN is necessary.

6.13 One approach suggested in Chapter 4 (Box 4.1) is to create a separate, fully autonomous power generation entity for Java which could progressively be privatized by offering shares to the public. The successful implementation of this approach could allow the private sector to finance a substantial part of investment in the power sector.

6.14 Based on the above considerations, an indicative public investment program for PLN is shown in Table 6.6. The main difference from PLN's own estimates is for the 1992/93-1993/94 period. The estimates in Table 6.6 take note of GOI's budgetary constraints in the next two years, while also recognizing the possible delays in project implementation. Thus, new investments in power generation for outer islands is scaled back, while targets for new supply areas and rural electrification are also reduced. It is assumed that these investments will be rephased to 1994/95 onwards as private participation is stimulated and PLN's own financing and institutional capacities are enhanced through appropriate changes in policies.

## C. Telecommunications

### Background

6.15 Despite recent progress, several indicators confirm that the performance of the telecommunications sector in Indonesia needs to be vastly improved (see Chapter 1). In particular: (a) Indonesia has by far the lowest

**Table 6.6: INDICATIVE PUBLIC SECTOR INVESTMENT PROGRAM FOR THE POWER SECTOR**  
(in 1991 US\$ million)

|                               | 1992/93      | 1993/94      | 1994/95      | 1995/96      | 1996/97      | 1997/98      | 1998/99      |
|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Generation                    | 1,788        | 1,798        | 1,205        | 950          | 1,042        | 1,218        | 1,428        |
| Transmission and distribution | 858          | 1,262        | 1,407        | 1,543        | 1,608        | 1,588        | 1,708        |
| <b>Total</b>                  | <b>2,641</b> | <b>3,060</b> | <b>2,612</b> | <b>2,493</b> | <b>2,650</b> | <b>2,804</b> | <b>3,131</b> |
| <b>Memo item:</b>             |              |              |              |              |              |              |              |
| - In current US\$ (b)         | 2.77         | 3.84         | 2.93         | 2.89         | 3.15         | 3.51         | 4.04         |
| - In current Rp (tr.)         | 5.54         | 7.00         | 6.36         | 6.73         | 7.58         | 8.78         | 10.50        |
| - % of GDP                    | 2.3          | 2.7          | 2.3          | 2.0          | 2.1          | 2.2          | 2.4          |

Source: PLN and World Bank staff estimates.

telephone density among ASEAN countries; (b) registered unmet demand for telephone service increased as a proportion of total supply from 39 percent of lines in 1982 to 45 percent by end-1990; (c) both the low successful call ratio (SCR) and the high number of faults per line indicate that the quality of service needs considerable improvement.

6.16 In recognition of the large economic benefits of adequate and reliable telecommunications system, GOI accorded high priority to the sector in REPELITA IV. For example, a total of \$3.1 billion (0.9 percent of GDP per annum) was allocated during REPELITA IV. Actual implementation, however, was constrained by the state telecommunication enterprises' project implementation capacity. A number of steps have been taken to improve the situation, including converting the enterprise to a limited liability company (now known as TELKOM) and applying commercial principles to improve operational performance. TELKOM's capacity to operate and maintain a much expanded network, however, will be a binding constraint. Future development strategy and investment allocations will need to take full account of this factor.

#### Demand for Services

6.17 A demand forecast was carried out by TELKOM with the assistance of Japan International Corporation Agency (JICA) in 1987 as part of its long-term development plan. This forecast focused on the growth in demand for connections to the national network for telephone services. Table 6.7 summarizes two demand projections. The first assumes an overall GDP growth rate of 5 percent per annum and tariff is assumed to remain constant in real terms. The second assumes continuation of historical trends (a growth rate of 13.5 percent per annum).

6.18 Despite rehabilitation and a large increase in investment, the supply of telecommunications facilities and services will remain inadequate relative to demand throughout the projection period because of the large overhang of unmet demand. Under TELKOM's medium-term development plan (1989/90-1998/99), new telephone line connections are planned to grow at a rate of 20 percent per

**Table 6.7: DEMAND ESTIMATES FOR TELEPHONE LINES**  
( '000 lines)

|   | 1989/90 | 1993/94 | 1998/99 | 2003/04 |
|---|---------|---------|---------|---------|
| A - Demand (GDP growth rate of 5% p.a.)         | 2,584   | 4,431   | 7,930   | 9,872   |
| B - Demand (historical growth rate of 13% p.a.) | 1,478   | 3,014   | 6,146   | 8,777   |

Source: TELKOM.

annum. This program, if successfully implemented, would raise the number of telephone lines from 1.2 million working lines in 1991 to 5 million lines by 1998/99.

**Table 6.8: SUMMARY TARGETS, 1988/89-1998/99**  
( '000 lines)

|                               | 1988/89    | 1993/94      | 1998/99      |
|-------------------------------|------------|--------------|--------------|
| Demand A (5% GDP growth p.a.) | 2,584      | 4,431        | 7,930        |
| Demand B (historical)         | 1,478      | 3,014        | 6,146        |
| Additional DELs               | 250        | 1,300        | 2,900        |
| <u>Total DELs</u>             | <u>800</u> | <u>2,100</u> | <u>5,000</u> |
| DELs/in people                | 0.45       | 1.04         | 2.35         |
| Demand met B (%)              | 0.50       | 0.70         | 0.82         |
| Demand met A (%)              | 0.31       | 0.48         | 0.63         |

Source: TELKOM.

**Key Elements of a Strategy for Telecommunications Development**

6.19 GOI's main objectives for the telecommunications sector are to:

- achieve rapid network expansion;
- reduce cost and enhance quality of service;
- extend coverage of basic telephone service to rural areas currently not covered.

Achieving these objectives will require major changes in the strategy for telecommunications development. At present the sector is characterized by government ownership of almost all public telecommunications facilities and monopoly provision of basic services. As a result, the performance of TELKOM has been critical to the performance of the sector as a whole. Two main factors have contributed to TELKOM's inadequate performance. First, until recently, government management of the sector did not give sufficient stimulus and incentive to TELKOM's management to strive for higher performance. Second, TELKOM faces virtually no competition in the provision of network and, therefore, has no compelling incentive to improve performance.

6.20 The key to improving TELKOM's efficiency, as well as increasing the supply of telecommunications services to satisfactory levels, is greater competition in service provision. There are at least four areas where competition can be increased immediately:

- Cellular Telephone Service. Instead of the current revenue-sharing arrangements, whereby service is provided through TELKOM, it should be provided by operators who own the assets and compete. This would lead to reduced prices and expanded services.
- Terminal Equipment. GOI should enforce a firm policy supporting competition in the provision of telecommunications terminal equipment, including cellular telephones.
- VSAT (Very Small Satellite Terminal) Telecommunications Services. These systems are typically used to provide private data transmission networks. At present the service is provided pursuant to a revenue-sharing agreement with TELKOM. As in cellular services, VSAT services should be provided directly by private operators in a competitive environment.
- Resale and/or value added ("non-basic") services provided over circuits leased from TELKOM. This important area of competition, still using TELKOM's network, to provide business services, is being discouraged by the large increase in TELKOM's leased line charges.

6.21 More fundamental competitive options include expanding the role of INDOSAT (the long-distance public telephone company) to provide certain domestic services and introducing elements of competition in long-distance telephone service. For example, INDOSAT, possibly through a subsidiary jointly owned with private investors, could be licensed to provide the new generation of digital cellular telephone networks. Economies of scale exist to a significant extent in long-distance networks but become less important as traffic volume increases. Therefore, as the volume increases, consideration should be given to promoting a private long-distance company. These and other strategic options that can have a very important long-term impact on the overall development of the sector need to be reviewed and assessed carefully.

6.22 Along with greater competition from the private sector, major changes in the organization and management of TELKOM will be needed. Following the change of TELKOM corporate status from PERUM to P.T. and with gradual introduction of competition in selected markets, GOI will now need to facilitate and encourage TELKOM to go faster and further in transforming itself

from a public utility to a commercial enterprise. The main needs are to: (a) develop an organizational structure that is able to offer telephone services in an enterprising and businesslike manner and improve system support for the management of the business; (b) delegate decision-making and accountability down to the lowest feasible levels in the hierarchy and encourage new attitudes in the staff with appropriate performance-oriented rewards; and (c) improve human resource management and development.

**Investment Requirements**

6.23 TELKOM has proposed two development plans (Table 6.9) for the period 1989/90-1998/99. The proposed plans are based on the following considerations. Plan A, the more manageable and realistic of the two alternatives, calls for adding a total of 4.2 million telephone lines in order to achieve a density of 2.35 lines per 100 population by 1998/99. This would represent an average growth rate of 20 percent per annum in telephone lines. This is the recommended "catch-up" plan, given TELKOM's current implementation capacity to effectively operate and maintain the expanded network. The more ambitious Plan B would add 6.2 million telephone lines, representing an average growth rate of 25 percent per annum and would result in a density of approximately 3.29 telephone lines per 100 population by 1998/99. Under Plan A, the 4.2 million additional lines would be divided among REPELITAs V, and VI as 1.3 and 2.9 million lines respectively. Summary targets are given in Table 6.9. Although the implementation of Plan A would not substantially reduce the number of outstanding applicants, there will be significant improvement in relative terms. Most importantly, the quality and access to service would be vastly improved. As TELKOM's operational capacity improves through further deregulation, increased investment through private participation would need to be explored to implement plan B.

**Table 6.9: TELKOM'S MEDIUM-TERM DEVELOPMENT PLAN, 1989/90-1998/99**

|   | <u>Repelita</u>   | <u>Repelita</u>   | <u>Repelita VI</u> |               |
|---|-------------------|-------------------|--------------------|---------------|
|   | <u>IV</u>         | <u>V</u>          | <u>Plan A</u>      | <u>Plan B</u> |
|   | (1983/84-1988/89) | (1989/90-1993/94) | (1994/95-1998/99)  |               |
| Added capacity<br>(mln DELs)              | 0.25              | 1.3               | 2.9                | 4.9           |
| Density (DELs/<br>100 pop.) <sup>/a</sup> | 0.45              | 1.04              | 2.35               | 3.29          |
| Average annual DEL<br>growth rate (%)     | 7.2               | 16.0              | 20.0               | 25.0          |

<sup>/a</sup> Figure at end of five-year period.

Source: TELKOM.

6.24 The required investment costs for the medium-term are shown in Table 6.10. This is based on the average cost Rp 3.0 million (\$1,500) per line added, which would be realized if TELKOM adopts: (a) emerging new technology in network design, (b) competitive procurement and financing strategy, and (c) an integrated system approach in project implementation.

**Table 6.10: TELKOM'S MEDIUM-TERM INVESTMENT PROGRAM, 1989/90-1998/99**

|                           | 1989/<br>90 | 1990/<br>91 | 1991/<br>92 | 1992/<br>93 | 1993/<br>94 | 1994/<br>95 | 1995/<br>96 | 1996/<br>97 | 1997/<br>98 | 1998/<br>99 |
|---------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Investment Cost:</b>   |             |             |             |             |             |             |             |             |             |             |
| - 1991 prices; US\$ ml    | 0.35        | 0.51        | 0.62        | 0.76        | 0.77        | 0.79        | 0.81        | 0.88        | 0.96        | 1.06        |
| - Current prices; US\$ ml | 0.38        | 0.52        | 0.62        | 0.78        | 0.80        | 0.85        | 0.90        | 1.03        | 1.16        | 1.38        |
| - Current prices; Rp tr   | 0.66        | 0.98        | 1.22        | 1.60        | 1.70        | 1.89        | 2.09        | 2.47        | 2.89        | 3.59        |
| <b>Memo item:</b>         |             |             |             |             |             |             |             |             |             |             |
| % of GDP                  | 0.40        | 0.51        | 0.57        | 0.67        | 0.65        | 0.65        | 0.64        | 0.68        | 0.72        | 0.81        |

Source: TELKOM and World Bank staff estimates.

6.25 Keeping Abreast of Technology Changes. As part of the long-term planning process, mechanisms for tracking technical change in today's fast-changing technology environment will play an important role in determining investment plans. TELKOM should organize a high-level committee, chaired by a senior manager, to review plans for the evolution of its networks, including the upgrading of its existing facilities and the introduction of ISDN. The conclusions of this committee would need to be reviewed at regular intervals, perhaps every three years. The committee membership structure would need to encourage the input of views from interested parties outside of TELKOM such as MTPT, PT Indosat, PT Inti and major users - PERTAMINA, PLN and GARUDA. As more experience with ISDN is accumulated in other countries, the committee should monitor the evolution of costs of the emerging telecommunication services and take them into account in reestimating investment needs. It is likely that plans for an ISDN pilot project would need to be laid before 1995 so that they could be implemented early in Repelita VI.

6.26 Reducing Unit Costs. In order to improve cost effectiveness, especially at a time when the network is fast developing, investment cost per direct exchange line (DEL) must be closely controlled. As material and equipment costs constitute a substantial part of investment, competitive procurement is essential to keep costs down. In the changing environment, TELKOM has to adopt a procurement strategy, supported by adequate policy and day-to-day implementation practices, which will advance this objective. TELKOM is determined to use its buying power on the domestic market to facilitate competition as much as possible. One approach for TELKOM is to issue a procurement policy statement early in 1993 and to follow the policy in a pragmatic way in the future. TELKOM believes, and the Bank supports the notion, that gradual introduction of a competitive purchasing process will benefit TELKOM as well as the suppliers.

6.27 Implementing the REPELITA V Investment Program (1989-94). TELKOM's proposed Rp 6.0 trillion (\$3.0 billion) investment plan during REPELITA V is expected to expand working lines by 2.1 million lines (a net increase of 1.3 million working lines), thus more than doubling the working lines. The program includes two relatively self-contained parts: Part I, to add 600,000 working lines, financed by the Bank, Germany, Japan and TELKOM, is under execution. Part II financed by the Bank, Germany, France, Japan, Spain, the U.S.A. and TELKOM is planned to result in the installation of 700,000 additional lines. Implementation is expected to commence in 1992 and would be completed by 1996.

#### D. Transport

##### Background

6.28 As the Indonesian economy developed, so have the scale, pattern, nature and complexity of demands on the transport system:

- the rapid growth of the major urban centers, and particularly the Jabotabek region, has placed growing strains on their transport infrastructure and public transport services, which in turn threaten to impair their efficiency--the problems are evident not only in congested inner city areas but also at their peripheries where much new industrial development is taking place alongside the major approach roads;
- the recent rapid growth in non-oil exports and, to a lesser extent, imports has resulted in some dramatic increases in the volume of general cargo traffic, and particularly containerized cargos, handled by the main seaports; and
- rapid development of foreign and domestic tourism, concentrated in a limited number of areas, has contributed to fast growth in domestic and international air passenger traffic. The emergence and growth of industries with high value, time-sensitive inputs or products--such as shellfish for export--has similarly created new demands for faster and more sophisticated air cargo services.

These trends require Indonesia's transport companies to become more efficient and responsive and to integrate themselves better into international transport and communications networks.

6.29 Reflecting the Government's efforts to address these emerging transport infrastructure constraints, development spending in this sector has increased dramatically in recent years. Government transport spending (at current prices) grew from Rp 1.2 trillion in 1984/85 to Rp 3.8 trillion in 1989/90, albeit with a sharp dip in 1986/87 (see Table 6.11). In US\$ terms, this represents a 90 percent increase in the annual level of spending over the period. The transport sector's share of total Central Government development spending has increased from 13.3 percent in 1984/85 to 22.2 percent in 1989/90, albeit again with a dip in 1986/87. Over the period, close to half of total transport sector spending has been on road infrastructure. Stated as a

**Table 6.11: DEVELOPMENT EXPENDITURES IN THE TRANSPORT SECTOR**  
(Rp. Billion)

|                             | 1984/85      | 1985/86      | 1986/87      | 1987/88      | 1988/89      | 1989/90      | Total         |
|-----------------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
| <b>Transport sector</b>     |              |              |              |              |              |              |               |
| Road infrastructure         | 821          | 557          | 376          | 928          | 1,364        | 2,1017       | 5,862         |
| Land transport              | 126          | 238          | 147          | 542          | 544          | 705          | 2,308         |
| Sea transport               | 176          | 230          | 213          | 463          | 551          | 375          | 2,008         |
| Air transport               | 240          | 189          | 86           | 367          | 710          | 736          | 2,328         |
| <b>Total</b>                | <b>1,168</b> | <b>1,215</b> | <b>822</b>   | <b>2,299</b> | <b>3,169</b> | <b>3,933</b> | <b>12,501</b> |
| <b>Subsector shares (%)</b> |              |              |              |              |              |              |               |
| Road infrastructure         | 53.4         | 45.9         | 45.8         | 40.3         | 43.0         | 52.6         | 46.9          |
| Land transport              | 10.9         | 19.6         | 17.9         | 23.6         | 17.2         | 18.4         | 18.4          |
| Sea transport               | 15.1         | 19.0         | 25.9         | 20.1         | 17.4         | 9.8          | 16.1          |
| Air transport               | 20.6         | 15.6         | 10.4         | 16.0         | 22.4         | 19.2         | 18.6          |
| <b>Total</b>                | <b>100.0</b>  |
| <b>Memo items:</b>          |              |              |              |              |              |              |               |
| Transport as % of           |              |              |              |              |              |              |               |
| Dev. Exp.                   | 13.3         | 11.0         | 10.8         | 18.8         | 22.4         | 22.2         | 16.4          |
| Transport as % of GDP       | 1.29         | 1.25         | 0.80         | 1.84         | 2.23         | 2.30         | 1.73          |

/a Expenditures through the Central Government Budget only.

Sources: Ministry of Finance and World Bank estimates.

percentage of GDP, state budget development expenditures on transport have risen from around 1.3 percent in 1984/85 to around 2.3 percent in 1989/90, after dipping to only 0.8 percent in 1986/87.

### Investment Priorities

6.30 Interurban Roads. The geometry and pavement of key interurban road links have been improved to a satisfactory condition and appropriate maintenance programs have been put in place. During the coming years, the main challenges will therefore increasingly shift to: (a) providing additional capacity in those corridors, principally on Java, where traffic volumes are now approaching capacity and where heavy freight traffic will necessitate further pavement strengthening; and (b) improving considerably the quality of road works. There are several options for providing the additional road capacity needed in the densely used trunk corridors, ranging from the widening of existing roads coupled with the construction of urban by-passes through to the construction of a strategic network of restricted access toll roads. A careful review of the net benefits of the various possible options would need to guide the appropriate choice of specific projects.

6.31 District Roads. The current level of spending on district roads, which is providing improved access to rural communities at a reasonably rapid rate, probably already exceeds the absorptive capacities of local governments and their contractors. In the medium term, there is no need to increase the level of real expenditure, although progressively larger shares of the total will need to be allocated to maintaining those roads that have recently been improved. Continued efforts will also be needed to develop further the capacities of district level agencies to plan and implement their road programs.

6.32 Urban Transport. Expenditures on urban roads and other public transport infrastructure will need to increase rapidly in the coming years. Such spending needs to be combined with effective traffic restraint measures to slow the growth in demand for private transport to manageable levels. Such measures could also reduce air pollution, which is an increasingly important problem in big cities. Recently completed studies for the Jabotabek region indicate a need over the coming 25 years for investments totalling around US\$4 billion at 1991 prices to develop a basic network of light rail transit lines and segregated busways to serve existing major transport corridors. In areas with significant land development potential, there are opportunities to secure efficient private sector participation that should reduce demands on the budget. Additional investments will be needed in the Jabotabek region to provide more road capacity in some inner city corridors, to construct grade-separated intersections at heavily congested junctions, and to open up new peripheral areas for efficient development. In other major cities, increased road investments will also be needed to open up new areas on the peripheries.

6.33 During the 1980s, the Government invested large sums in providing the public bus corporations with new buses needed to maintain and increase the size of their fleets. Particularly in the case of Perum PPD, this investment has not been very effective. Although initiatives to improve performance of these corporations are in progress, opportunities for improving services by allowing competition from private bus companies need to be considered. Many competent private companies have already expressed interest in operating city buses.

6.34 Railways. The public railway corporation has recently changed its status to a Perum and will need to streamline its operations and improve its efficiency. A major priority is to reduce the backlog of deferred maintenance and asset replacement of its locomotive fleet, much of which is inoperable or operating below capacity and prone to in-service failure as a result of shortages of basic spare parts. In addition, minor investments in rollingstock are needed to serve high potential markets. Expenditures approaching US\$400 million would be required in these areas over the coming five years. Other investments in railway system capacity expansion can be deferred until the operational performance and financial condition of the new perum has improved significantly.

6.35 Maritime Transport. The rapid increase in non-oil exports has been reflected in strong growth in throughputs at Java's main general cargo ports, and particularly in the movement of containers through Tanjung Priok, where the tonnage of international containerized cargos increased at an average rate of 24 percent per annum from 1986 to 1989. Providing additional capacity at this and other large general cargo ports in Java and Sumatra will account for the major proportion of all port investments in the medium term. There will also be a need for continuing government funding of the development and rehabilitation of small ports in more remote areas, particularly eastern Indonesia, although the annual cost of such projects will be small. Before undertaking these investments, improved approaches for the planning and design of small port projects need to be established. Required expansion of shipping services as well as shipbuilding and repair services can be left to the private sector.

6.36 Air Transport. The second phase of Jakarta's new international airport is nearing completion and major capacity expansion projects are underway at Bali and Balikpapan. Once these projects are complete, there will

be a need for continuing investments to add capacity at certain other major airports, although some of the proposals have been driven by very high projections of tourism development and require review. A Government decision to permit private sector participation in the development and management of airport facilities would also serve to reduce demands on the budget.

6.37 The suggested level of public investment spending on the transport sector for the medium term (through to end-REPELITA VI) would be equivalent to around 2 percent of GDP (see Table 6.12). This would be sufficient to meet the expenditure priorities outlined above and be consistent with the growing role being accorded to the private sector. Road infrastructure and land transport will command higher average shares than during the period 1984/85 - 1989/90, as the private sector is expected to take a more prominent role in the provision of sea and air transport during the 1990s.

**Table 6.12: INDICATIVE PUBLIC SECTOR INVESTMENT PROGRAM FOR THE TRANSPORT SECTOR**

|                                       | 1991/92     | 1992/93     | 1993/94     | 1994/95     | 1995/96     | 1996/97     | 1997/98     | 1998/99      |
|---------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| <u>Rp trillion current prices</u>     |             |             |             |             |             |             |             |              |
| Road infrastructure                   | 2.60        | 2.78        | 3.06        | 3.32        | 3.60        | 3.99        | 4.41        | 5.01         |
| Land transport                        | 1.04        | 1.11        | 1.22        | 1.33        | 1.44        | 1.59        | 1.76        | 2.00         |
| Sea transport                         | 0.78        | 0.84        | 0.92        | 1.00        | 1.08        | 1.20        | 1.32        | 1.50         |
| Air transport                         | 0.78        | 0.84        | 0.92        | 1.00        | 1.08        | 1.20        | 1.32        | 1.50         |
| <u>Total</u>                          | <u>5.20</u> | <u>5.57</u> | <u>6.12</u> | <u>6.65</u> | <u>7.20</u> | <u>7.98</u> | <u>8.81</u> | <u>10.01</u> |
| Total (Rp trillion<br>1990/91 prices) | (4.69)      | (4.70)      | (4.92)      | (5.02)      | (5.05)      | (5.22)      | (5.37)      | (5.70)       |

Source: World Bank staff estimates.

## E. Water Resources Development

### Demand-Supply Balance

6.38 An existing shortage of water is evident from the fact that agricultural output is constrained by the available water supply. The monthly surface water balance on Java for both "average" and "dry" years presented in Table 6.13 assumes a year-round demand for irrigation water (see Table 6.13). Even during average years, there is a substantial deficit from July to October. During the dry years, the deficit period extends from May to November. Part of the deficits are met by water stored by dams and reservoirs, but significant shortages remain during several months of both average and dry years. There is also significant variation in the water balance among water basins, with shortages generally more severe in the eastern part of Java. The worst shortages occur along the northern coast.

6.39 Future water balances will depend on a number of factors, including population and economic growth, the structure of production, and efficiency of use. Some supply increases are possible given improved delivery and distribution systems, but it is clear that there is very little scope for increasing the total amount of available water on Java, since social,

**Table 8.12: WATER DISCHARGE AND REQUIREMENTS IN JAVA IN AVERAGE AND DRY YEARS (m<sup>3</sup>/sec)**

|  | Jan          | Feb          | Mar          | Apr          | May          | Jun          | July         | Aug          | Sept         | Oct          | Nov          | Dec          |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>Mean discharge from surface sources</b> |              |              |              |              |              |              |              |              |              |              |              |              |
| Average                                    | 9,846        | 10,177       | 10,019       | 8,882        | 8,902        | 8,115        | 2,233        | 1,555        | 1,782        | 2,629        | 5,195        | 7,428        |
| Dry year                                   | 4,166        | 4,536        | 4,466        | 8,786        | 2,830        | 1,868        | 995          | 693          | 781          | 1,172        | 2,316        | 3,311        |
| <b>Mean Requirements</b>                   |              |              |              |              |              |              |              |              |              |              |              |              |
| Irrigation <sup>/a</sup>                   | 2,840        | 2,840        | 2,840        | 2,840        | 2,840        | 2,840        | 2,840        | 2,840        | 2,840        | 2,840        | 2,840        | 2,840        |
| M&I <sup>/b</sup>                          | 101          | 101          | 101          | 101          | 101          | 101          | 101          | 101          | 101          | 101          | 101          | 101          |
| <b>Total</b>                               | <b>2,941</b> |
| <b>Balance in an Average Year</b>          |              |              |              |              |              |              |              |              |              |              |              |              |
|  | 6,405        | 7,076        | 7,528        | 5,441        | 2,961        | 174          | -607         | -1,285       | -1,068       | -211         | 2,355        | 4,487        |
| <b>Balance in a Dry Year</b>               |              |              |              |              |              |              |              |              |              |              |              |              |
|  | 1,224        | 1,595        | 1,524        | 795          | -311         | -1,553       | -1,845       | -2,147       | -2,059       | -1,668       | -524         | 369          |

<sup>/a</sup> Assumes year-round demand.  
<sup>/b</sup> M&I Municipal and industrial.

Source: Adopted from Indonesia: Forest, Land and Water: Issues in Sustainable Development, World Bank, June 1989. (Bank staff estimates based on data from the Directorate General of Water Resources Development (DWRD)).

ecological, and economic considerations render infeasible the construction of more than a limited number of new dams. The essentially limited water supply, combined with an existing deficit and a growing economy, means that the main instrument for avoiding even worse shortages in the future will be increased efficiency in use. At the macro level, efficiency in irrigation is most important, since irrigation is by far the largest user of water. Domestic and non-domestic demand--for surface water especially--are expected to grow rapidly, however, and thus increasing efficiency in these sectors will be important as well.

5.40 Impairment of water quality in Indonesia threatens to become as serious as quantity shortages. The most pervasive cause of surface water pollution is human excreta.<sup>3/</sup> The lack of adequate sewage treatment and garbage handling in Indonesia means that a great deal of human sewage and solid waste is dumped near or directly into surface water sources. As a result, the major rivers on Java have fecal coliform levels that exceed conventional standards many fold--in some cases by over 4,000 times--and biological and chemical oxygen demand (BOD and COD) exceed conventional standards in all provinces.<sup>4/</sup> Even more serious, rivers in some areas have been found to have a high concentration of heavy metals, which come largely from industrial effluent. The problem is especially severe on the north coast of Java. The Jakarta-Bandung corridor alone contains over one-third of all large and medium-scale industrial establishments in the country, and another 11 percent are located around Surabaya. Heavily polluted raw water makes adequate treatment expensive, or even impossible (as in the case of heavy metals).

<sup>3/</sup> The Government wisely introduced degradable pesticides in the 1970s and eliminated pesticide subsidies in the late 1980s, thereby reducing significantly one pollution source that is very serious in many countries. Recent studies for several rivers have shown that neither pesticides nor fertilizers are a major source of river water pollution.

<sup>4/</sup> A 1990 study by Ashley Bansgrove (quoted in Witolar, 1991) estimated that, of total BOD in the S. Ciliwung River in Jakarta, 45 percent was due to domestic sewage and 28 percent was due to solid waste.

6.41 The combination of highly polluted raw water and poorly operated treatment and distribution systems means that none of the public water in Indonesia is drinkable without boiling first. Quality is so poor that many domestic and non-domestic users who are connected to or have access to the public water system prefer instead to use groundwater. While part of this preference is due to relative costs, the current quality differential would drive many users to continue using groundwater even if the costs of private extraction (including government-imposed fees) rose above the tariff for public water. Unfortunately, groundwater quality has deteriorated badly due to over-extraction in a number of urban areas, including Jakarta and Surabaya.

6.42 To address the problems with surface water quality, in 1989, the Government launched a Clean River Program (PROKASIH) covering 24 rivers in 11 provinces. The Ministry of KLH is in charge of coordinating the program, with the Vice Governor of each province responsible for implementation. The original goals of Prokasih were to: decrease waste water loads into the 24 rivers by 50 percent by June 1990; bring all major polluters into compliance with effluent standards by June 1991; and bring all remaining dischargers into compliance with effluent standards by 1995. These goals were too ambitious to be met on schedule, but there is some indication that waste loads have already gone down in some rivers, even though detailed effluent standards have not yet been promulgated.

#### Investment Priorities

6.43 Expenditures on irrigation rose dramatically in the late 1980s (see Table 6.14). After remaining essentially flat in real terms from 1982/83 through 1987/88,<sup>5/</sup> expenditures on new irrigation development increased by about 75 percent in real terms in the last two years of the decade. Expenditures on irrigation rehabilitation and maintenance rose by about 50 percent in real terms over the same period. In both cases, unit costs have risen substantially. Expenditure levels for non-agricultural piped water for water supply, after declining by 25 percent in real terms in 1986/87 following the fall in oil prices, have risen by over 100 percent to a level nearly 50 percent higher than in 1982/83. However, this overall increase masks important differences in trends between various programs. For example, expenditures on KIP have fallen by nearly 30 percent since 1986/87 and by over 40 percent since 1982/83. By contrast, expenditures on urban water supply rose by 36 percent and 115 percent as compared to 1982/83 and 1986/87, respectively. Substantial investments in water, especially for non-agricultural uses, will be required in the 1990s to ease existing water shortages and improve the availability of clean water.

6.44 Water for Agricultural Use Total resources available for water supply to agriculture have risen substantially over the past few years, and the current level of resources budgeted for agricultural water supply should be adequate to meet sectoral needs. The issue, therefore, is not the level but the allocation of these resources--specifically the emphasis given to new system development vs. completion of existing schemes, and new investment in general vs. O&M.

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<sup>5/</sup> With the exception of the adjustment year of 1986/87.

**Table 6.14: CENTRAL GOVERNMENT EXPENDITURES IN WATER SECTOR**  
Rp. Billion (Current)

|  | 1982/83       | 1983/84       | 1984/85       | 1985/86       | 1986/87       | 1987/88         | 1988/89         | 1989/90         | 1990/91         |
|--|---------------|---------------|---------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|
| KIP  | 66.71         | 58.12         | 39.21         | 40.44         | 89.92         | 81.46           | 46.88           | 76.97           | 59.14           |
| Water supply                               | 84.18         | 90.69         | 109.31        | 128.46        | 202.00        | 333.19          | 308.60          | 351.57          | 403.48          |
| Env. sanitation<br>& drainage              | 9.51          | 9.40          | 13.69         | 16.80         | 26.59         | 49.30           | 60.97           | 49.58           | 58.19           |
| Flood protection                           | 166.11        | 203.16        | 226.07        | 203.61        | 162.61        | 180.85          | 293.41          | 432.51          | 356.19          |
| Irrigation<br>rehabilitation/<br>upgrading | 108.90        | 79.22         | 115.04        | 122.32        | 62.33         | 151.15          | 216.29          | 281.49          | 308.00          |
| Irrigation dev.                            | 174.63        | 158.00        | 222.22        | 231.23        | 159.12        | 305.76          | 577.63          | 580.31          | 509.89          |
| Swamps dev.                                | 35.17         | 23.44         | 28.33         | 43.56         | 12.66         | 27.80           | 106.76          | 82.93           | 49.64           |
| <b>Total</b>                               | <b>643.16</b> | <b>621.93</b> | <b>753.87</b> | <b>781.42</b> | <b>709.23</b> | <b>1,129.51</b> | <b>1,610.04</b> | <b>1,835.36</b> | <b>1,742.44</b> |

Source: Ministry of Finance and World Bank staff estimates.

6.45 REPELITA V targets include a 500,000 hectare increase in new irrigation area, 334,000 ha of irrigation rehabilitation and upgrading, and 444,000 ha of swamp area rehabilitation. These targets are more than double the achievements of REPELITA IV, and it is doubtful whether they are attainable. Furthermore, recent studies indicate that attaining these targets are unnecessary to meet GOI's stated goal of rice self-sufficiency on trend. In particular, the need for additional irrigated area will likely be below the 100,000 ha/yr envisioned in REPELITA V, a level which probably could not be implemented in any case.<sup>6/</sup> Furthermore, most of the area suitable for irrigation has already been developed. Consequently the costs of developing new areas are rising rapidly, and economic rates of return for many new schemes are well below 10 percent.

6.46 Priorities, therefore, should be given to completion of existing command areas instead of construction of entirely new systems. Some 400,000 hectares within existing command areas could be developed at a cost per hectare of about half that needed for developing entirely new systems. Although costs vary according to location and other factors, new system development usually costs at least twice as much per hectare as completion of existing command areas. Land in existing irrigation systems has remained undeveloped for several reasons: (a) poor coordination with the Ministry of Agriculture, which is in charge of providing extension services and assistance in land development; (b) insufficient attention to land titling; and (c) lack of financing. It was assumed that farmers would undertake tertiary land development within command areas at their own expense. In practice, the costs of development, in conjunction with the lack of land title and financing, have meant that many farmers have been unable to develop land themselves. If the Government cannot devise a viable financing mechanism for smallholders, it may have to develop the land itself and recover costs through a user fee.

<sup>6/</sup> The average annual new area development from 1985/86 to 1990/91 was about 50,000 ha/year, with no upward trend. The President's speech in January 1991 set a target of 75,000 ha of new irrigated land during FY 1991/92, although it is doubtful that this can be achieved.

6.47 A substantial amount of investment in rehabilitation and upgrading (R&U) is needed to return the irrigation infrastructure to its designed state. Resources spent on R&U will be wasted, however, unless followed by efficient O&M activities, which are necessary to prevent the infrastructure from deteriorating once again.<sup>7/</sup> In addition, unit costs for R&U (over Rp 2 million/ha) are excessively high due to inappropriately elaborate design (e.g. extensive canal linings). With improved design, costs could probably be brought down substantially. There remain a number of unanswered technical and organizational questions regarding efficient operation and maintenance of swamp areas, suggesting that substantial expenditures on swamp rehabilitation could be delayed until these issues are studied in greater depth.

6.48 The combination of reduced hectare targets and reduced per hectare development costs for new irrigation will lower dramatically the expenditures required in the subsector. In addition, expenditure reductions should be possible in irrigation rehabilitation and upgrading. Consequently, total expenditures on agricultural water supply would fall over the decade of the 1990s by about one-half (see Table 6.15).

**Table 6.15: INDICATIVE INVESTMENT PROGRAM FOR THE WATER SECTOR**  
(Rp. Billion, 1990/91 Prices)

| Subsector                     | 1991/92      | 1992/93      | 1993/94      | 1994/95      | 1995/96      | 1996/97      | 1997/98      | 1998/99      |
|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| KIP                           | 80           | 100          | 125          | 160          | 200          | 250          | 350          | 350          |
| Water supply                  | 450          | 500          | 550          | 600          | 650          | 750          | 850          | 950          |
| Env. sanitation and drainage  | 100          | 150          | 225          | 300          | 400          | 500          | 600          | 700          |
| Flood protection              | 500          | 500          | 500          | 500          | 500          | 500          | 500          | 500          |
| Subtotal non-ag. water supply | <u>1,130</u> | <u>1,250</u> | <u>1,400</u> | <u>1,560</u> | <u>1,750</u> | <u>2,000</u> | <u>2,250</u> | <u>2,500</u> |
| Irrigation reh./upgrading     | 250          | 190          | 180          | 170          | 160          | 160          | 160          | 160          |
| New irrigation development    | 400          | 300          | 250          | 175          | 100          | 100          | 100          | 100          |
| Swamps development            | 50           | 50           | 50           | 50           | 50           | 50           | 50           | 50           |
| Subtotal irrigation/swamps    | <u>700</u>   | <u>540</u>   | <u>480</u>   | <u>375</u>   | <u>310</u>   | <u>310</u>   | <u>310</u>   | <u>310</u>   |
| Total water supply            | <u>1,830</u> | <u>1,790</u> | <u>1,880</u> | <u>1,955</u> | <u>2,060</u> | <u>2,310</u> | <u>2,560</u> | <u>2,810</u> |

Source: World Bank staff estimates.

6.49 Non-Agricultural Water Use. Central Government expenditures for water supply to non-agricultural users have recovered since 1986/87 for all programs except KIP. Expenditures for sanitation and drainage rose strongly through 1988/89, but then fell by 25 percent in real terms in 1989/90.

<sup>7/</sup> The NPV of expenditure on rehabilitation over the next 10 years could be reduced by an estimated Rp 4.0 trillion (1990 prices) if a nationwide program of efficient O&M were in place (ISSP-II SAR, p.47).

Expenditures on piped water now appear to be declining again and are too low to maintain the effective life of existing networks and to meet increasing needs (see Box 6.1). The low level of expenditures appears to be due to implementation constraints rather than a lack of available financing. It is therefore urgent that implementation capacity be strengthened so that the required expenditures can be implemented efficiently. Local governments, which are responsible for most O&M, do face financing constraints, however, and strong efforts are needed to enhance local resource mobilization and access to loan funds from the Central Government in order to improve O&M.

**Box 6.1: MEETING THE CHALLENGES IN PIPED WATER SUPPLY**

During the 1980s, the Government expanded water supply service significantly. During REPELITA IV (1984/85 through 1988/89), safe water supply was made available to an additional seven million consumers in urban areas alone--thereby keeping pace with very high population growth--albeit at relatively high unit costs of about Rp 300,000 per/capita (1990 prices) primarily through expansion of public piped systems. While extensive use of groundwater continues to be made by industrial and domestic consumers in many parts of Indonesia, saline intrusion and increased pollution, particularly in the densely populated urban areas, will limit the effective life of these systems. Indeed, there is evidence that groundwater extraction rates in some areas have reached unsustainable levels. During the present plan period (1989/90 to 1993/94) the Government hopes to extend water supply to an additional 13 million consumers, primarily through piped systems. This will require investment of around Rp 4 trillion for the period and a substantially expanded implementation effort than hitherto. At current growth rates, considerable increases in urban population (an additional 20 million people in REPELITA VI) and industrial commercial activities can be expected. Adding 20 million new consumers during REPELITA VI would expand the proportion of the urban population served by about 10 percent, thereby helping to meet the needs of the poor not presently served by a safe and reliable supply, and substituting for depleted groundwater sources. To meet this need, investment requirements are likely to amount to about Rp 7 trillion--about 0.5 percent of projected GDP for the period. Without significant improvements in institutional capacity to formulate and implement sound projects, however, public investments during the period are unlikely to exceed Rp 5 trillion in current prices and could well be around Rp 4 trillion. This level of investment would cover an additional 13-15 million new consumers during REPELITA VI, and would at least maintain existing service coverage. Private investment in bulk water production and distribution would add to this, helping meet the gap between total demand and public supply.

6.50 The Government has somewhat ambitious plans to expand the public water supply. REPELITA V physical targets include: (i) expansion of water production capacity from 51,000 l/s to 65,000 l/s; (ii) piped-water distribution to 47 percent of the urban population, or about 29 million people (vs. 32 percent or 16 million people at the end of Repelita IV); (iii) access by 60 percent of the village population to publicly supplied ground or surface water (vs. 30 percent at the end of REPELITA IV). In particular, REPELITA V envisions replacing a great deal of the existing private ground and surface water supply with public piped systems. Although there is a growing need to provide piped water supply, these targets need to be scaled back for three reasons. First, implementation of the suggested adjustments in water tariffs (Chapter 3) will lower the demand for residential water. Second, it does not appear to be feasible for the public sector to physically implement more than

about 50 percent of the REPELITA V targets. Third, there is a risk that pursuit of quantity targets might reduce the quality of the investment, causing the infrastructure to deteriorate quickly. Based on these considerations, the major elements of an appropriate piped water development strategy will need to include: (a) implementing proper tariff policy for water; (b) improving O&M of water to reduce water losses; (c) improving project implementation capacity of water enterprises through necessary organizational and staffing changes; and (d) encouraging a greater private participation in both bulk water production (through BOT schemes) and distribution (through franchises).

6.51 In the large cities, where the needs are perhaps the most urgent, water supply expenditures have been lagging the most. In particular, there is a need to extend water supply to the poor segments of the population through public standpipes and other low-cost solutions. There is also an urgent need to improve the access to safe water for the rural population. If the latter task is designed properly, through low-cost technical solutions and community participation, the investment requirements will be moderate. PDAM systems depend on internally generated funds for financing and on local manpower capacities for implementation; given major constraints in both areas, they have been unable to increase their expenditures as necessary. In addition to tariff adjustments, bill collection and overall financial management also need to be improved to ensure that PDAMs generate sufficient funds to operate and maintain properly their existing systems, and to amortize loans undertaken for system expansion. The Government, in turn, will need to develop appropriate mechanisms for encouraging and financing viable investments by both the BPAMS and the PDAMs.

6.52 Expenditures on human waste disposal need to keep pace with the rate of expansion of water supply. Unless increased attention is directed towards suitable disposal of wastes, both human and solid, the quality of the raw water supply will deteriorate further. One area for concern is that low-cost KIP-type approaches for these activities (which generally provide shared public facilities), as well as intermediate household-based approaches, have been neglected in favor of more capital-intensive, technical, and centralized investments. This is reflected in high unit costs for investments in water supply (over Rp 300,000/capita) and flood control (Rp 1.5 to 5 million/ha), as well as in the decline in real expenditures on the KIP program. To maximize coverage of waste disposal, garbage handling, and flood control facilities, a renewed effort is needed to develop and disseminate low-cost approaches.

6.53 Central Government development expenditures for non-agricultural water supply will need to rise to Rp 2.5 trillion in 1990/91 prices by 2000 (see Table 6.15). With the exception of flood protection, expenditures on all subsectors will need to increase substantially. Although implementation capacity will limit the expansion program, expenditures on piped water supply would still need to increase significantly in view of the backlog and new demand. Major increases in sanitation and drainage investments are vital for preventing further deterioration of water quality. It is estimated that the investment program in this subsector needs to expand by 30 percent per annum in real terms. Major improvements in administrative capacity will be needed to implement this expansion satisfactorily. Expenditures on KIP complement those in the main water supply and sanitation/drainage subsectors, and it is assumed that they will grow at a rate of over 20 percent per year. No growth in expenditures on flood protection is required, because it is assumed that any increase in coverage could be offset by lower-cost investments. Improved drainage would also reduce the need for "remedial" flood protection measures.

INDONESIA

STRATEGY FOR INFRASTRUCTURE DEVELOPMENT

STATISTICAL ANNEX

Table of Contents

|           |  |
|-----------|--|
| Table 1:  | Expenditure on Economic Infrastructure, 1974/75-1989/90          |
| Table 2:  | Economic Subsidies and Taxes on Electricity Consumption, 1989-90 |
| Table 3:  | PLN's Long Run Marginal Cost vs. Existing Tariff, 1989           |
| Table 4:  | National Tariff Guidelines for the Structure of Water Rates      |
| Table 5:  | Domestic and Industrial Water Tariffs                            |
| Table 6:  | PLN - Income Statement, 1982/83-1984/95                          |
| Table 7:  | PLN - Funds Flow Statement, 1982/83-1989/90                      |
| Table 8:  | PERUMTEL's Income and Expenditure Statement, 1983-92             |
| Table 9:  | Growth of Captive Power in Indonesia, 1974/75-1989/90            |
| Table 10: | Growth of PLN's Consumers and Sales, 1975/76-1989/90             |
| Table 11: | Public Investment in Infrastructure, 1984/85-1992/2000           |

Statistical Annex  
Table 1

INDONESIA

STRATEGY FOR INFRASTRUCTURE DEVELOPMENT

Expenditure on Economic Infrastructure, 1974/75-1989/90  
(FY, current Rp)

| Sector                              | 1974/75      | 1975/76      | 1976/77      | 1977/78        | 1978/79        | 1979/80        | 1980/81        | 1981/82        | 1982/83        | 1983/84        | 1984/85        | 1985/86        | 1986/87        | 1987/88        | 1988/89        | 1989/90        |
|-------------------------------------|--------------|--------------|--------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Irrigation <sup>/a</sup>            | 98.1         | 74.3         | 178.4        | 150.1          | 209.0          | 2268.6         | 257.7          | 362.6          | 350.9          | 289.4          | 273.2          | 464.5          | 486.6          | 288.9          | 381.8          | 526.5          |
| Energy                              | 45.1         | 78.0         | 127.7        | 218.1          | 223.3          | 271.8          | 330.2          | 420.7          | 530.1          | 758.1          | 659.6          | 911.4          | 1,446.9        | 980.4          | 1,084.9        | 1,955.3        |
| Roads & bridges                     | 79.4         | 123.5        | 311.6        | 428.8          | 354.7          | 409.9          | 242.4          | 342.8          | 376.1          | 373.2          | 489.4          | 679.6          | 585.3          | 565.4          | 917.7          | 1,046.9        |
| Land transport                      | 0.0          | 0.0          | 0.0          | 0.0            | 0.0            | 0.0            | 60.3           | 79.5           | 117.6          | 104.5          | 569.5          | 180.2          | 206.3          | 147.3          | 132.6          | 247.5          |
| Sea transport                       | 0.0          | 0.0          | 0.0          | 0.0            | 0.0            | 0.0            | 105.4          | 143.3          | 147.6          | 240.9          | 305.7          | 276.7          | 285.9          | 124.4          | 182.2          | 243.3          |
| Air transport                       | 0.0          | 0.0          | 0.0          | 0.0            | 0.0            | 0.0            | 39.1           | 133.8          | 111.2          | 86.8           | 135.2          | 219.8          | 193.5          | 102.3          | 258.0          | 353.7          |
| Posts & telecommunications          | 0.0          | 0.0          | 0.0          | 0.0            | 0.0            | 0.0            | 8.7            | 57.0           | 24.1           | 55.8           | 33.1           | 49.4           | 198.7          | 77.4           | 88.8           | 93.1           |
| Regional development                | 59.8         | 135.9        | 172.9        | 190.0          | 240.8          | 275.1          | 335.7          | 482.4          | 615.9          | 711.3          | 750.9          | 790.8          | 849.9          | 938.9          | 930.2          | 1,137.4        |
| Housing                             | 8.5          | 6.5          | 13.3         | 30.4           | 89.5           | 55.6           | 117.3          | 190.7          | 166.3          | 150.8          | 220.8          | 224.2          | 334.6          | 336.6          | 431.6          | 481.3          |
| Transmigration (infra.)             | 1.8          | 4.8          | 10.8         | 24.3           | 57.9           | 64.9           | 130.6          | 166.6          | 174.4          | 182.6          | 168.6          | 266.0          | 117.0          | 80.0           | 106.4          | 112.4          |
| <b>Total</b>                        | <b>302.7</b> | <b>423.0</b> | <b>814.7</b> | <b>1,041.7</b> | <b>1,165.0</b> | <b>1,340.9</b> | <b>1,627.3</b> | <b>2,379.4</b> | <b>2,614.5</b> | <b>2,963.4</b> | <b>3,585.9</b> | <b>4,062.6</b> | <b>4,704.6</b> | <b>3,671.6</b> | <b>4,512.4</b> | <b>6,197.4</b> |
| <b>Memo items:</b>                  |              |              |              |                |                |                |                |                |                |                |                |                |                |                |                |                |
| % of development exp. <sup>/b</sup> | 41.2         | 33.5         | 41.8         | 49.0           | 47.1           | 34.5           | 28.9           | 36.2           | 37.7           | 30.9           | 38.9           | 39.1           | 59.8           | 42.1           | 37.4           | 45.7           |
| % of GDP                            | 2.4          | 2.9          | 4.7          | 5.0            | 4.9            | 3.8            | 3.3            | 4.1            | 4.2            | 3.8            | 4.0            | 4.2            | 4.6            | 2.9            | 3.2            | 3.7            |

<sup>/a</sup> Data for Irrigation 74.75-77/78 from Robert Varley, "Irrigation Issues and Policy in Indonesia". Dev. Dis. Paper # 332, HIID, December 1989, Table pg A8.

<sup>/b</sup> Excludes fertilizer subsidy.

Source: President's National Speech, Attachments, various years.

INDONESIA  
STRATEGY FOR INFRASTRUCTURE DEVELOPMENT

ECONOMIC SUBSIDIES AND TAXES ON ELECTRICITY CONSUMPTION, 1989/90

| Tariff Category      | Projected sales (GWh) | No. of PLN customers ('000) | Average unit rates (Rp/kWh) | Average unit cost (Rp/kWh) | Rate/cost ratio | Tax/(subsidy) |                |
|----------------------|-----------------------|-----------------------------|-----------------------------|----------------------------|-----------------|---------------|----------------|
|                      |                       |                             |                             |                            |                 | (Rp/kWh)      | Rp billion     |
| <b>Social</b>        |                       |                             |                             |                            |                 |               |                |
| S-1                  | 205                   | 289.8                       | 57                          | 137                        | 0.42            | (80)          | (16.4)         |
| S-2                  | 410                   | 118.7                       | 73                          | 182                        | 0.40            | (109)         | (44.7)         |
| S-3                  | 220                   | 59.3                        | 103                         | 103                        | 1.00            | 0             |                |
| <b>Residential</b>   |                       |                             |                             |                            |                 |               |                |
| R-1                  | 4,836                 | 7,692.3                     | 105                         | 177                        | 0.59            | (72)          | (348.2)        |
| R-2                  | 2,794                 | 1,634.2                     | 124                         | 168                        | 0.75            | (42)          | (117.3)        |
| R-3                  | 548                   | 102.1                       | 208                         | 176                        | 1.18            | 30            | 16.4           |
| R-4                  | 518                   | 28.7                        | 246                         | 173                        | 1.42            | 73            | 37.8           |
| <b>Commercial</b>    |                       |                             |                             |                            |                 |               |                |
| U-1                  | 419                   | 365.6                       | 208                         | 168                        | 1.23            | 38            | 15.9           |
| U-2                  | 892                   | 81.0                        | 244                         | 191                        | 1.28            | 53            | 47.3           |
| U-3                  | 758                   | 0.6                         | 152                         | 103                        | 1.48            | 49            | 37.1           |
| U-4                  | 93                    | 0.0                         | 400                         | 100                        | 4.00            | 300           | 27.9           |
| <b>Hotel</b>         |                       |                             |                             |                            |                 |               |                |
| I-1/H                | 68                    | 4.7                         | 113                         | 157                        | 0.72            | (44)          | (3.0)          |
| I-2/H                | 57                    | 0.1                         | 112                         | 134                        | 0.84            | (22)          | (1.3)          |
| I-3/H                | 411                   | 0.1                         | 105                         | 91                         | 1.15            | 14            | 5.7            |
| <b>Industrial</b>    |                       |                             |                             |                            |                 |               |                |
| I-1                  | 70                    | 269.2                       | 118                         | 215                        | 0.55            | (98)          | (8.9)          |
| I-2                  | 1,364                 | 3.5                         | 112                         | 173                        | 0.65            | (61)          | (63.2)         |
| I-3                  | 6,681                 | 3.3                         | 94                          | 95                         | 0.99            | (1)           | (8.7)          |
| I-4                  | 3,968                 | 0.1                         | 79                          | 83                         | 0.95            | (4)           | (15.9)         |
| <b>Government</b>    |                       |                             |                             |                            |                 |               |                |
| G-1                  | 532                   | 71.8                        | 168                         | 162                        | 1.04            | 6             | 3.2            |
| G-2                  | 909                   | 0.9                         | 115                         | 103                        | 1.11            | 12            | 10.9           |
| <b>Street Lights</b> |                       |                             |                             |                            |                 |               |                |
| J                    | 359                   | 6.9                         | 98                          | 121                        | 0.81            | (28)          | (8.3)          |
| <b>Total</b>         | <b>26,113</b>         | <b>10,730.9</b>             | <b>115</b>                  | <b>132</b>                 | <b>0.87</b>     | <b>(17)</b>   | <b>(443.9)</b> |

Source: PLN.

**INDONESIA**  
**STRATEGY FOR INFRASTRUCTURE DEVELOPMENT**  
**PLN'S LONG RUN MARGINAL COST VS. EXISTING TARIFF**

| Tariff Category     | Contracted Power     | Existing Tariff        |                        | Long Run Marginal Cost |                      |
|---------------------|----------------------|------------------------|------------------------|------------------------|----------------------|
|                     |                      | Demand charge (Rp/kVA) | Energy charge (Rp/kWh) | Capacity cost (Rp/kVA) | Energy cost (Rp/kWh) |
| <b>Social</b>       |                      |                        |                        |                        |                      |
| S-1                 | Up to 200 VA         | /a                     | -                      | 57,589                 | -                    |
| S-2                 | 250 VA to 200 kVA    | 2,700                  | 45.00                  | 8,309                  | 98.71                |
| S-3/P               | 201 kVA and over     | 3,160                  | 136.50                 | 2,736                  | 113.48               |
| S-3/OP              |                      |                        | 68.00                  |                        | 75.29                |
| <b>Residential</b>  |                      |                        |                        |                        |                      |
| R-1                 | 250 VA to 500 VA     | 3,160                  | 63.50/b<br>86.00/c     | 8,309                  | 99.42                |
| R-2                 | 501 VA to 2,200 VA   | 3,160                  | 76.00/b<br>115.50/c    | 8,309                  | 101.23               |
| R-3                 | 2,201 VA to 6,000 VA | 5,520                  | 155.50                 | 8,309                  | 99.42                |
| R-4                 | 6,601 VA and over    | 5,520                  | 198.50                 | 8,309                  | 98.07                |
| <b>Commercial</b>   |                      |                        |                        |                        |                      |
| U-1                 | 250 VA to 2,200 VA   | 5,520                  | 166.00/d<br>133.00/e   | 8,309                  | 96.26                |
| U-2                 | 2,201 VA to 200 kVA  | 5,520                  | 186.50/d<br>149.50/e   | 8,309                  | 95.81                |
| U-3/P               | 201 kVA and over     | 3,460                  | 219.50                 | 2,736                  | 113.48               |
| U-3/OP              |                      |                        | 109.50                 |                        | 75.29                |
| U-4                 | --                   | -                      | 400.0                  | -                      | 100.33               |
| <b>Hotel</b>        |                      |                        |                        |                        |                      |
| I-1/H               | 250 VA to 99 kVA     | 3,460                  | 87.00                  | 8,309                  | 95.36                |
| I-2/H               | 100 kVA to 200 kVA   | 3,460                  | 95.00                  | 8,309                  | 84.46                |
| I-3/H               | 201 kVA and over     | 3,160                  | 94.00                  | 2,736                  | 81.40                |
| <b>Industry</b>     |                      |                        |                        |                        |                      |
| I-1                 | 450 VA to 139 kVA    | 3,460                  | 68.00                  | 8,309                  | 95.36                |
| I-2/P               | 14 kVA to 200 kVA    | 3,460                  | 138.60                 | 8,309                  | 134.19               |
| I-2/OP              |                      |                        | 70.00                  |                        | 89.04                |
| I-3/P               | 201 kVA and over     | 3,160                  | 134.00                 | 2,736                  | 113.48               |
| I-3/OP              |                      |                        | 68.00                  |                        | 75.29                |
| I-4/P               | 10,000 kVA and over  | 2,960                  | 119.50                 | 2,101                  | 106.10               |
| I-4/OP              |                      |                        | 60.00                  |                        | 70.40                |
| <b>Government</b>   |                      |                        |                        |                        |                      |
| G-1                 | 250 VA to 200 kVA    | 5,520                  | 122.50                 | 8,309                  | 94.00                |
| G-2/P               | 201 kVA and over     | 2,960                  | 159.50                 | 2,736                  | 113.48               |
| G-2/OP              |                      |                        | 79.50                  |                        | 75.29                |
| <b>Street Light</b> |                      |                        |                        |                        |                      |
| J                   | --                   | --                     | 98.00                  | 8,309                  | 101.68               |

- /a Rp 5,450 per month for 200 VA.  
 /b For utilization hours up to 60.  
 /c For utilization hours 61 and over.  
 /d For utilization hours up to 150.  
 /e For utilization hours 151 and over.

Note: P = peak time; OP = Off-peak time.

Source: Indonesia: Energy Pricing Review, 1990.

INDONESIA

STRATEGY FOR INFRASTRUCTURE DEVELOPMENT

NATIONAL TARIFF GUIDELINES FOR THE STRUCTURE OF WATER RATES

(a) For City Size: 500,000 or less Inhabitants

| Category of Subscriber | Consumption (per month per cu m) |       |       |              |
|------------------------|----------------------------------|-------|-------|--------------|
|                        | 0-10                             | 11-20 | 21-30 | 30 and above |
| Social public          | 0.8A                             | 0.8A  | 0.8A  | 0.8A         |
| Social specific        | 0.8A                             | A     | 1.5A  | 2A           |
| Residential            | A                                | 1.5A  | 2A    | 3A           |
| Government agencies    | A                                | A     | 2A    | 3A           |
| Small business         | 2.5A                             | 2.5A  | 5A    | 5A           |
| Large business         | 4A                               | 4A    | 8A    | 8A           |
| Small industry         | 3A                               | 3A    | 6A    | 6A           |
| Large industry         | 5A                               | 5A    | 10A   | 10A          |
| Special (ports)        | 15A                              | 15A   | 15A   | 15A          |

(b) For City Size: 500,000 or more inhabitants

| Category of Subscriber | Consumption (per month per cu m) |       |       |              |
|------------------------|----------------------------------|-------|-------|--------------|
|                        | 0-10                             | 11-20 | 21-30 | 30 and above |
| Social public          | 0.8A                             | 0.8A  | 0.8A  | 0.8A         |
| Social specific        | 0.8A                             | 1.5A  | 2A    | 3A           |
| Residential            | A                                | 2A    | 3A    | 5A           |
| Government agencies    | 1.5A                             | 2.5A  | 4A    | 6A           |
| Small business         | 4A                               | 4A    | 8A    | 8A           |
| Large business         | 5A                               | 5A    | 10A   | 10A          |
| Small industry         | 4.5A                             | 4.5A  | 9A    | 9A           |
| Large industry         | 6A                               | 6A    | 12A   | 12A          |
| Special (ports)        | 20A                              | 20A   | 20A   | 20A          |

Note: "A" is the ratio of total cost (in Rp) to the weighted consumption (in cu m), where the weights are given in the table. In the special case where all weights are equal to one, "A" is the average cost per cu m.

Source: Support Study for Master Planning for Water Supply Subsector Policy, Ministry of Public Works, Government of Indonesia, 1988.

INDONESIASTRATEGY FOR INFRASTRUCTURE DEVELOPMENTDOMESTIC AND INDUSTRIAL WATER TARIFFS  
(Rupiah per cubic meter)

| <u>LPDAMs /a</u> | <u>Lowest Domestic (A)</u> | <u>Highest Industrial (B)</u> | <u>Ratio (B/A)</u> | <u>O&amp;M Cost</u> |
|------------------|----------------------------|-------------------------------|--------------------|---------------------|
| Jakarta          | 180                        | 1,680                         | 9.3                | 320                 |
| Surabaya         | 80                         | 720                           | 9.0                | 270                 |
| Medan            | 70                         | 610                           | 8.7                | 180                 |
| Bandung          | 130                        | 910                           | 7.0                | 350                 |
| Palembang        | 135                        | 635                           | 4.7                | 230                 |
| Semarang         | 100                        | 1,100                         | 11.0               | 310                 |
| Malang           | 100                        | 550                           | 5.5                | 170                 |
| Bogor            | 25                         | 400                           | 16.0               | 140                 |
| Surakarta        | 80                         | 800                           | 10.0               | 260                 |
| Ujung Pandang    | 110                        | 1,320                         | 12.0               | 230                 |
| Yogyakarta       | 60                         | 400                           | 6.6                | 180                 |

/a Water enterprises in 11 big cities and metropolitan areas.

Note: LRMC of public piped water for the above systems is estimated at Rp 600-900/m<sup>3</sup>.

Source: Support Study for Master Planning for Water Supply Subsector Policy, Ministry of Public Works, Government of Indonesia, September 1988.

INDONESIA

STRATEGY FOR INFRASTRUCTURE DEVELOPMENT

PLN - Income Statement, 1982/83-1994/95  
(Rp billion)

| Fiscal year                           | 1982/83     | 1983/84     | 1984/85      | 1985/86      | 1986/87      | 1987/88      | 1988/89      | 1989/90<br><i>/a</i> | Projected    |              |              |              |              |
|---------------------------------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|----------------------|--------------|--------------|--------------|--------------|--------------|
|                                       |             |             |              |              |              |              |              |                      | 1990/91      | 1991/92      | 1992/93      | 1993/94      | 1994/95      |
| Sales increase (%)                    | 16.0        | 9.9         | 10.4         | 15.1         | 16.4         | 15.5         | 17.3         | 17.0                 | 15.1         | 14.6         | 114.2        | 13.7         | 12.9         |
| Energy sales (GWh)                    | 9,101       | 10,000      | 11,041       | 12,706       | 14,786       | 17,077       | 20,027       | 23,435               | 26,112       | 29,932       | 34,169       | 38,850       | 43,862       |
| Average revenue (Rp/kWh)              | 58.5        | 76.0        | 97.8         | 96.6         | 93.5         | 92.8         | 91.9         | 114.1                | 121.03       | 125.89       | 130.94       | 136.19       | 141.63       |
| Energy revenue                        | 514         | 760         | 1,080        | 1,227        | 1,382        | 1,581        | 1,840        | 2,674                | 3,161        | 3,768        | 4,474        | 5,291        | 6,212        |
| Other operating revenue               | 21          | 27          | 31           | 36           | 43           | 48           | 59           | 83                   | 74           | 87           | 102          | 117          | 138          |
| <b>Total Revenues</b>                 | <b>535</b>  | <b>787</b>  | <b>1,111</b> | <b>1,263</b> | <b>1,425</b> | <b>1,629</b> | <b>1,899</b> | <b>2,757</b>         | <b>3,235</b> | <b>3,855</b> | <b>4,576</b> | <b>5,408</b> | <b>6,348</b> |
| <b>Operating Expenses</b>             |             |             |              |              |              |              |              |                      |              |              |              |              |              |
| Fuel/bulk power                       | 283         | 477         | 712          | 775          | 720          | 881          | 1,006        | 1,085                | 1,345        | 1,559        | 1,867        | 2,044        | 2,114        |
| Operations                            | 143         | 165         | 203          | 237          | 251          | 320          | 375          | 469                  | 481          | 533          | 577          | 659          | 740          |
| Depreciation                          | 145         | 158         | 204          | 261          | 321          | 438          | 515          | 640                  | 853          | 1,001        | 1,141        | 1,347        | 1,631        |
| <b>Total Expenses</b>                 | <b>571</b>  | <b>800</b>  | <b>1,119</b> | <b>1,273</b> | <b>1,292</b> | <b>1,639</b> | <b>1,896</b> | <b>2,194</b>         | <b>2,679</b> | <b>3,093</b> | <b>3,584</b> | <b>4,050</b> | <b>4,489</b> |
| <b>Operating Income</b>               | <b>(36)</b> | <b>(13)</b> | <b>(8)</b>   | <b>(10)</b>  | <b>133</b>   | <b>(10)</b>  | <b>3</b>     | <b>583</b>           | <b>558</b>   | <b>762</b>   | <b>992</b>   | <b>1,348</b> | <b>1,859</b> |
| Other income (net)                    | -           | -           | (14)         | (21)         | (9)          | (8)          | 1            | (133)                | (19)         | (18)         | (16)         | (11)         | (5)          |
| Gross interest                        | 33          | 63          | 144          | 110          | 164          | 214          | 273          | 343                  | 280          | 308          |              |              |              |
| Less: interest during construction    | 28          | 44          | 120          | 86           | 77           | 96           | 136          | 113                  | 280          | 308          |              |              |              |
| <b>Interest Charged to Operations</b> | <b>5</b>    | <b>19</b>   | <b>24</b>    | <b>24</b>    | <b>87</b>    | <b>118</b>   | <b>137</b>   | <b>230</b>           | <b>280</b>   | <b>308</b>   | <b>307</b>   | <b>319</b>   | <b>294</b>   |
| <b>Net Income /b</b>                  | <b>(41)</b> | <b>(32)</b> | <b>(46)</b>  | <b>(55)</b>  | <b>37</b>    | <b>(136)</b> | <b>(133)</b> | <b>200</b>           | <b>257</b>   | <b>436</b>   | <b>669</b>   | <b>1,028</b> | <b>1,560</b> |
| Rate base /c                          | 1,218       | 1,497       | 1,998        | 2,779        | 3,867        | 5,100        | 6,845        | 8,913                | 10,708       | 12,517       | 13,958       | 16,413       | 20,109       |
| Rate of return (%)                    | (3.0)       | (0.9)       | (0.4)        | (0.3)        | 3.4          | (0.2)        | 0.0          | 6.3                  | 5.2          | 6.1          | 7.1          | 8.3          | 9.3          |
| Operating ratio (%)                   | 107         | 102         | 101          | 101          | 91           | 101          | 100          | 80                   | 83           | 80           | 78           | 75           | 71           |

*/a* Unaudited.  
*/b* Before taxes.  
*/c* Based on revalued fixed assets.

Source: Indonesia: Power Transmission Project; Staff Appraisal Report, 1990.

**INDONESIA**  
**STRATEGY FOR INFRASTRUCTURE DEVELOPMENT**

**PLN - Funds Flow Statement, 1982/83-1989/90**  
(Rp billion)

| Fiscal year                               | 1982/83     | 1983/84     | 1984/85     | 1985/86      | 1986/87      | 1987/88      | 1988/89      | 1989/90/a    |
|---|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|
| <b>Internal Sources of Funds</b>          |             |             |             |              |              |              |              |              |
| Net income before interest and tax        | (36)        | (13)        | (22)        | (31)         | 124          | (8)          | 4            | 430          |
| Depreciation                              | 145         | 158         | 204         | 261          | 321          | 438          | 515          | 640          |
| Consumers contributions other adjustments | 45          | 167         | 71          | 89           | 108          | 115          | 130          | 166          |
| <b>Total Internal Funds</b>               | <b>154</b>  | <b>312</b>  | <b>253</b>  | <b>319</b>   | <b>553</b>   | <b>535</b>   | <b>649</b>   | <b>1,236</b> |
| <b>Operational Requirements</b>           |             |             |             |              |              |              |              |              |
| Variation working capital and others      | (41)        | 93          | 71          | 19           | (107)        | (8)          | (97)         | (131)        |
| Debt repayment                            | 11          | 21          | 52          | 135          | 87           | 269          | 253          | 279          |
| Interest charged to operations            | 5           | 19          | 24          | 24           | 87           | 118          | 137          | 267          |
| <b>Total Operational Requirement</b>      | <b>(25)</b> | <b>133</b>  | <b>147</b>  | <b>178</b>   | <b>67</b>    | <b>379</b>   | <b>293</b>   | <b>821</b>   |
| Total capital investment                  | 585         | 981         | 1,030       | 1,408        | 1,712        | 1,925        | 1,976        | 1,615        |
| <b>Balance to be Financed</b>             | <b>406</b>  | <b>802</b>  | <b>924</b>  | <b>1,267</b> | <b>1,226</b> | <b>1,875</b> | <b>1,620</b> | <b>794</b>   |
| <b>Financed by</b>                        |             |             |             |              |              |              |              |              |
| Borrowings                                | 153         | 469         | 488         | 702          | 896          | 932          | 714          | 448          |
| Government contributions                  | 311         | 238         | 425         | 558          | 442          | 860          | 962          | 646          |
| <b>Total Capital Sources</b>              | <b>464</b>  | <b>707</b>  | <b>913</b>  | <b>1,260</b> | <b>1,318</b> | <b>1,792</b> | <b>1,676</b> | <b>1,094</b> |
| <b>Cash Increase/Decrease</b>             | <b>58</b>   | <b>(95)</b> | <b>(11)</b> | <b>(7)</b>   | <b>92</b>    | <b>23</b>    | <b>56</b>    | <b>300</b>   |
| Debt service coverage ratio (times)       | 6.8         | 3.6         | 2.4         | 1.7          | 2.6          | 1.1          | 1.3          | 2.0          |
| <b>Contribution to construction:</b>      |             |             |             |              |              |              |              |              |
| Annual (%)                                | 30.6        | 18.2        | 11.4        | 10.5         | 23.0         | 6.9          | 15.2         | 32.3         |
| 3-year average (%) <u>b</u>               | 30.3        | 23.6        | 18.3        | 12.9         | 16.9         | 13.4         | 14.7         | 17.3         |

a Unaudited.

b Current and two preceding years.

Source: Indonesia, Power Transmission Project Staff Appraisal Report, 1990.

## INDONESIA

## STRATEGY FOR INFRASTRUCTURE DEVELOPMENT

PERUMTEL'S INCOME AND EXPENDITURE STATEMENT  
(In billion Rp for fiscal year ending December 31)

|   | 1983          | 1984          | 1985          | 1986          | 1987          | 1988          | 1989/a        | 1990/a          | 1991/a                     | 1992/a          |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------------|----------------------------|-----------------|
| <b>Operating Revenues</b>                     |               |               |               |               |               |               |               |                 |                            |                 |
| Telephone                                     | 354.88        | 379.51        | 463.27        | 527.23        | 623.21        | 690.56        | 784.05        | 947.83          | 1,160.31                   | 1,381.16        |
| Telex   | 29.25         | 34.61         | 44.69         | 47.04         | 53.40         | 58.20         | 60.83         | 62.77           | 64.78                      | 64.33           |
| Telegraph                                     | 5.95          | 6.55          | 8.03          | 8.81          | 9.85          | 11.19         | 4.50          | 6.14            | 10.08                      | 15.32           |
| LCs and concessions                           |               |               |               |               |               |               | 35.95         | 39.55           | 43.50                      | 47.85           |
| Other   | 18.68         | 23.38         | 26.38         | 31.11         | 37.55         | 41.49         | 17.78         | 19.56           | 21.51                      | 23.67           |
| <b>Total Revenue</b>                          | <b>408.72</b> | <b>444.05</b> | <b>542.37</b> | <b>614.19</b> | <b>724.02</b> | <b>799.43</b> | <b>903.10</b> | <b>1,075.84</b> | <b>1,300.18</b>            | <b>1,532.32</b> |
| <b>Operating Expenses</b>                     |               |               |               |               |               |               |               |                 |                            |                 |
| Personnel                                     | 79.26         | 105.31        | 133.17        | 152.02        | 166.61        | 181.19        | 271.52        | 307.68          | 344.33                     | 386.27          |
| Material and transport                        | 51.27         | 73.31         | 91.50         | 113.22        | 107.63        | 108.95        | 115.59        | 126.54          | 144.97                     | 170.32          |
| Repair and maintenance                        | 78.38         | 89.31         | 73.43         | 84.65         | 87.33         | 61.33         | 77.65         | 92.25           | 112.36                     | 138.96          |
| Depreciation and amortization                 | 125.93        | 123.30        | 130.42        | 142.32        | 324.48        | 288.43        | 278.17        | 350.24          | 435.11                     | 553.22          |
| Other   | 1.17          | 2.21          | 1.57          | 3.02          | 5.34          | 3.07          | 10.81         | 12.51           | 14.66                      | 17.19           |
| <b>Total Expenses</b>                         | <b>334.01</b> | <b>393.44</b> | <b>430.09</b> | <b>495.23</b> | <b>691.39</b> | <b>640.97</b> | <b>753.68</b> | <b>889.22</b>   | <b>1,051.4<sup>a</sup></b> | <b>1,265.96</b> |
| <b>Operating income</b>                       | <b>74.71</b>  | <b>50.61</b>  | <b>112.28</b> | <b>118.96</b> | <b>32.63</b>  | <b>158.46</b> | <b>149.42</b> | <b>186.62</b>   | <b>248.75</b>              | <b>266.36</b>   |
| <b>Interest and other Nonoperating income</b> | <b>30.95</b>  | <b>30.47</b>  | <b>25.47</b>  | <b>34.39</b>  | <b>31.01</b>  | <b>25.63</b>  | <b>65.04</b>  | <b>76.83</b>    | <b>99.59</b>               | <b>127.97</b>   |
| <b>Extraordinary profit or loss</b>           |               |               |               |               |               |               |               |                 |                            |                 |
|   |               |               |               |               | 31.12         | 51.47         |               |                 |                            |                 |
| <b>Pretax income</b>                          | <b>62.04</b>  | <b>71.08</b>  | <b>160.96</b> | <b>187.97</b> | <b>104.13</b> | <b>182.11</b> | <b>108.86</b> | <b>137.25</b>   | <b>183.74</b>              | <b>170.74</b>   |
| <b>Income tax</b>                             | <b>26.12</b>  | <b>1.27</b>   | <b>40.13</b>  | <b>53.79</b>  | <b>20.66</b>  | <b>70.38</b>  | <b>32.66</b>  | <b>41.17</b>    | <b>55.12</b>               | <b>51.22</b>    |
| <b>Net Income</b>                             | <b>35.92</b>  | <b>69.81</b>  | <b>120.83</b> | <b>134.18</b> | <b>83.47</b>  | <b>111.73</b> | <b>76.21</b>  | <b>96.07</b>    | <b>128.62</b>              | <b>119.52</b>   |
| <b>Appropriation of Net Income</b>            |               |               |               |               |               |               |               |                 |                            |                 |
| <b>GOI Development Fund (55%)</b>             | <b>19.76</b>  | <b>38.40</b>  | <b>66.46</b>  | <b>73.80</b>  | <b>45.91</b>  | <b>61.45</b>  | <b>41.91</b>  | <b>52.84</b>    | <b>70.74</b>               | <b>65.73</b>    |
| <b>Retained earnings (25%)</b>                | <b>8.98</b>   | <b>17.45</b>  | <b>30.21</b>  | <b>33.55</b>  | <b>20.87</b>  | <b>27.93</b>  | <b>19.05</b>  | <b>24.02</b>    | <b>32.15</b>               | <b>29.88</b>    |
| <b>Operating ratio (%)</b>                    | <b>82</b>     | <b>89</b>     | <b>79</b>     | <b>81</b>     | <b>95</b>     | <b>80</b>     | <b>83</b>     | <b>83</b>       | <b>81</b>                  | <b>83</b>       |

/a Projected.

Source: Indonesia: Staff Appraisal Report (Third Telecommunications Project), 1990.

INDONESIA

STRATEGY FOR INFRASTRUCTURE DEVELOPMENT

Growth of Captive Power in Indonesia, 1974/75-1989/90

| Fiscal year | Java             |                            |         |              | Outside Java     |                            |         |              | Indonesia        |                            |         |              |
|-------------|------------------|----------------------------|---------|--------------|------------------|----------------------------|---------|--------------|------------------|----------------------------|---------|--------------|
|             | Connected to PLN | Not connected to PLN (MVA) | Total   | Increase (%) | Connected to PLN | Not connected to PLN (MVA) | Total   | Increase (%) | Connected to PLN | Not connected to PLN (MVA) | Total   | Increase (%) |
| 1974/75     | -                | -                          | -       | -            | -                | -                          | -       | -            | 522.7            | 1,447.6                    | 2,070.3 | 18.0         |
| 1975/76     | -                | -                          | -       | -            | -                | -                          | -       | -            | 688.4            | 1,598.8                    | 2,287.2 | 10.4         |
| 1976/77     | -                | -                          | -       | -            | -                | -                          | -       | -            | 731.5            | 1,670.0                    | 2,401.5 | 5.0          |
| 1977/78     | -                | -                          | -       | -            | -                | -                          | -       | -            | 807.1            | 1,767.1                    | 2,574.2 | 7.0          |
| 1978/79     | -                | -                          | -       | -            | -                | -                          | -       | -            | 848.9            | 1,860.9                    | 2,709.7 | 5.0          |
| 1979/80     | -                | -                          | -       | -            | -                | -                          | -       | -            | 872.2            | 1,911.5                    | 2,783.7 | 3.0          |
| 1980/81     | -                | -                          | -       | -            | -                | -                          | -       | -            | 878.3            | 1,930.6                    | 2,808.9 | 0.9          |
| 1981/82     | -                | -                          | -       | -            | -                | -                          | -       | -            | 879.7            | 1,933.9                    | 2,813.6 | 0.2          |
| 1982/83     | -                | -                          | -       | -            | -                | -                          | -       | -            | 900.8            | 2,073.1                    | 2,973.9 | 5.7          |
| 1983/84     | 921.0            | 918.2                      | 1,839.2 | -            | 212.2            | 1,456.5                    | 1,668.7 | -            | 1,333.2          | 2,374.7                    | 3,507.9 | 18.0         |
| 1984/85     | 1,021.4          | 1,053.0                    | 2,074.4 | 12.8         | 289.7            | 1,347.8                    | 1,637.5 | (1.9)        | 1,311.1          | 2,400.8                    | 3,711.9 | 5.8          |
| 1985/86     | 1,478.8          | 1,223.2                    | 2,702.0 | 30.3         | 358.5            | 1,358.3                    | 1,716.8 | 4.8          | 1,837.3          | 2,581.5                    | 4,418.8 | 19.0         |
| 1986/87     | 1,923.3          | 1,244.5                    | 3,167.8 | 17.2         | 272.3            | 1,397.7                    | 1,670.0 | (2.7)        | 2,195.6          | 2,842.2                    | 4,837.8 | 9.5          |
| 1987/88     | 2,095.3          | 1,130.1                    | 3,225.4 | 1.8          | 334.1            | 1,514.6                    | 1,848.7 | 10.7         | 2,429.4          | 2,644.7                    | 5,074.1 | 4.8          |
| 1988/89     | 2,022.9          | 1,078.6                    | 3,101.5 | (3.8)        | 439.8            | 1,588.2                    | 2,008.0 | 8.6          | 2,462.7          | 2,646.8                    | 5,109.5 | 0.7          |
| 1989/90     | 1,911.4          | 1,365.8                    | 3,277.2 | 5.7          | 502.9            | 1,994.9                    | 2,497.8 | 24.4         | 2,414.3          | 3,380.6                    | 5,775.0 | 13.0         |

Note: The above excludes the following major enclave installations:

|                |                   |           |
|----------------|-------------------|-----------|
| Krakatau Steel | (West Java)       | 500.0 MVA |
| P.T. INCO      | (PLN Region VIII) | 206.3 MVA |
| ASAHAN         | (PLN Region II)   | 689.0 MVA |
| ARUN LNG       | (PLN Region I)    | 320.7 MVA |
| CALTEX Oil     | (PLN Region III)  | 272.5 MVA |
| Others         | (Outside Java)    | 835.3 MVA |

Source: PLN.

INDONESIASTRATEGY FOR INFRASTRUCTURE DEVELOPMENTGrowth of PLN's Consumers and Sales, 1975/76-1989/90

| Fiscal year | Number of consumers<br>(000) | Connected load<br>(MVA) | Sales<br>(GWh)    |
|-------------|------------------------------|-------------------------|-------------------|
| 1975/76     | 1,140.7<br>(5.0%)            | 1,426.4<br>(13.0%)      | 2,804<br>(14.7%)  |
| 1976/77     | 1,208.5<br>(5.8%)            | 1,594.5<br>(11.8%)      | 3,082<br>(10.1%)  |
| 1977/78     | 1,413.9<br>(17.0%)           | 1,939.2<br>(21.6%)      | 3,527<br>(14.6%)  |
| 1978/79     | 1,783.2<br>(26.1%)           | 2,459.1<br>(26.8%)      | 4,287<br>(21.6%)  |
| 1979/80     | 2,246.7<br>(26.0%)           | 3,063.4<br>(24.6%)      | 5,343<br>(24.6%)  |
| 1980/81     | 2,745.2<br>(22.2%)           | 3,744.2<br>(22.2%)      | 6,523<br>(22.1%)  |
| 1981/82     | 3,232.1<br>(17.7%)           | 4,502.8<br>(20.3%)      | 7,845<br>(20.3%)  |
| 1982/83     | 3,802.4<br>(17.6%)           | 5,270.4<br>(17.0%)      | 9,101<br>(16.0%)  |
| 1983/84     | 4,406.0<br>(15.9%)           | 6,126.7<br>(16.3%)      | 10,000<br>(9.9%)  |
| 1984/85     | 5,133.2<br>(16.5%)           | 7,120.7<br>(16.2%)      | 11,041<br>(10.4%) |
| 1985/86     | 5,953.3<br>(16.0%)           | 8,149.9<br>(14.5%)      | 12,706<br>(15.1%) |
| 1986/87     | 6,965.6<br>(17.0%)           | 9,282.1<br>(13.9%)      | 14,786<br>(16.4%) |
| 1987/88     | 8,203.3<br>(17.8%)           | 10,710.7<br>(15.4%)     | 17,077<br>(15.5%) |
| 1988/89     | 9,276.0<br>(13.1%)           | 12,233.7<br>(14.2%)     | 20,027<br>(17.3%) |
| 1989/90     | 10,316.9<br>(11.2%)          | 14,150.9<br>(15.6%)     | 23,435<br>(17.0%) |

Source: PLN.

Statistical Annex  
Table 11

INDONESIA  
STRATEGY FOR INFRASTRUCTURE DEVELOPMENT

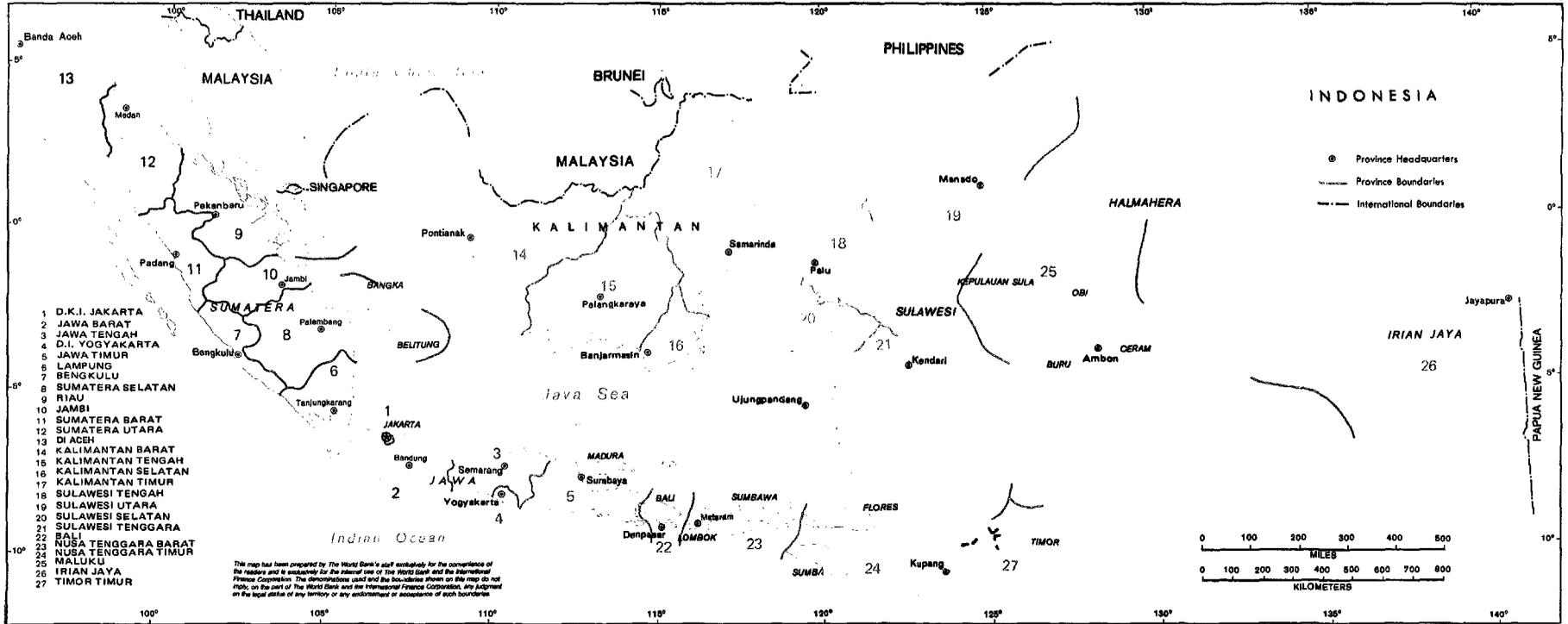
Public Investment in Infrastructure, 1984/85-1999/2000

|  | 1984/85 | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 | 1990/91 | 1991/92 | 1992/93 | 1993/94 | 1994/95 | Projected |         | 1997/98 | 1998/99 | 1999/00 |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|---------|---------|---------|---------|
|  |         |         |         |         |         |         |         |         |         |         |         | 1995/96   | 1996/97 |         |         |         |
| <b>Power</b>                             |         |         |         |         |         |         |         |         |         |         |         |           |         |         |         |         |
| \$ billion                               | 0.98    | 1.26    | 1.21    | 1.15    | 1.15    | 0.90    | 0.98    | 1.57    | 2.63    | 3.27    | 2.90    | 2.88      | 3.18    | 3.49    | 4.05    | 4.16    |
| Rp trillion                              | 1.03    | 1.41    | 1.71    | 1.92    | 1.98    | 1.62    | 1.83    | 3.10    | 5.40    | 6.96    | 6.44    | 6.64      | 7.65    | 8.73    | 10.53   | 11.27   |
| Rp trillion (1990 prices)                | 1.67    | 2.15    | 2.42    | 2.37    | 2.30    | 1.74    | 1.83    | 2.80    | 4.63    | 5.60    | 4.85    | 4.66      | 5.01    | 5.31    | 5.98    | 5.98    |
| <b>Telecom</b>                           |         |         |         |         |         |         |         |         |         |         |         |           |         |         |         |         |
| \$ billion                               | 0.20    | 0.20    | 0.17    | 0.33    | 0.19    | 0.38    | 0.52    | 0.62    | 0.78    | 0.80    | 0.85    | 0.90      | 1.03    | 1.16    | 1.38    | 1.52    |
| Rp trillion                              | 0.21    | 0.22    | 0.24    | 0.29    | 0.33    | 0.67    | 0.98    | 1.22    | 1.60    | 1.70    | 1.89    | 2.09      | 2.47    | 2.89    | 3.59    | 4.11    |
| Rp trillion (1990 prices)                | 0.34    | 0.34    | 0.34    | 0.36    | 0.38    | 0.73    | 0.98    | 1.10    | 1.38    | 1.37    | 1.42    | 1.47      | 1.62    | 1.76    | 2.04    | 2.18    |
| <b>Water</b>                             |         |         |         |         |         |         |         |         |         |         |         |           |         |         |         |         |
| \$ billion                               | 0.71    | 0.70    | 0.50    | 0.69    | 0.94    | 1.01    | 0.93    | 1.03    | 1.02    | 1.10    | 1.17    | 1.27      | 1.47    | 1.68    | 1.90    | 2.15    |
| Rp trillion                              | 0.75    | 0.78    | 0.71    | 1.13    | 1.61    | 1.81    | 1.74    | 2.03    | 2.09    | 2.34    | 2.60    | 2.94      | 3.53    | 4.20    | 4.94    | 5.83    |
| Rp trillion (1990 prices)                | 1.21    | 1.19    | 1.00    | 1.40    | 1.87    | 1.95    | 1.74    | 1.83    | 1.79    | 1.88    | 1.96    | 2.06      | 2.31    | 2.56    | 2.81    | 3.09    |
| <b>Transport</b>                         |         |         |         |         |         |         |         |         |         |         |         |           |         |         |         |         |
| \$ billion                               | 1.10    | 1.09    | 1.34    | 1.39    | 1.85    | 2.14    | 2.52    | 2.64    | 2.71    | 2.87    | 2.99    | 3.12      | 3.31    | 3.53    | 3.85    | 3.98    |
| Rp trillion                              | 1.16    | 1.22    | 1.90    | 2.30    | 3.17    | 3.83    | 4.72    | 5.20    | 5.57    | 6.11    | 6.64    | 7.20      | 7.97    | 8.82    | 10.02   | 10.78   |
| Rp trillion (1990 prices)                | 1.88    | 1.86    | 2.69    | 2.84    | 3.68    | 4.06    | 4.72    | 4.69    | 4.78    | 4.92    | 5.02    | 5.05      | 5.22    | 5.37    | 5.70    | 5.71    |
| <b>Total</b>                             |         |         |         |         |         |         |         |         |         |         |         |           |         |         |         |         |
| \$ billion                               | 3.00    | 3.24    | 3.22    | 3.42    | 4.14    | 4.43    | 4.95    | 5.86    | 7.14    | 8.04    | 7.91    | 8.17      | 8.99    | 9.86    | 11.18   | 11.81   |
| Rp trillion                              | 3.52    | 4.06    | 5.27    | 6.34    | 7.90    | 7.93    | 9.27    | 11.55   | 14.66   | 17.11   | 17.57   | 18.87     | 21.62   | 24.64   | 29.08   | 31.99   |
| Rp trillion (1990 prices)                | 5.70    | 6.19    | 7.46    | 7.84    | 9.16    | 8.48    | 9.27    | 10.52   | 12.58   | 13.77   | 13.25   | 13.24     | 14.16   | 15.00   | 16.54   | 16.96   |
| <b>Investment Deflator /<sub>a</sub></b> | 61.75   | 65.59   | 70.66   | 80.86   | 86.23   | 92.75   | 100.00  | 110.88  | 116.58  | 124.35  | 132.64  | 142.49    | 152.85  | 164.25  | 175.65  | 188.60  |
| <b>GDP (Rp trillion)</b>                 | 91.5    | 98.3    | 108.0   | 128.7   | 147.4   | 166.2   | 189.9   | 214.5   | 237.7   | 263.5   | 291.9   | 325.3     | 361.1   | 400.0   | 442.6   | 489.6   |

<sub>a</sub> 1990/91 = 100.

Source: Ministry of Finance and World Bank Staff estimates.

**MAP SECTION**



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