Analysis of Power Projects with Private Participation under Stress

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PURPOSE

The Joint UNDP/World Bank Energy Sector Management Assistance Program (ESMAP) is a special global technical assistance partnership sponsored by the UNDP, the World Bank and bi-lateral official donors. Established with the support of UNDP and bilateral official donors in 1983, ESMAP is managed by the World Bank. ESMAP's mission is to promote the role of energy in poverty reduction and economic growth in an environmentally responsible manner. Its work applies to low-income, emerging, and transition economies and contributes to the achievement of internationally agreed development goals. ESMAP interventions are knowledge products including free technical assistance, specific studies, advisory services, pilot projects, knowledge generation and dissemination, trainings, workshops and seminars, conferences and roundtables, and publications. ESMAP work is focused on three priority areas: access to modern energy for the poorest, the development of sustainable energy markets, and the promotion of environmentally sustainable energy practices.

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FUNDING

ESMAP is a knowledge partnership supported by the World Bank, the UNDP and official donors from Belgium, Canada, Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden, Switzerland, and the United Kingdom. ESMAP has also enjoyed the support of private donors as well as in-kind support from a number of partners in the energy and development community.

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Acknowledgements

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The main results of the analytical work were presented at a follow-up workshop with power sector investors held in Washington in March 2004. The observations and suggestions received were taken into account in the final phase of the work by the working group. Other contributors to the report include Messrs. Daizo Oda and Ricardo Balzaretti, graduate students at Georgetown University. Mrs. Yabei Zhang and Mrs. Noni Gikonyo (ESMAP). The report was reviewed by Dominique Lallement, ESMAP Manager, and Michael Schur, PPFIAF Deputy Program Manager. The report was edited by Grammarians. Special thanks to ESMAP staff, Nidhi Sachdeva for formatting this report and to Marjorie K. Araya for making useful suggestions for the presentation of the report and for coordinating the publication process.

Preface

In March of 2004, the World Bank and the IFC hosted a roundtable meeting with CEOs and Senior Managers of private firms who have invested in the power sector in developing countries. The purpose of the Roundtable was to discuss how to re-establish an environment that would be conducive to attract private investment in the power sectors of developing countries. Some of the important messages conveyed by the industry representatives included:

- While it is important to develop more robust market models for the future, investors' confidence can best be built by addressing existing assets under stress
- Investors would like the World Bank Group to play a more active role in shaping the relationship between the private and public sectors
- Investor confidence in the regulatory system is critical, particularly through the predictability and enforcement of contracts/regulations
- Reform/privatization programs need to be coordinated and gradual in approach
- A level playing field needs to be established between public & private investment
- Corruption in the power sector is a major risk factor for investors
- Local players should to tapped for financing as well as partnership
- Harmonization is needed among the entities of the World Bank Group and among the multi-lateral institutions
- The World Bank Group's specific products for the electricity sector need to be clarified and publicized better

As a follow-up to the Roundtable, the World Bank Group supported the establishment of three working groups comprising representatives of the World Bank Group and private power investors:

Working Group 1: Options for addressing the existing assets under stress:

This group was to develop practical options for resolving the issues faced by the existing assets under stress, and to start with a few countries for pilot activities based on this group's output.

Working Group 2: Risk mitigation:

This group was to primarily focus on risks beyond the control of private investors such as political risk, breach of contract by a government, etc. and was intended to develop recommendations for new instruments or innovative ways of using existing instruments.

Working Group 3: Governance/Benchmarks for sector performance:

The importance of basic standards for governance, efficiency, and viability of the power sector was highlighted at the roundtable. This working group was intended to develop a practical set of minimum standards to gauge the evolution of the sector.

The main objectives of the first Working Group Designing Strategies and Instruments to address Power Projects Stress were to:

i. Understand what economical, political or contractual events affecting power projects in a region or a specific country led to project distress;

ii. Establish how they affected the various private power projects;

iii. Design alternative workout strategies and specific financial and institutional instruments to address the most frequent causes of stress. For each typical case of stress, propose a "stress relief" package suggesting how the governments and the private sector partners may jointly work out an equitable exit to the crisis; and

iv. Reflect on what could be the role of the WBG and other IFIs in the resolution process, in the cases where an exit strategy to the crisis has been agreed between the parties involved.

The present report, prepared as part of ESMAP's and PPIAF's programs on governance in the power sector, addresses the first two objectives. It describes and analyzes the trends in private participation in the electric power sector in developing countries over the 1984–2003 period, and by characterizing electricity projects under stress. The analysis is based on the survey of 63 electricity projects under stress. It identifies the most significant causes of stress, describes the most frequent stress factors and their combination in "stress patterns," and presents the consequences of the stress patterns on power projects. Beyond the presentation of stress patterns, the report provides insights in the relationship between power sector reforms, privatization of power utilities and success/failure of private power projects.

This report is to be followed by the preparation of a handbook for Designing Strategies and Instruments to Address Power projects Stress Situations, which is being prepared as a second phase, to address the third and fourth objectives. Based on the characteristics of the stress patterns and on the description of the consequences of stress situations coming out of the present report, this handbook will propose strategies, instruments and processes to address a number of stress situations with power projects, and develop the concepts validated by the Group into practical propositions.

Executive Summary

The present study prepared with the participation of representatives from six major investors in power projects, provides an overview of the causes and consequences of distress for power projects with private sector participation in developing countries. It presents to the reader a classification of the projects under stress situations, the causes of distress and what where the consequences of the stress, with a view to help preventing the recurrence of stress in the future, and to understand the issues to be addressed by workout strategies and instruments.

FDI in electricity has been more volatile than other FDI in developing countries, rising faster than other FDI from US$3.3 billion in 1990 to a peak of US$51.3 billion in 1997, accounted mainly by divestitures of electric companies in Latin America and the Caribbean and greenfield power plants in East Asia and the Pacific. Starting in September 1997, private investment in the sector dropped more sharply than total FDI because of the East Asia and the Pacific financial crises and the subsequent crisis in the developing world.

Information was gathered through the PPI Database and from a survey in the World Bank group and with private investors which produced a list of 63 power projects under stress in 18 countries. It reveals that a stress situation in the electricity sector is in fact a rare event with only 4 percent of the total power projects being or having been affected by stress situations. From the projects under stress, 21 percent were ultimately worked out, suggesting that workout measures do play an important role to address distress situations.

Although private participation in electricity was spread around the globe, there was a high regional concentration, in Latin America and the Caribbean and East Asia and the Pacific, and a few large projects accounted for a significant share of the total investments resulting in a high risk exposure.

It emerged that South Asia has the highest percentage of projects under stress, but if the special case of Pakistan is excluded, Sub-Saharan Africa becomes the region with the least FDI in the power sector, but the highest percentage of projects under distress with 11 percent of its projects under stress. Latin America and the Caribbean follows with 6 percent. Eastern Europe and Central Asia region has relatively low stress percentages with a probability of 3 percent. And the East Asia and the Pacific region is the best with a stress probability of 1 percent only. More than half of the electricity projects under stress in number are divestitures projects because of their more complex nature involving different parties and because of their political visibility. IPP generation projects are less risky than any other type of electric project with 3 percent of stress, because of their relative protection from political visibility and market fluctuations, whereas distribution projects have a high distress probability of 9 percent. A conclusion is that distress risk is significantly higher for projects with higher market risk exposure, compared to projects isolated from market risk through Power Purchase Agreements. A

second conclusion is that political visibility associated with distribution projects or divestitures increases the distress risk. These characteristics explain why Africa and Latin America and the Caribbean, with a large number of divestitures and distribution privatization have higher stress risk than East Asia where most projects were greenfield IPPs.

The main the causes of distress revealed by the survey of projects under stress are, in decreasing order, socio political factors, macroeconomic instability, regulatory and pricing disputes, project structural problems, and investors' poor performance. In East Asia and the Pacific stress in IPP's was caused mainly by macroeconomic instability. Latin America and the Caribbean mainly faced stress in Distribution investments due to socio political problems at the same level as macroeconomic instability. Eastern Europe and Central Asia suffered from socio political uncertainties, whereas Africa was affected by socio political issues stemming from an uncertain national adherence to sector reforms.

Regarding the issues to be addressed through project workouts, many of the stress situations are caused by contractual disputes, mainly related to pricing that can be addressed through a workout process. The consequences of exchange rate instability are the second priority issue to be addressed through workouts, using specific financial engineering instruments. The prominence of the political factors, except in East Asia and Pacific indicate that ex ante consensus building and communication are key factors for success of a PPI: closing a deal or a contract with a government is not sufficient to ensure the long term sustainability of a PPI; at workout time, consensus building around a workout strategy is also an essential element.

The consequences of stress most of the time fall into two main categories: financial distress and administrative and licensing cancellation risk. The first includes cash flow shortage leading to lower return to investors, risk of default to lenders, inability to pay dues to the host government, and inability to finance the investment program from internal cash. The second includes threat of cancellation of license or non-renewal. More than 90 percent of the projects under stress experience financial distress and only 25 percent of the projects report licensing issues. The financial consequences of stress in each region are directly related to the type of PPI. Regions with high number of IPPs under stress, mainly in East Asia and the Pacific and Latin America and the Caribbean showed a high risk of default to lenders, because of the highly leveraged structure of these projects. In Africa, Eastern Europe and Central Asia where FDIs in utilities or distribution sector were predominant, there was more risk of license cancellation, return below target, but less risk of default to lender, as these projects typically have a low leverage level.

The present study leads to the conclusion that reforms without a strong consensus among the parties involved, including in particular the public, is one of the major causes of distress for power projects throughout the regions and the types of investments. Project workout should aim at forging this consensus when it has been broken. The second main conclusion is that power projects workout needs to address macroeconomic

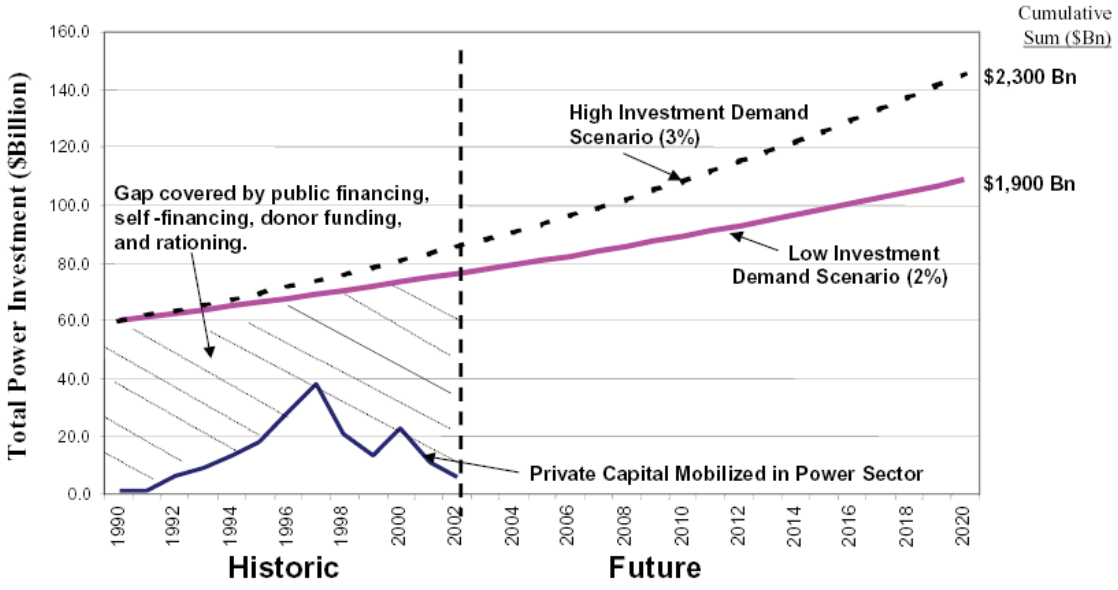
instability through financial engineering instruments and risk re-allocation. The third conclusion is that workouts need to address the issue of ensuring fair and sustainable adjustment of electricity prices, particularly under macroeconomic instability. The last conclusion is that in most cases, the workout will need to be accompanied by the preparation of a new business plan, demonstrating the commercial viability of the restructured project. The World Bank Group could play an important role in the industry for consensus building and financial engineering, to ensure that effective workout strategies be created and implemented in order to promote private participation in the energy sector of developing countries.

1

Introduction

1.1 Investment in energy projects with private participation has been decreasing after the 1997 peak. This has been a disappointment for developing and transition countries, most of which embarked in sweeping sector restructuring in the hope that private investment will replace public sector financing to accelerate sector growth, expecting thereby to free up public sector resources for other uses, particularly for social programs. The resulting widening gap between investment needs in the power sector and available private financing results in more immediate pressure on users and state budgets to allow energy supply to meet the rapidly growing demand (Figure 1.1).

Figure 1.1: Financing Gap for the Energy Sector in Emerging Markets, 1990–2020



Source: : World Bank, IEA, Deloitte Touche Tohmatsu Emerging Markets Group

1.2 The persistence in the energy sector of a number of bad investments or investment under stress is widely publicized and highly visible, both in the media and in the activity report of investing companies or lenders, and it acts as a deterrent to additional commitments by the private sector. During the March 2004 Private Investors

Roundtable, organized by the World Bank Group, a number of international investors confirmed that the high visibility and psychological effect of the persistence of a number of high-profile power projects under stress, particularly in South America, is an important contributing factor in their decision to reduce their involvement in, and exposure to, emerging markets.

1.3 Understanding the settlement of the disputes related to these projects would contribute to restoring the willingness of private investors to consider taking more risk in the energy sector of emerging markets. To achieve this goal, the workout of the projects under stress needs to be facilitated (possibly with the involvement of the World Bank Group), when appropriate. The organization of the workout of power projects under stress, however, depends on the causes of distress and on their impact on each project: workout approaches and instruments need to be flexible and tailored to the real-life situations. Although each project is special and each stress situation has its own history and causes, the review of real-life stress situations suggests that there are typical syndromes of stress that fall into a limited number of categories. The specification and understanding of these typical situations form an important step for designing differentiated workout strategies and instruments to respond to the most frequently occurring situations. The present report will limit itself to the analysis of the population of electricity projects under stress in developing countries and emerging markets, the identification of the most significant causes of stress, and their impact on the projects. It will also characterize the most frequent syndromes of stress and seek to identify homogeneous clusters of comparable energy projects under stress affected by similar issues, which would be eligible for similar workout strategies. The development of workout approaches and instruments to address the most frequent stress syndromes will be the subject of a follow-up study.

1.4 This report comprises two parts: an overview of private participation in the electric power sector and an analysis and classification of the stress situation. The overview will describe and analyze the trends in private participation in the electric power sector in developing countries during 1984–2003. Within the analysis of the stress situation, the report will first characterize electricity projects under stress, using the survey results of 63 electricity projects under stress. It will then examine and classify the causes of stress, derive the most frequent stress factors and their combination in "stress patterns," and present the consequences of the stress patterns on the projects.

2

Overview: Private Participation in the Electric Power Sector

2.1 Traditionally, energy services in most developing and transition countries have been provided by public sector monopolies. However, progress in expanding service coverage and improving service quality has been slow. Today, 1.6 billion people still lack access to electricity, and 2.4 billion rely on traditional biomass fuels for cooking and heating.[1] Inefficiency in utility management, coupled with government budget constraints, the perception that there were funds from the international financial market available to finance energy services in developing countries and emerging markets, and growth in immediate investment needs to meet power demand, led the governments of developing and transition countries to seek to attract private financing in their energy sector. Investors and lenders were attracted to this new business opportunity because they were seeking higher returns[2] in developing countries with increasing energy demand and underserved markets while their home markets were showing signs of saturation. They reckoned that the risk-reward ratio was attractive compared with Organisation for Economic Co-operation and Development (OECD) markets. In liberalizing and privatizing the electric power sector, governments were expected to reconsider their own role, seeking to transform from being the exclusive financiers, managers, and operators of electricity services to being facilitators and regulators of services provided by private companies.[3]

2.2 The private sector involvement in the electric power sector as investor or long-term lender began in the 1980s with a comprehensive privatization program in Chile and

[1] Jamal Saghir. "Energy and Poverty." Paper presented at the International Energy Forum 2004.

[2] The determining factor is not the expected return alone, but in relation with the perceived risk. During the expansion period of the mid-1990s, the key factor may have been the decrease in the perceived risk of investing in developing countries, rather than increasing expected returns. During the withdrawal period post-1997, the main change may have been mainly with the sharp increase in perceived risk.

[3] Governments' adherence to this model was in fact uneven. It seems that it was higher in Latin America and the Caribbean than in Asia, which never totally embraced this model. In Africa, the governments' adhesion seems to have been superficial in a number of cases.

a few projects in other developing countries.[4] Since then, the private sector has played an important though minority role in financing investment in this sector in developing countries. According to the World Bank's Private Participation in Infrastructure (PPI) Project Database,[5] which covers the infrastructure projects with private investment in the energy sector, 89 countries have achieved 952 electricity projects with private participation between 1984 and 2003, attracting investment commitments of more than US$256 billion (Table 2.1 in Annex 2).

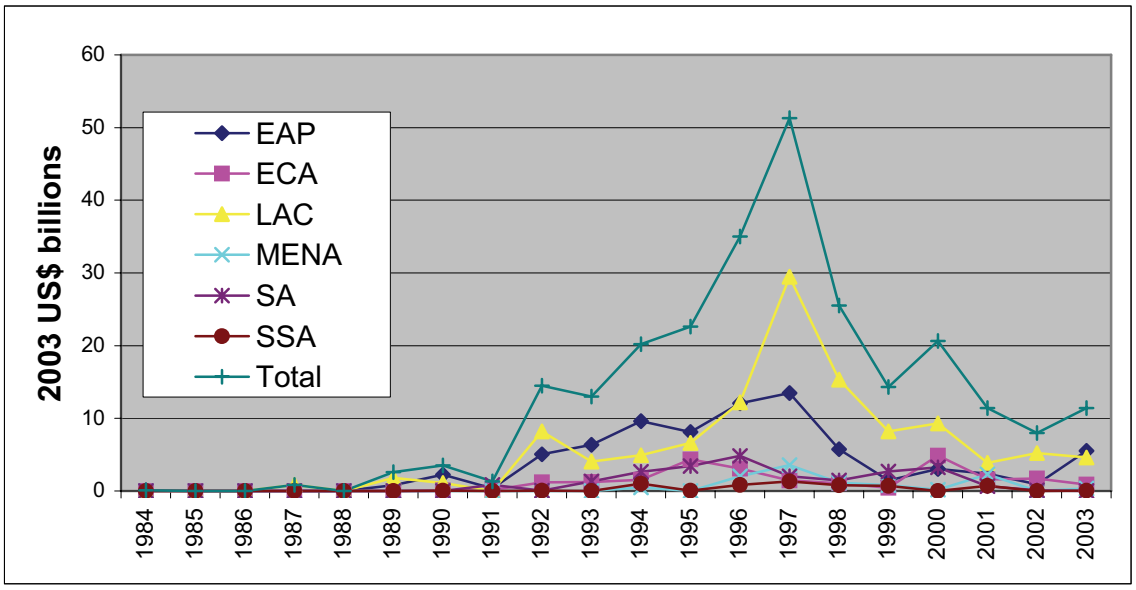
2.3 Based on the data from the World Bank's PPI Project Database, this chapter provides an overview of trends in private participation in the electric power sector in developing countries in 1984–2003.

Growth and Decline of Private Activity in the Electric Power Sector

2.4 The private activity grew rapidly in the electric power sector in the 1990s, with annual investment commitments for private electricity projects in the developing world rising from US$3.3 billion in 1990 to a peak of US$51.3 billion in 1997 (Figure 2.1). The peak investment levels in 1996 and 1997 were propelled mainly by divestitures of electricity companies in Latin America and the Caribbean and greenfield power plants in East Asia and the Pacific. Brazil was among the most active countries with private participation in the sector, accounting for 32 percent of investments in 1997–1998, when it privatized most of its large distribution companies.[6] Similarly, the number of projects with private participation also increased rapidly in 1990s, from 6 in 1990 to a peak of 130 in 1997 (Figure 2.1). The initial privatization efforts in the Eastern Europe and Central Asia explained most of the surge in activity in 1993, while greenfield projects in East Asia and the Pacific and Latin America and the Caribbean and divestitures in Latin America and the Caribbean accounted for most of the electricity projects in 1994–1997.

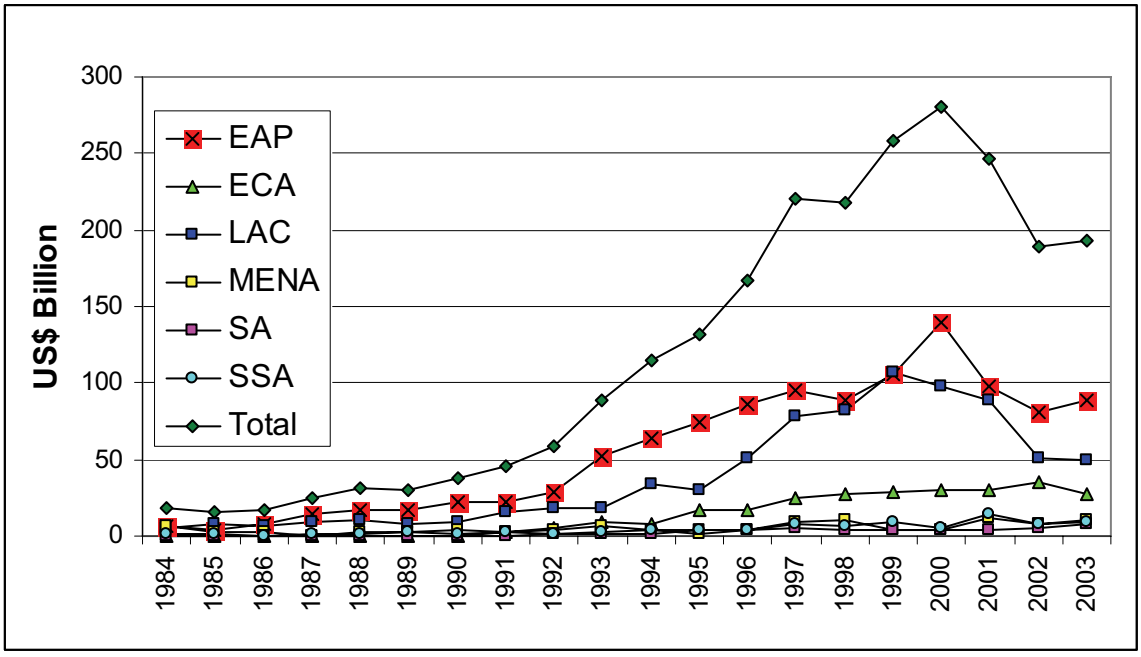
[4] Before the 1980s, commercial banks frequently extended short-term facilities to utilities in local currencies, and there were a few cases of commercial bond issues.
[5] The World Bank, PPI Project Database: http://ppi.worldbank.org/.
[6] The World Bank. Public-Private Infrastructure Advisory Facility. *Private Participation in Infrastructure: Trends in Developing Countries in 1990–2001*. Chapter 8: Electricity. http://ppi.worldbank.org/book/.

Figure 2.1: Annual Foreign Direct Investment (FDI) in Electricity Projects With Private Participation by Region, 1984-2003



Source: World Bank, PPI Project Database.

Figure 2.2: Annual FDI Inflows in Developing Countries by Region, 1984—2003



Source: United Nations Conference on Trade and Development (UNCTAD), FDI Database.

2.5 Investment commitments then dropped sharply because of the East Asia and the Pacific financial crises and the subsequent crises in the developing world, starting in September 1997. Although many countries have slowly recovered from the crises, private investments in the electric power sector have not been able to rebound accordingly. The amount of investment in 2003 was less than 23 percent of its peak of 1997 and had returned to a level similar to that in 1993. The number of projects also dropped to less than 30 percent of its peak of 1997. Because of the heightened perception of investment risks in the developing countries, the sponsors have turned to other investment opportunities, such as less lucrative, but lower-risk, projects in OECD countries[7] or speculations in cross-border mergers and acquisitions (M&As).[8]

2.6 The trend of the investment in electricity projects with private participation is not identical to the overall foreign direct investment (FDI) inflows in developing countries (Figures 2.1 and 2.2): FDI in power, starting from nil in 1986, grew faster than total FDI, but peaked earlier in 1997 (instead of 2000 for overall FDI) and collapsed more abruptly after 1997 (to a level of only 20 percent of peak level), whereas total FDI decreased only to 75 percent of peak level. The conclusion is that FDI in power is more volatile than FDI in general. This implies that the private investment level in electricity projects in developing countries, as part of the overall FDI inflows, was more severely affected by the regional investment climate and risk. (More discussions on the influence of credit rating are in Chapter 3.)

Country Concentration

2.7 Private activity in the electric power sector was initially concentrated in six countries (Côte d'Ivoire, Chile, India, the Philippines, the Republic of Korea, and Turkey), and it spread rapidly among a large number of projects and sponsors in developing countries as more countries introduced private participation in electricity. Even then, only a few countries accounted for most of the investment. The 15 countries attracting the most investment in electricity projects with private participation captured 86 percent of the cumulative investment in 1984–2003 and accounted for 62 percent of the projects. The large Latin American economies, such as Brazil, Argentina, Chile, Columbia, Mexico, and Peru made the group of top 15, as did the main Asian economies, such as China, the Philippines, India, Indonesia, Malaysia, and Thailand (Table 2.1).

[7] According to the OECD International Direct Investment Database, the total OECD area FDI inflows increased from US$300 billion in 1997 to US$500 billion in 1998 and reached the peak of US$1,300 billion in 2000.

[8] According to UNCTAD, *World Investment Report 2003*, the value of cross-border M&As increased from US$300 billion in 1997 to US$550 billion in 1998 and reached the peak of US$1,150 billion in 2000.

Table 2.1: Top 15 Developing Countries by Cumulative Investment in Electricity Projects with Private Participation, 1984–2003

Country	Number of Projects	Investment (2003 US$ Billion)	Investment as a Share of Developing World Total (%)
Brazil	93	57.6	22
China	112	25.2	10
Argentina	76	20.2	8
Philippines	46	16.7	7
India	46	14.3	6
Indonesia	17	11.7	5
Malaysia	17	11.4	4
Chile	37	11.0	4
Thailand	49	10.6	4
Turkey	10	8.7	3
Morocco	7	7.8	3
Colombia	20	7.6	3
Pakistan	23	7.1	3
Mexico	16	5.9	2
Peru	23	5.0	2
Total	592	220.8	86

Source: World Bank, PPI Project Database.

2.8 Measuring investment in per capita terms, however, brought some small countries such as Belize, Gabon, Cape Verde, Oman, Panama, and Dominica into the group of the top 15 (Table 2.2). But regardless of how investment is measured, Brazil, Argentina, Chile, and Malaysia were among the most active countries, appearing in both groups of top 15.

Table 2.2: Top 15 Developing Countries by Per Capita Cumulative Investment in Electricity Projects with Private Participation, 1984–2003

Country	Per Capita Investment (2003 US$)	Total Investment (2003 US$ Billion)
Belize	733	0.2
Chile	700	11.0
Gabon	541	0.7
Cape Verde	523	0.2
Argentina	522	20.2
Malaysia	495	11.4
Oman	474	1.3
Dominica	432	0.0
Panama	401	1.2
Brazil	316	57.6
Hungary	310	3.1
Dominican Republic	292	2.5
Morocco	245	7.8
Trinidad and Tobago	216	0.2
Jamaica	210	0.6

Source: World Bank, PPI Project Database.

2.9 Although private participation in electricity was widely spread, a few large projects accounted for a significant share of the total investment commitments. The top 10 largest electricity projects accounted for 13 percent of the investment in such projects in 1984–2003 (Table 2.3).

Table 2.3: Top 10 Electricity Projects with Private Participation in Developing Countries, 1984–2003

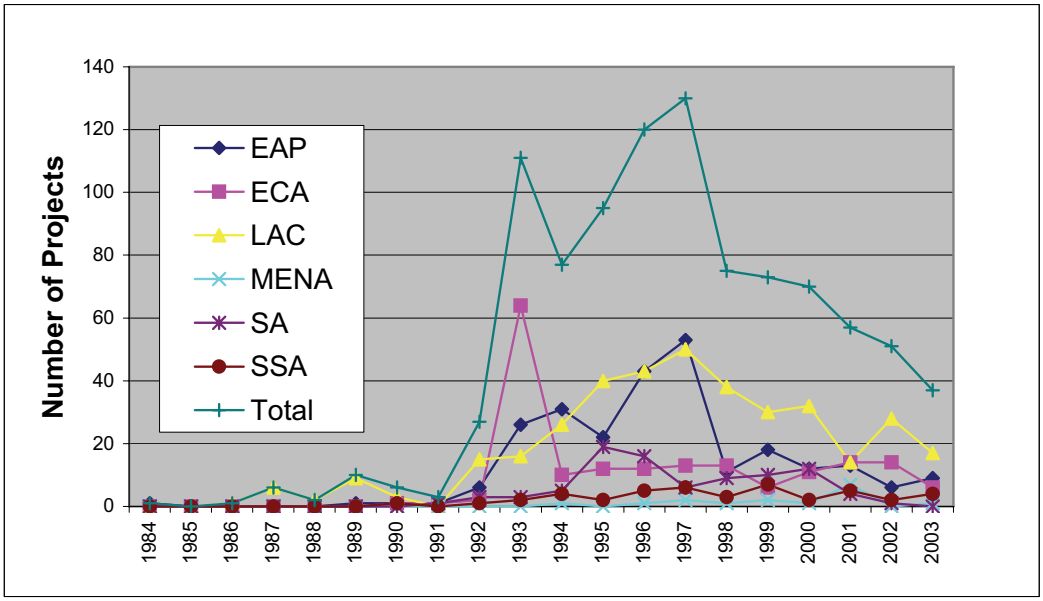
Country	Financial Closure Year	Project Name	Type of PPI	Investment (2003 US$ Million)
Brazil	1996	Light Servicos de Electricidade SA	Divestiture	5,148
Brazil	1997	Companhia Paulista de Forca e Luz (CPFL)	Divestiture	3,530
Brazil	1998	Eletropaulo Metropolitana de Eletricidade SA (Eletropaulo Metropolitana)	Divestiture	3,515
Morocco	1997	Lyonnaise des Eaux de Casablanca	Concession	3,498
Brazil	1997	Companhia Energetica de Minas Gerais (CEMIG)	Divestiture	3,282
Argentina	1992	Edesur SA	Divestiture	2,997
Indonesia	1995	PT Paiton Energy Company	Greenfield project	2,982
Brazil	1997	Companhia de Electricidade do Estado da Bahia (COELBA)	Divestiture	3,033
China	1998	Huadian Power International	Greenfield project	2,522
Turkey	2000	InterGen Gebze Adapazari Izmir	Greenfield project	2,351
Total				32,858

Source: World Bank PPI Project Database.

Regional Trends

2.10 The dominant regions in terms of FDI in electricity, Latin America and the Caribbean and East Asia and the Pacific, followed by South Asia, exhibited similar time profiles with their peak in 1997. Eastern Europe and Central Asia had a different profile, with most of the investment concentrated in the very early years of sector reforms in 1993 and little investment afterward, though the reform and sector regulation process were becoming more reliable and transparent. The question raised by the time investment profile is whether sector reforms effectively contribute to attracting private investment or whether they rely essentially on contractual agreements with host governments.

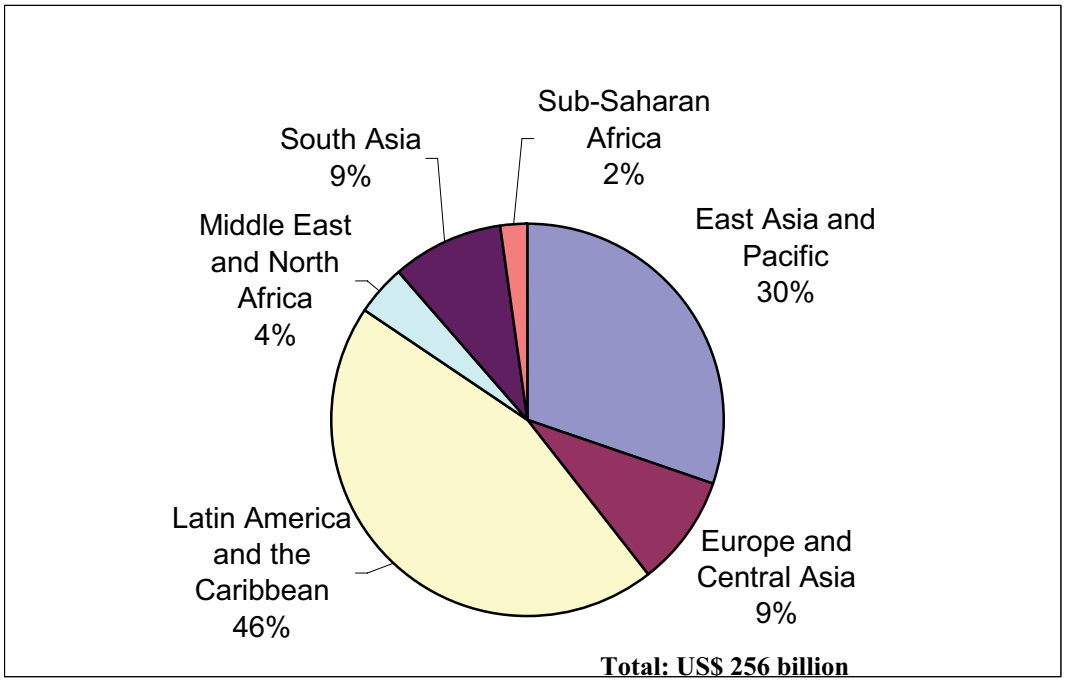
Figure 2.3: Regional Distribution of Electricity PPI Projects, 1984-2003



Source: World Bank, PPI Project Database.

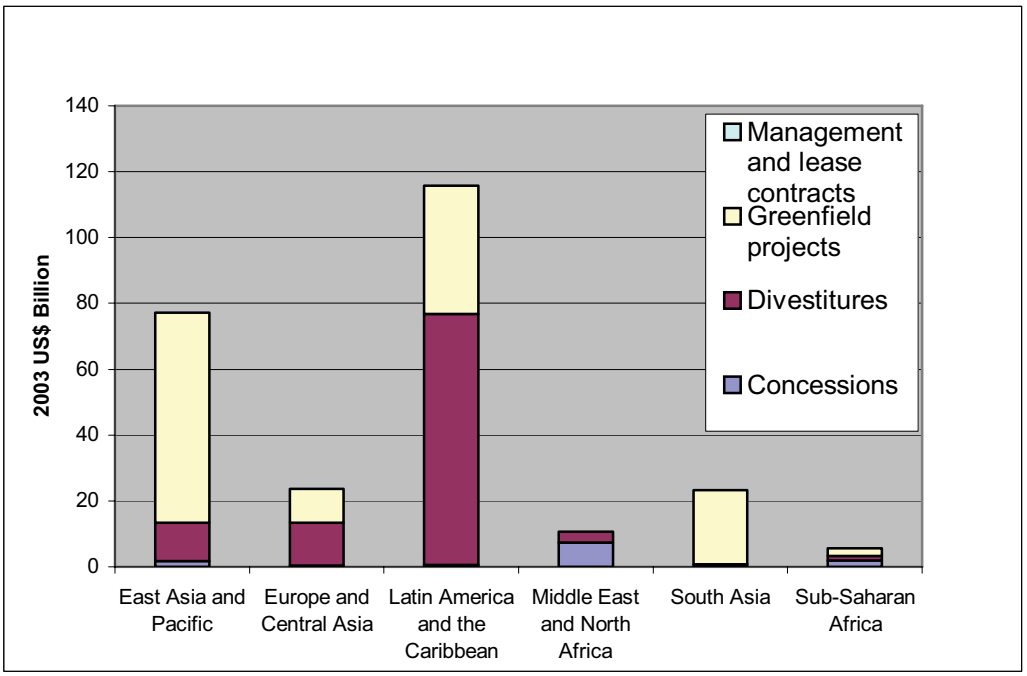
2.11 Among developing countries, the Latin America and the Caribbean region attracted most private investment over the 1984–2003 period, accounting for 46 percent of cumulative investment (Figure 2.3). Latin America and the Caribbean's dominance of investment was driven mainly by privatization and divestiture activity in the region, when Argentina, Brazil, and other countries privatized their utilities. Private participation in the power sector was part of a broader sectoral reform agenda aimed at enhancing performance-improving public finance and hoping to lower tariffs through private operation, private financing of capital investments, and introducing competition to stimulate efficiency and cost-effectiveness. Under this approach, divestitures of existing assets predominated, accounting for two-thirds of the cumulative investment in electricity projects in the Latin America and the Caribbean region during the period (Figure 2.4). Another third of the cumulative investment went to greenfield capacity projects. Management and lease contracts and concessions were barely used in the electricity projects in this region, which relied on outright divestiture and private ownership.

Figure 2.4: Cumulative Investment in Electricity Projects by Region, 1984-2003



Source: World Bank, PPI Project Database.

Figure 2.5: Cumulative Investment in Electricity Projects with Private Participation by Region and Type, 1984–2003



Source: World Bank, PPI Project Database.

2.12 The East Asia and the Pacific (EAP) region came second in attracting private investment in electricity projects. Although the EAP region's annual investment in private electricity projects grew steadily in the 1990s and reached the peak of US$13.5 billion in 1997, it was severely affected by the Asia financial crisis and decreased by 56.8 percent in 1998. In 1999, it further decreased by 88.8 percent, compared with 1997 investment commitments. The private investments declined to less than US$1 billion in 2002, but had a strong recovery to US$5.5 billion in 2003 as investments in fast-expanding Chinese and Thai economies with an improving business climate compensated for the stagnation of the other EAP markets.

2.13 Most countries in this region have adopted a specific electricity reform model, under which the system in general remains directly or indirectly under state ownership, though with increasing management autonomy and improving commercial performance, and private investment is welcome in the generation sector for the development of new generation capacities. The fundamental precondition for this model to effectively mobilize private financing is that the creditworthiness of the sovereign and of the state-owned utility is acceptable to the market.

2.14 A number of countries in the region have met this challenge, as demonstrated by the 2003 rebound in private investments and encouraging prospects for 2004–2005. Private investment in the electricity sector have therefore focused on creating new assets through greenfield projects that served or complemented investments by public sector national utilities. Greenfield projects accounted for 83 percent of the investment in the EAP region in 1984–2003 in response to the rapidly growing demand. Divestitures and concessions accounted for only the remaining 17 percent. Under this approach, the governments in the region decided not to rely on private management to improve the performance of the power utilities, but to rely on improving the efficiency of state-owned utilities. It left, however, the demand risk directly or indirectly with the government through take-or-pay agreements or traffic guarantees, as would have been the case if new investments had been carried out directly by the public sector. The 1997 financial crisis in East Asia and the Pacific highlighted the potential liability remaining with the government and led most of them to consider ways to ensure that the creditworthiness of the utilities is adequate to remove the need for a direct or implicit government guarantee.

2.15 Europe and Central Asia (ECA) and South Asia were the second most active transition or developing regions, holding similar shares of cumulative investment in electricity projects over the 1984–2003 period. However, their approaches were quite different. The ECA region followed an approach similar to that in the Latin America and the Caribbean region. Most countries in ECA introduced competition and private participation in electricity projects as part of deeper sectoral reforms aimed at redefining the role of the state, hoping to put infrastructure operations on a more commercial footing, and in some cases complying with the competition requirements for accession of

the European Union.[9] This approach was reflected in the dominant share of divestitures and concessions, accounting for 60 percent of cumulative investment in electricity project in this region. The investment in electricity projects was concentrated mainly in 1995–1997 and 2000, when the Czech Republic and Hungary privatized their gas and electricity sectors and also awarded a few greenfield projects for independent power producers (IPPs). In addition, Turkey awarded large greenfield projects for independent power producers during that period. The trend for private investment in the ECA region reflects the deep slump in the power demand in the former Communist countries after 1990, which generated substantial overcapacities, hence limited need for new investment, while the issue was the introduction of commercial management in power utilities for operational efficiency and financial rehabilitation. In Turkey, however, the climate was different because there was no transition or a market economy, but an expanding demand.

2.16 South Asia (SA) followed an approach similar to that in the EAP region. Greenfield projects accounted for nearly 97 percent of cumulative investment in South Asia. Little new investment was attracted to this region after 2001. Only one project was recorded in 2002. This pattern reflects the policy decision of most of the SA countries to maintain power utilities under state ownership while seeking to generate financing for additional capacity to meet the increasing demand off the central government balance sheet, to the extent possible.

2.17 Although the Middle East and North Africa attracted only the fourth highest private investment in the electric power sector, most concessions took place in this region, accounting for more than 60 percent of concessions in the developing countries. Private activities in the electric power sector in this region were in only two types: concessions (69 percent) and divestitures (31 percent). No greenfield projects were attracted to this region. Little new investment flew into this region after 2001. Only one project was recorded in 2003. This pattern reflects the limited extent of power sector reforms in the region (including Egypt, which stepped up reforms only recently), the availability of substantial aid to several countries in the region, and the high perceived political risk in certain countries in the region.

2.18 The Sub-Saharan Africa (SSA) region was the least successful with private investment. It attracted only 2 percent of cumulative investment in developing countries over the period of 1984–2003. Some countries introduced private activity in the sector through unbundling and private participation in the generation business through greenfield projects and divestiture of the distribution business (Côte d'Ivoire), while others transferred the operation of the main integrated utilities through concessions or lease contracts (for example, Senegal and Cameroon). Greenfield projects accounted for 42 percent of the cumulative investment, and concessions and divestitures accounted for the rest. Most of the energy investment in the region took place during 1995–2001. Little

[9] The World Bank. Public-Private Infrastructure Advisory Facility. *Private Participation in Infrastructure: Trends in Developing Countries in 1990–2001.* p. 3. http://ppi.worldbank.org/book/. The EU accession requires sector deregulation and opening to competition, but not private ownership.

investment was attracted to this region after 2001. The low level of private investment reflects the high perceived political risk. The type of privatization and the frequent privatization of integrated utilities reflect the small size of many African systems, which may not lend themselves to unbundling. A particular feature of private sector involvement in the SSA region is the recourse to management contracts in several instances (for example, in Ghana and Tanzania) as a transitory phase toward more risk taking by private investors.

Trends by Type of PPI

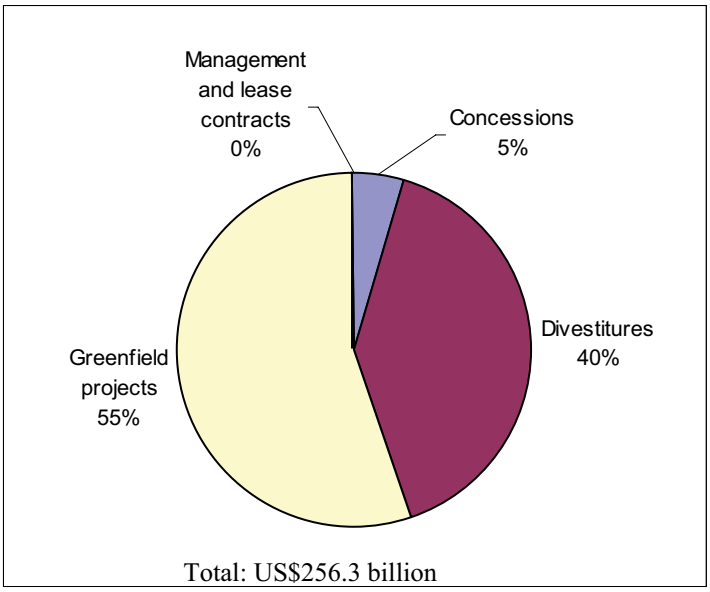
2.19 Greenfield projects were the most common type of private participation in the electric power sector in developing countries and also attracted the most investment in 1984–2003, accounting for 55 percent of cumulative investment (Table A2.2 in Annex 2 and Figure 2.6). The investment was driven mainly by greenfield projects for independent power producers in the East Asia and the Pacific region.

2.20 Divestitures were the second most common type of private participation, attracting 40 percent of cumulative investment. The investment was mainly driven by the Latin America and the Caribbean region.

2.21 Concessions of existing assets accounted for the remaining 5 percent of the cumulative investment in electricity projects. This type of PPI was primarily used in the Middle East and North Africa region and also in Sub-Saharan Africa.

2.22 Management and lease contracts have been used to introduce private participation without requiring the private sector to assume significant investment risks and often without undertaking major sector reforms up front. Such contracts were involved in only 17 projects, mainly in the Sub-Saharan Africa region, where short-term management and lease contracts were used as a transitory structure while sector reforms are developed.

Figure 2.6: Percentage of Investment in Power Projects with Private Participation in Developing Countries by Type of PPI, 1984–2003



Source: World Bank PPI Project Database

Trends by Subsector

2.23 The generation business attracted the most investment, accounting for 70 percent of the total (Table A2.3 in Annex 2 and Figure 2.7). The stand-alone distribution business was the second most active segment, accounting for 14 percent of cumulative investment. Integrated utilities followed as the third most active segment.

2.24 This pattern reflects the trend that emerged in the late 1990s for "unbundling" the power sector and separating the sector into its three basic functions, based on their potential for introducing effective competition or on their characteristic of natural monopoly (generation, which is essentially competitive;[10] transmission, which is seen as a natural monopoly; and distribution, which is sometimes thought to be competitive, although only the commercialization business is competitive, while the distribution wire business is rather a natural monopoly[11]). The distribution of investments between generation and distribution reflects the higher capital intensity of the generation business compared with distribution activities, but it seems to reflect as well the lesser appetite of investors for the commercial risk of the distribution business and their preference for the generation business, where the market risk is taken by a third party through "take-or-pay" power purchase agreements (PPAs). Very few merchant plants were financed by the private sector in developing countries, although a handful of IPPs included some limited commercial risk.

[10] In fact, cogeneration plants and certain hydro schemes may not be in the competitive sector.
[11] The distribution business is increasingly separated into the commercial function and the wire business.

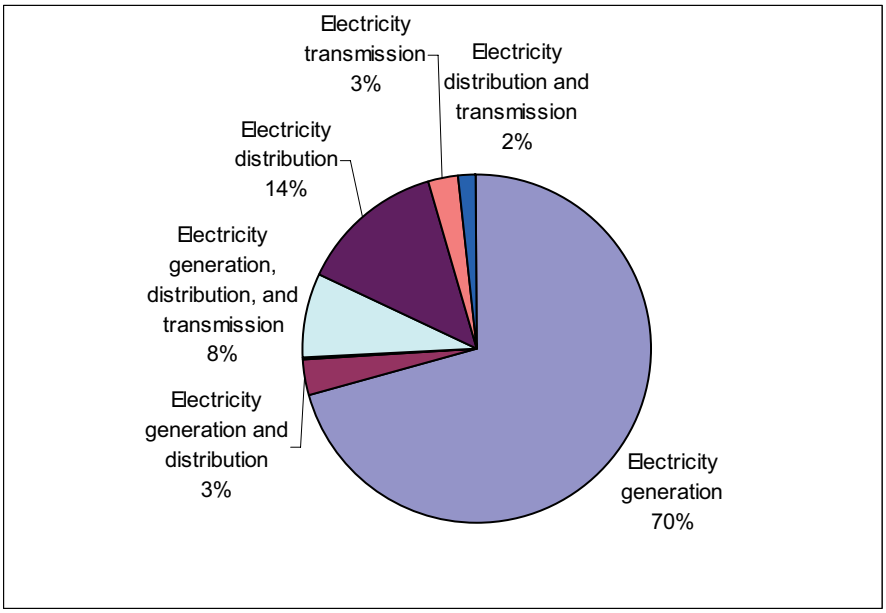
2.25 Most electricity projects in East Asia and the Pacific and in South Asia were stand-alone generation facilities (Figure 2.8). Investment in these projects was channeled mainly through build-operate-own (BOO) and build-operate-transfer (BOT) programs to expand generating capacity. In the Latin America and the Caribbean region, stand-alone generation business emerged from three types of transactions: BOO and BOT schemes and privatization of segments of unbundled erstwhile vertically integrated electricity utilities.

2.26 Most private electricity distribution projects were awarded in Latin America and the Caribbean, the Middle East and North Africa, and Eastern Europe and Central Asia. Most integrated utility projects were in Latin America and the Caribbean, Sub-Saharan Africa, and Eastern Europe and Central Asia. Developing countries used two schemes to introduce private participation in integrated utilities: in most cases, minority stakes were sold in state-owned enterprises, an approach shared with Eastern Europe and Central Asia and East Asia and the Pacific; in the other cases, management control was also transferred to the private sector, an approach used in several countries in Latin America and the Caribbean, Sub-Saharan Africa, and the Middle East and North Africa.[12]

2.27 Latin America and the Caribbean was the only region to introduce PPI on a significant scale in the transmission business, possibly because it was the only region where the sector reform scheme was sufficiently advanced and the business climate was adequate to address the specific issues of the regulation of a privatized natural monopoly.

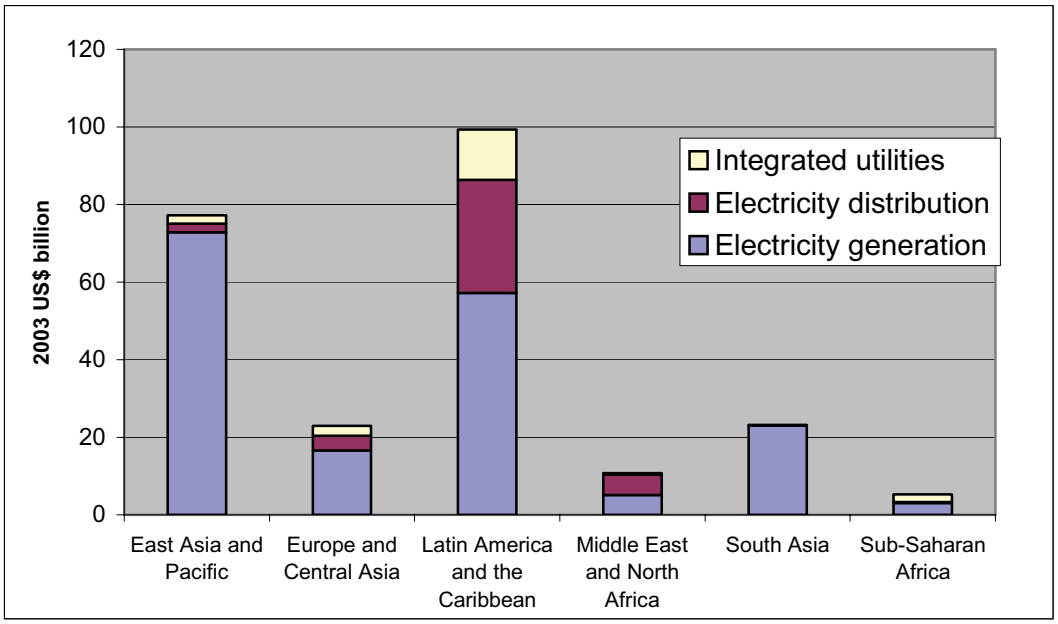
[12] The World Bank. Public-Private Infrastructure Advisory Facility. *Private Participation in Infrastructure: Trends in Developing Countries in 1990–2001*. Chapter 8: Electricity. http://ppi.worldbank.org/book/.

Figure 2.7: Percentage of Investment in Electricity Projects with Private Participation in Developing Countries by Subsector, 1984–2003



Total: US$256.3 billion

Figure 2.8: Cumulative Investment in Electricity Projects with Private Participation by Region and Subsector, 1984–2003



Conclusions to Chapter 2

- FDI in electricity has been more volatile than total FDI in developing countries and has been more affected by the post-2000 decline.
- FDI in electricity was highly concentrated geographically, with 15 percent of the countries accounting for 86 percent of investment. The investment pattern showed a high exposure to risk in a small number of countries.
- Investment was heavily concentrated in generation (70 percent) and much less so in distribution (14 percent), suggesting an aversion of investors toward taking market and commercial risk. The concentration in generation is similar in terms of amounts invested and number of projects.
- FDI occurred mainly in Latin America and the Caribbean and in East Asia and the Pacific, with very different investment characteristics: greenfield IPPs in East Asia and the Pacific, with little sector reforms; more investment in distribution—though with significant investment in generation, as well—with major sector reforms in Latin America and the Caribbean.

3

Electricity Projects under Stress

3.1 From the 952 electricity projects worth US$256 billion taken to closing over the 1983–2003 period, some ran into difficulties; a few of them were ultimately cancelled; and others went through a period of stress, which required the parties involved to engage in negotiations to work out a mutually acceptable solution. This chapter will seek to analyze the most frequent events that led to stress situations. From the understanding of the causes of stress for electricity projects, it is expected that a few specific patterns of stress will emerge. The analysis of the causes of stress will also help to better understand the highly differentiated stress and risk patterns facing electricity projects of different types and in different regions.

Frequency and Probability of Stress

3.2 In the present analysis, "electricity projects under stress" are defined as electricity projects that have been terminated before their term; are under arbitration; are still ongoing, but declared unsatisfactory by either the investors, the host government, or the lenders; or went through a stress period, but were successfully worked out.

3.3 According to the definition of stress mentioned above, information was gathered through the PPI Project Database (updated to 2003); from country and project knowledge of representatives of five private investors and of the World Bank Group Regional staff using a survey; and from public information from conference speeches, magazines, and journal articles on stressed energy projects. It produced a list of 63 power projects under stress, that went through a period of stress, or that were cancelled in 18 countries (the list is attached in Annex 1). It found 14 cancelled projects (from the PPI Project Database as of 2003), 19 projects that are currently under stress, and 30 projects that have been worked out. The 30 workout cases include 22 Pakistan electricity projects with a total investment of 5.9 billion, which are regarded as special cases because almost all energy projects in the country have experienced the same type of stress in the late 1990s, and thus they should rather be treated as one case. Figures 3.1, 3.2, and 3.3 (based on Table A2.4 in Annex 2) illustrate the number and value of electricity projects under stress and the percentage in number and value of projects under stress compared with all private electricity projects (which gives an evaluation of the probability for a project to come under stress and the probability for a dollar invested in an electricity project in a

developing country to be caught in a stress situation). The figures isolate the Pakistan case to show the effect of Pakistan projects under stress. In the later analysis, the 22 Pakistan projects are treated as one big project; therefore, the analysis counts 9 worked out projects.

Figure 3.1: Number of Electricity Projects under Stress by Status

Figure 3.2: Value of Electricity Projects under Stress

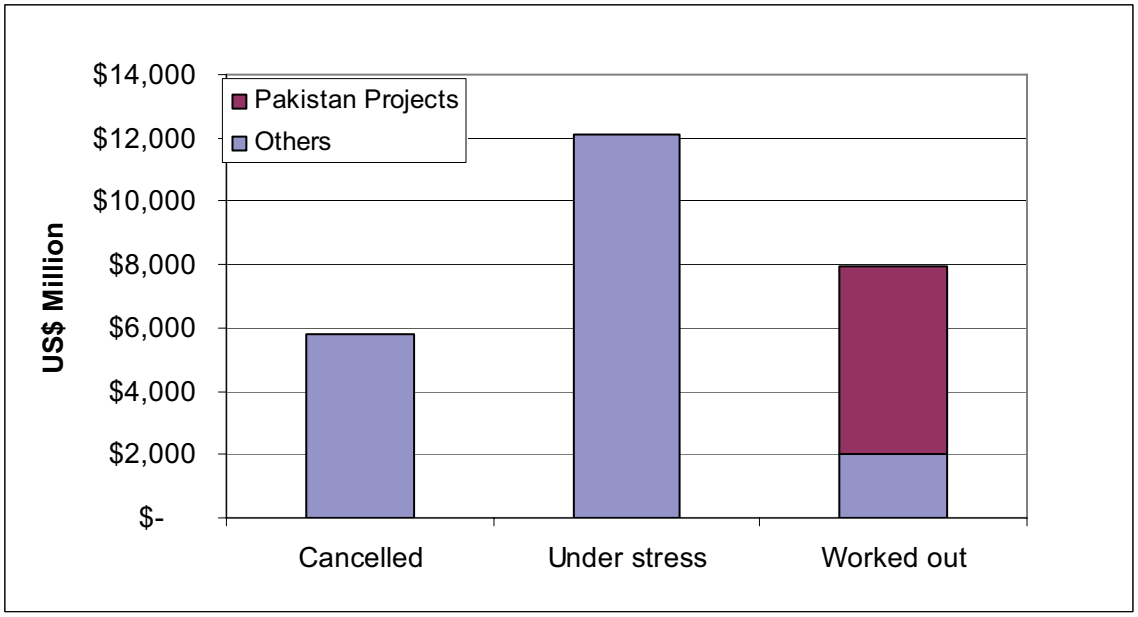
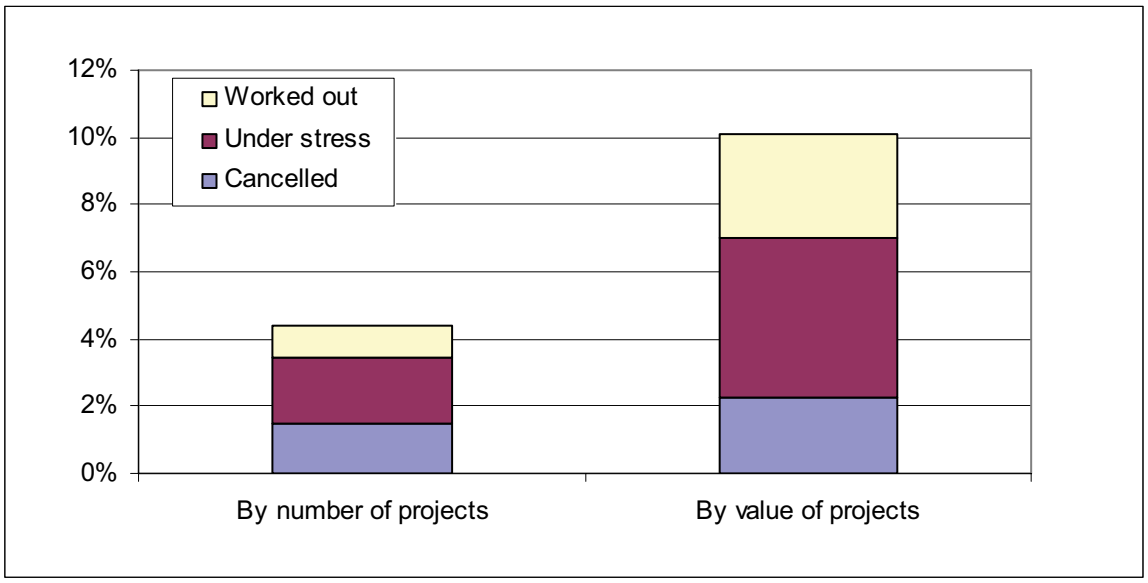


Figure 3.3: Percentage of Electricity Projects under Stress, Compared with All Electricity PPIs



3.4 Overall, a stress situation in the electricity sector is a rare event, which has affected or is affecting only 4 percent of power projects in number and 10 percent in value. If projects that have been worked out are excluded, the risk of stress falls to 3.5 percent in number and about 7 percent in value. Considering that all projects that went through stress were either cancelled or worked out, it appears that in the past some 21 percent of the projects that incurred stress were ultimately worked out while some 33 percent ended up in cancellation. This suggests that effective workout procedure and instruments do play an important role in addressing stress situations, and in particular the situation of the 19 projects presently under stress. Even though our analysis may have missed a few projects under stress in its identification process, it appears that at that low level of probability, the stress risk should not be a significant deterrent to investment in the power sector.

3.5 To complement the global analysis over the 1984–2003 period, the number of projects that went under stress every year was tabulated in order to assess whether the perceived high risk of stress is due to a recent surge in cases of stress. (The results are shown in Figures 3.4 and 3.5.) During the period 1992–1998, both the number and value of electricity projects under stress experienced a surge, anticipating by about one year the overall growth and decline of private investment in the electricity sector.

Figure 3.4: Number of Electricity Projects Coming under Stress by Year

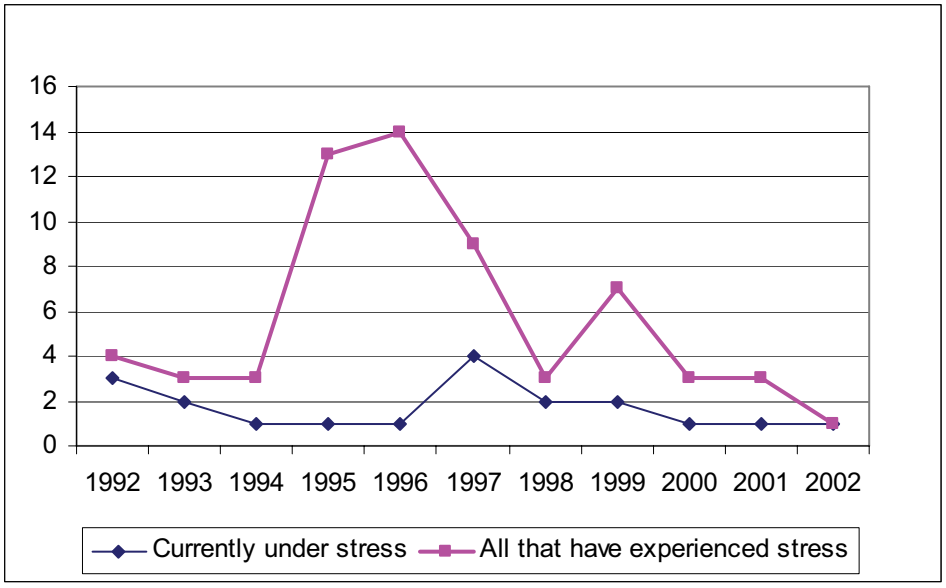
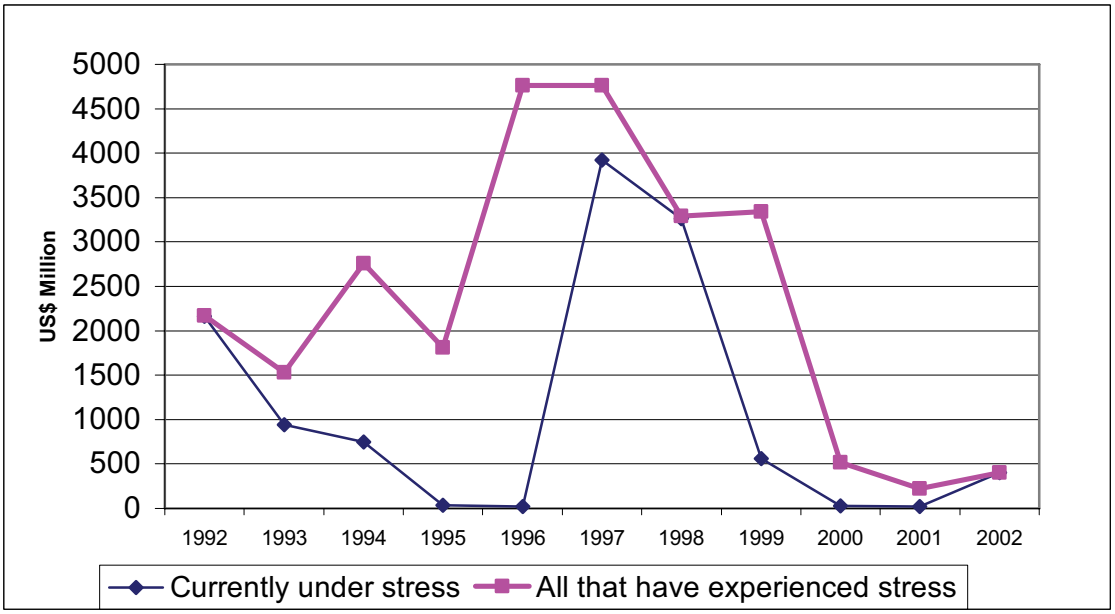


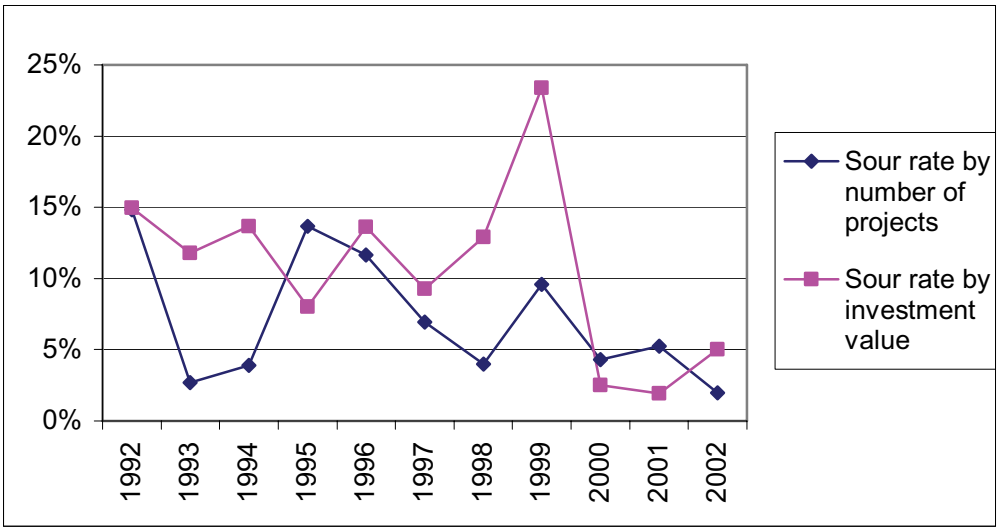
Figure 3.5: Value of Electricity Projects Coming under Stress Annually



3.6 The number of electricity projects coming under stress is fluctuating, but remains low compared with the overall population of new electricity projects in the same year. The annual percentage of electricity projects that went to stress (annual sour rate defined as projects becoming stressed in the year compared with the number of new projects in the same year) is shown in Figure3.6. It appears that in terms of number of projects, the

annual sour rate remains relatively low, ranging from 2 percent to 15 percent, with an average of 7 percent; in terms of investment value, the annual sour rate is more volatile, ranging from 2 percent to 23 percent, with an average of 11 percent. In 1999, the private investment had already declined dramatically after the Asia and Russia financial crises. In this less supportive business climate, more of the existing projects were subjected to stress situations (for example, in India); therefore, the sour rate by value in 1999 is especially high.

Figure 3.6: Annual Percentage of Electricity Coming under Stress, 1992—2002



Regional Distribution of Electricity Projects under Stress

3.7 Energy projects under stress are found in five out of the six Bank regions: Latin America and the Caribbean, South Asia, East Asia and the Pacific, Europe and Central Asia, and Sub-Saharan Africa. No projects came under stress in the Middle East and North Africa region.

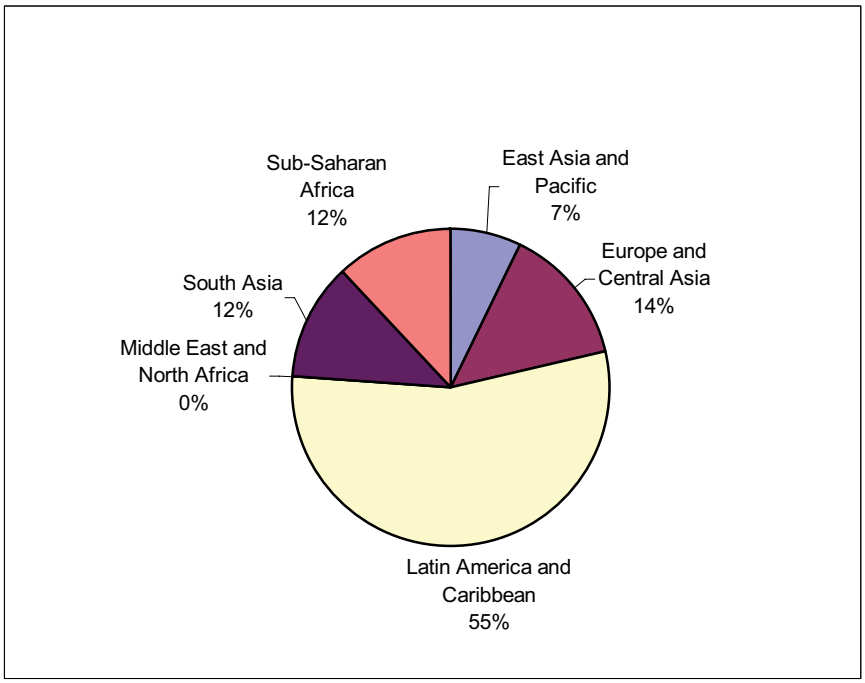
Number of Projects

3.8 Latin America and the Caribbean, which is the most affected region at the moment, accounts for 56 percent of the total (Figure 3.7), warrants special consideration because of the magnitude of the amounts of money at risk and the unexpected nature of the crisis. Eastern Europe and Central Asia is second with 14 percent of the total, followed by South Asia (treating Pakistan projects as one project) and Sub-Saharan Africa, each accounting for 12 percent of the total. East Asia and the Pacific accounts for the remaining 7 percent. The Middle East and North Africa region has no power projects under stress, which can be partially due to the limited number of electricity PPI projects in this region (only 4 percent of electricity projects).

Frequency of Stress by Region

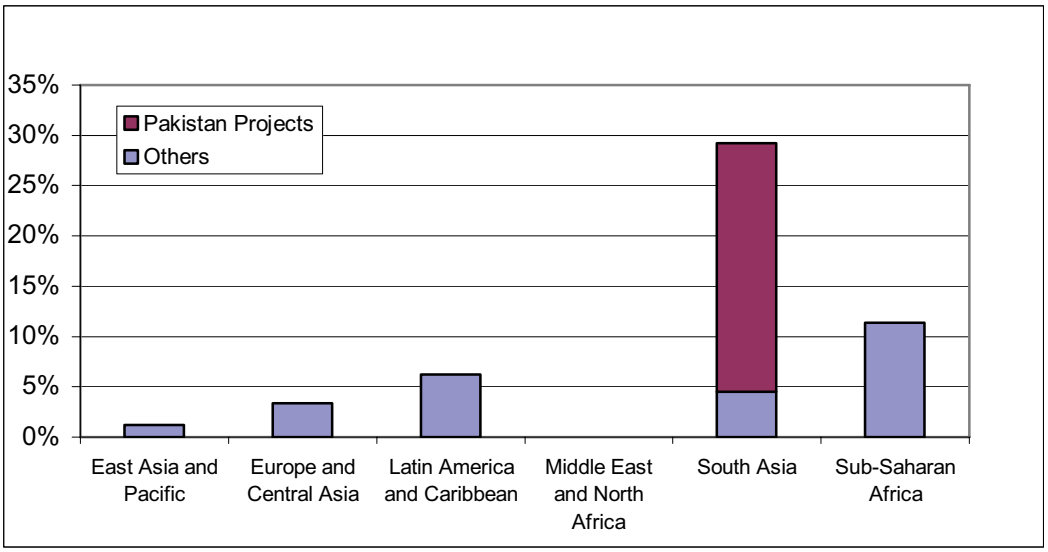
3.9 The percentages of electricity projects under stress relative to the overall projects in each region in terms of number of projects (Table A2.5 in Annex 2 and Figure 3.8) show that South Asia's figure is the highest if all Pakistan projects are included. However, if this special effect is eliminated, Sub-Saharan Africa would become the region where the frequency of stress compared with the overall number of projects is highest, with a percentage of 11 percent, showing that almost 1 out of 10 energy projects has experienced some kind of stress. The Latin America and the Caribbean region also has a relatively high percentage, 6 percent. The Eastern Europe and Central Asia and the East Asia and the Pacific regions have relatively low percentages, 3 percent and 1 percent, respectively. Figure 3.9 shows the similar regional characteristics of projects under stress in terms of value of investment. The higher percentages, compared with those in Figure 3.8, imply that projects under stress have a larger size than average. In both cases, the East Asia and the Pacific region has the lowest percentages of projects under stress, showing that although the region has the second highest number of energy projects with private participation, its energy projects have fared well, compared with other regions. This frequency pattern of stress by region is generally consistent with the risk perception that is often reflected in the sovereign country credit ratings in these regions.

Figure 3.7: Geographical Allocation of Projects under Stress



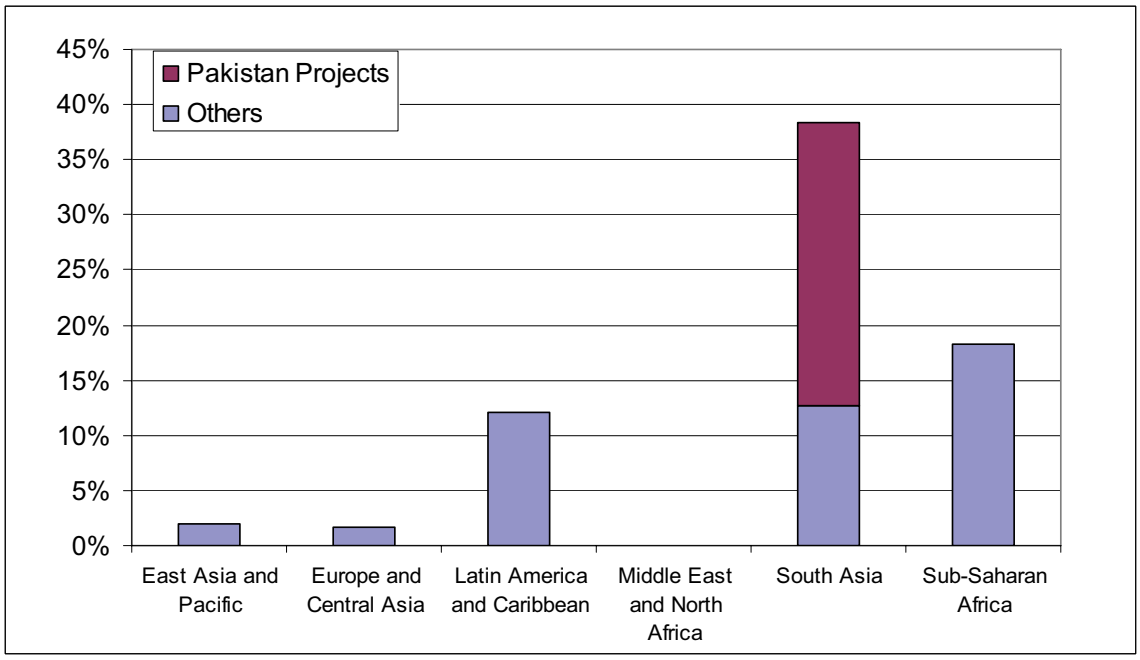
Source: PPI Project Database and Working Group members.

Figure 3.8: Geographical Allocation of Electricity Projects under Stress in Number



Source: PPI Project Database and Working Group members.

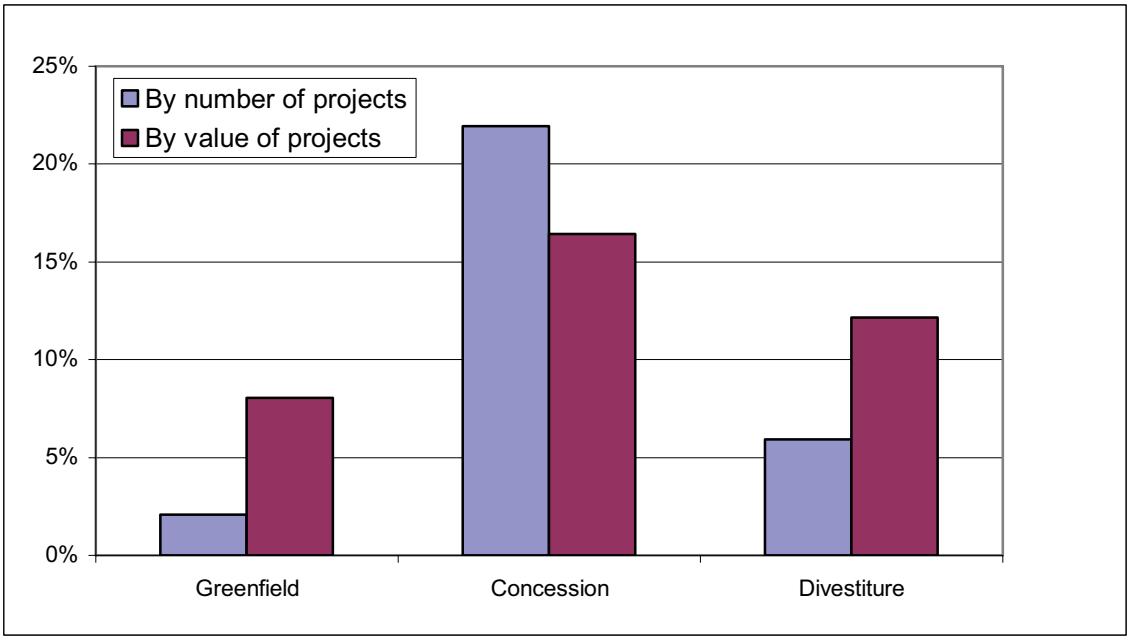
Figure 3.9: Geographical Allocation of Projects under Stress in Value



Electricity Projects under Stress by Type of PPI

3.10 More than half of the electricity projects under stress in number are divestiture projects. (Table A2.6 in Annex 2 and Figure 3.10). One reason may relate to the more complex nature of divestiture, which involves more parties and uncertainties and therefore higher risk than other types of private projects. Another reason is that most divestitures involve vertically integrated utilities or distribution companies, and it emerges from the analysis of projects under stress that projects involving an interaction with the users and a market risk tend to meet more difficulties than independent power producers (IPPs) (see Chapter 4). This conclusion is supported by the observation that concessions, which also often involve enterprises with an interface with end users, also show a high percentage of stress, and that on the contrary, greenfield projects, which are mainly IPPs for power generation based on long-term power purchase agreements (PPAs), are less prone to stress.

Figure 3.10 Electricity Projects under Stress by Type of PPI



Source: PPI Project Database and Working Group members.

Electricity Projects under Stress by Sub-sector

3.11 Projects under stress have been separated by sub-sector in three categories: distribution, generation, and utility:

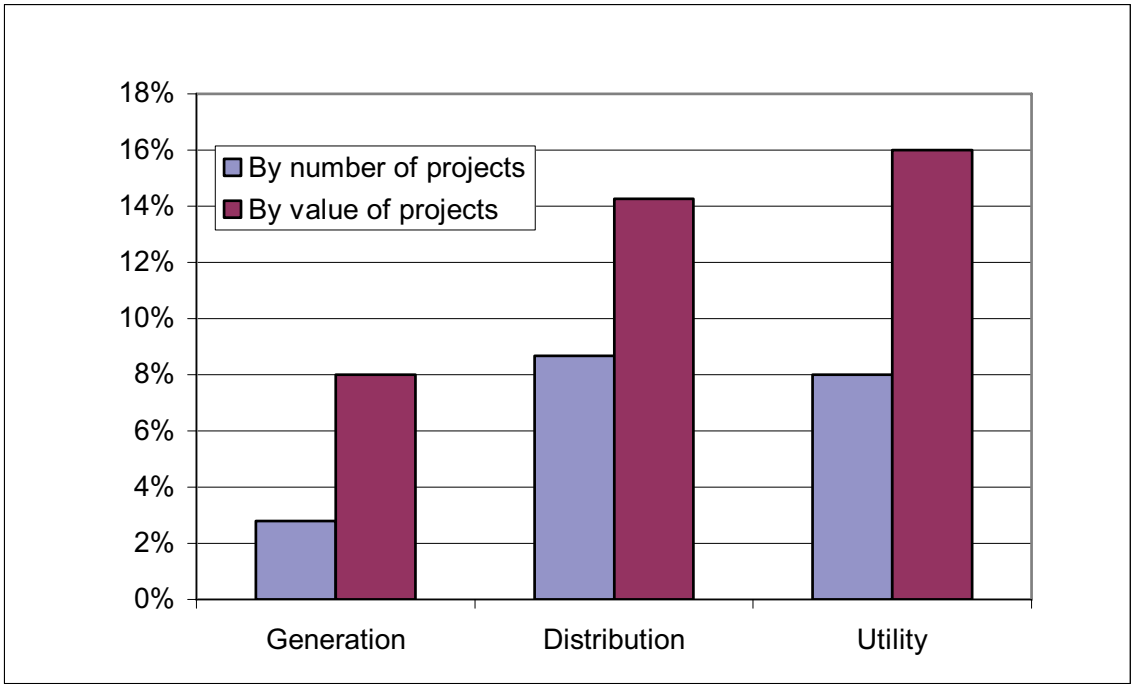
- Distribution includes low voltage distribution and commercialization and is part of the business, transmission (when this function is not separated from distribution), and the ISO function (excluding generation activities).

Distribution is in direct contact with electricity users. PPI in distribution is generally the result of divestiture or concession.

- Generation includes the production function exclusively. PPI in generation occurs generally through divestiture or through a greenfield IPP. Generation companies are generally not in commercial contact with the public, but interact with the government and subsidiarily with the regulator.
- Utilities include vertically integrated systems plus a few special cases that include generation and distribution, but not transmission.

3.12 IPP generation projects represent the largest group of electricity projects under stress (45 percent) because they are the most frequent type of PPI in the electricity sector. They are in fact less risky than other types of electricity projects in terms of probability of stress (3 percent in number of projects). On one hand, Table A2.7 in Annex 2 and Figure 3.11 show that IPP generation has the lowest stress probability of all types of electricity projects, in terms of both number of projects (3 percent) and value of investment (8 percent). On the other hand, distribution projects have the highest stress probability in terms of number of projects (9 percent), slightly higher than utility projects (8 percent), but below utility projects in terms of investment value (14 percent compared with 16 percent, respectively).

Figure 3.11: Electricity Projects under Stress by Subsector



Source: PPI Project Database and Working Group (WG) members.

3.13 Utilities and distribution projects have the highest market risk level. IPPs, on the other hand, are not directly exposed to market risk, but to the credit risk on their direct or indirect off-taker (the utility or the government). The figures confirm that the direct market risk of a privately managed utility is often higher than the indirect market risk of an IPP, because the off-taker is often state-owned or state-guaranteed. Possible explanations are that state-backed off-takers have a lower probability of becoming insolvent because they have the implicit guarantee from the government and that many IPPs benefit from some form of cut-through, giving them some recourse on the government in case of stress.

3.14 The conclusion is that the stress risk resulting from the interaction with a state-owned utility is lower than the risk of stress resulting from market exposure of a privately managed utility or distribution company.

3.15 Overall, the distribution of the risk of stress by sub-sectors reflects the exposure to market risk of each type of project: the stress risk is significantly higher for projects with higher market risk exposure, compared with projects relying on PPAs.

Private Electricity Projects and the Influence of Credit Ratings

3.16 Several countries where electricity projects have come under stress were considered by investors as moderate risk countries, having carefully thought through reforms going back 10 years or more, a credible track record of energy sector institutional stability, as was the case in Argentina, India, Indonesia, or Senegal, and sometimes a good sovereign credit rating, as was the case particularly in Latin America and the Caribbean for Chile, Argentina, and the Dominican Republic, or in South Asia for Pakistan. A question in this regard is to what extent there is a relationship between the level and variation of country credit rating of the sovereign rated and private investment in the power sector. A comparative analysis of the level and changes in credit rating by Standard and Poor's (S&P) and investment in electricity projects for countries with the largest percentages of electricity projects under stress has been conducted: Pakistan (100 percent), Dominican Republic (25 percent), Indonesia (18 percent), and Argentina (13 percent).

3.17 The long-term local and foreign credit ratings from the S&P Sovereign Ratings history are plotted in Figures 3.12–3.15 for each country, based on the allocation of numbers as shown in Table A2.8 in Annex 2.

Figure 3.12: Investment in Electricity and Sovereign Credit Rating: Pakistan

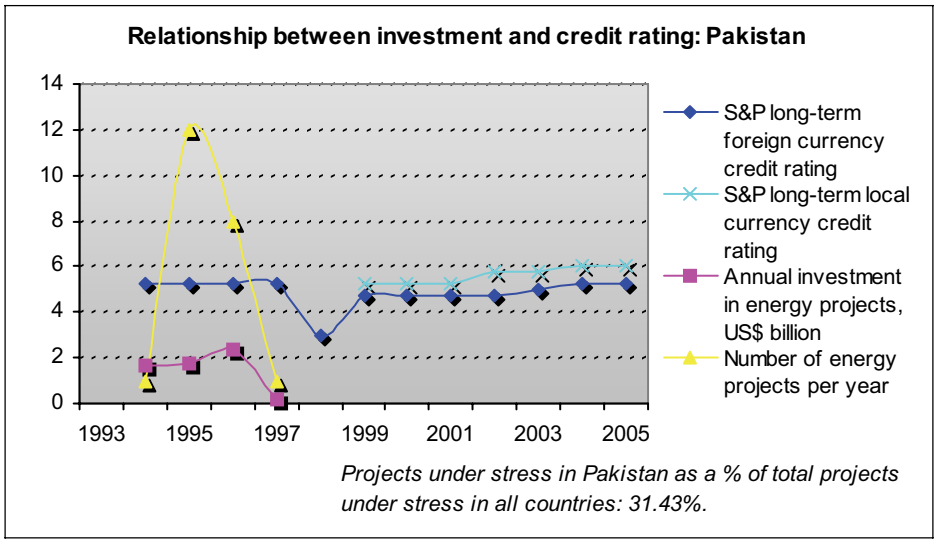


Figure 3.13: Investment in Electricity and Sovereign Credit Rating: Dominican Republic

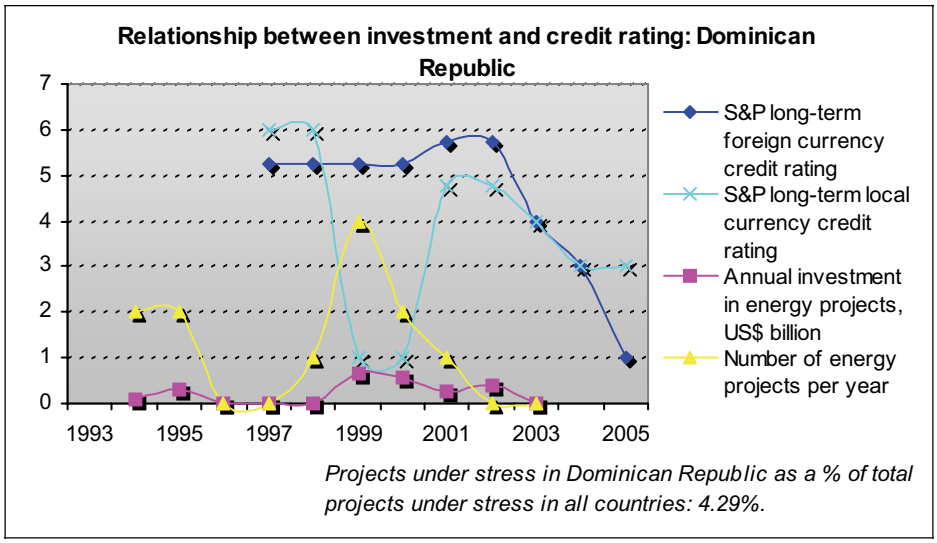


Figure 3.14: Investment in Electricity and Sovereign Credit Rating: Indonesia

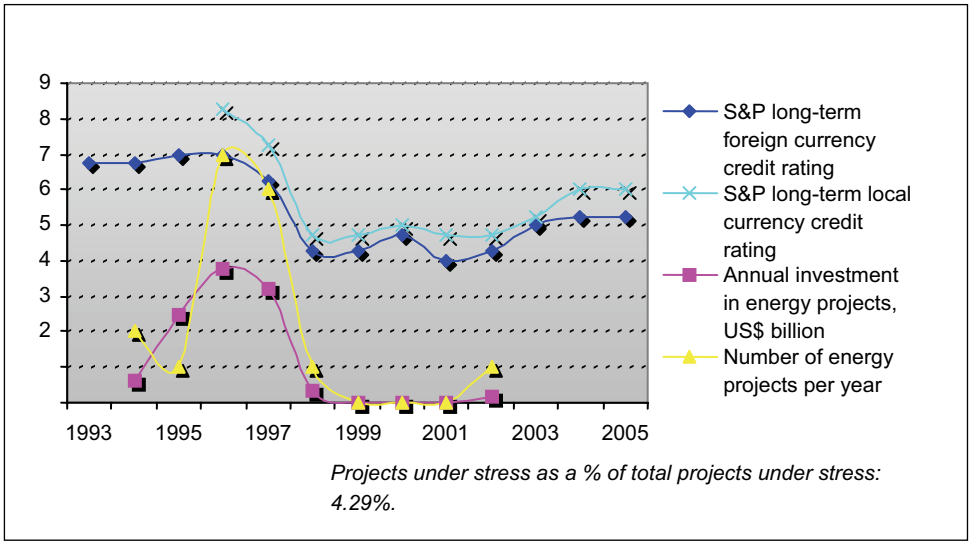
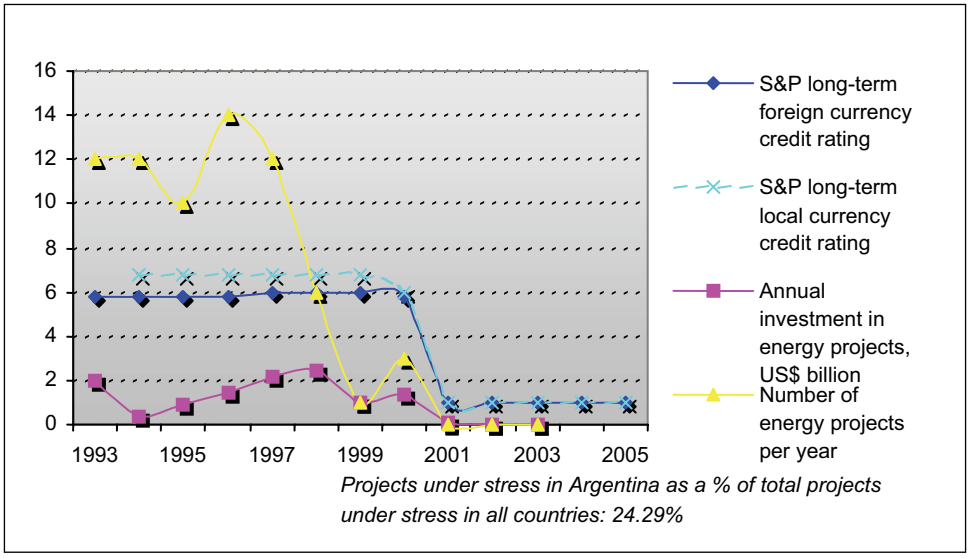


Figure 3.15: Investment in Electricity and Sovereign Credit Rating: Argentina



3.18 The figures show that all of the four most affected countries had weak credit ratings. They also suggest that there is a positive correlation between the relative volatility of long-term foreign currency credit rating (defined as the difference between the highest and the lowest rating in the period) and the percentage of projects under stress among all energy projects of the sample countries. The comparison also suggests a positive correlation between the changes in investment in energy projects and the changes of the sovereign credit risk. In some cases (for example, Pakistan), the S&P credit rating downgrade occurred after the sharp decrease in investment and number of projects, and

similarly, the upgrade often lags behind the increased investment in the sector (for example, Indonesia). It seems, therefore, that the level of private investment and the probability of stress are related to the country credit rating and its fluctuation, suggesting that a major contributor to stress is the overall state of the economy. However, the slow response of credit ratings to changes in the country risk makes them of little use to anticipate energy project risks. In fact, it is rather the level of energy sector private investment in the country that provides a lead on future credit rating movement.

3.19 The figures also suggest that when a country credit rating falls below "CCC," according to S&P ratings, private sector investment falls to zero, indicating that at that level the country sovereign risk is more than what private investors in the electricity sector are willing to take under any circumstances.

Conclusions to Chapter 3

General conclusions

- Overall, a stress situation in the electricity sector is a rare event, which has affected or is affecting only 4 percent of power projects in number and 10 percent in value.
- The number of electricity projects under stress anticipated by about one year the overall growth and decline of private investment in the electricity sector.
- Some 21 percent of the projects that incurred stress were ultimately worked out, suggesting that effective workout procedure and instruments do play an important role in addressing stress situations.
- There is a positive correlation between the relative volatility of long-term foreign currency credit rating and the percentage of projects under stress among all energy projects. In fact, the level of energy sector private investment in the country anticipates future credit rating movement.
- When a country credit rating falls below "CCC," according to S&P ratings, private sector investment falls to zero, indicating that at that level the country sovereign risk is more than what private investors in the electricity sector are willing to take under any circumstances.

Regional and sub-sectoral analysis

- South Asia had the highest percentage of projects under stress. However, if the special effect of Pakistan is eliminated, Sub-Saharan Africa becomes the highest stress regions, with a percentage of 11 percent. The Latin America and the Caribbean region also had a relatively high percentage, 6 percent. The Eastern Europe and Central Asia and the East Asia and the Pacific regions have relatively low percentages, 3 percent and 1 percent, respectively. The frequency pattern of stress by region is generally consistent with the risk

perception that is often reflected in the sovereign country credit ratings in these regions.

- More than half of the electricity projects under stress in number are divestiture projects. One reason may relate to the more complex nature of divestiture, which involves more parties and uncertainties. Moreover, divestitures often involve vertically integrated utilities or distribution companies, and it emerges from the analysis of projects under stress that projects involving an interaction with the users and a market risk tend to meet more difficulties. Concessions, which also often involve an interface with end users, also show a high percentage of stress. On the contrary, greenfield projects, which are mainly IPPs for power generation based on long-term power purchase agreements (PPAs), are less prone to stress.
- IPP generation projects are less risky than other types of electricity projects (3 percent in number of projects). On the other hand, distribution projects have the highest stress probability of stress (9 percent), slightly higher than utility projects (8 percent).
- Overall, the distribution of the risk of stress by sub-sectors reflects the exposure to market risk of each type of project: the stress risk is significantly higher for projects with higher market risk exposure, compared with projects relying on PPAs. Possible explanations are that state-backed off-takers have a lower probability of becoming insolvent because they have the implicit guarantee from the government and that many IPPs benefit from some form of cut-through, giving them some recourse on the government in case of stress.

4

Causes of Stress

4.1 Having analyzed the occurrence of stress situations in power projects and their distribution by type of project, subsector, sector, and region, the next step is to analyze the causes of stress to understand the issues that need to be addressed and to facilitate the workout of projects under stress. This chapter will seek to identify the most frequent causes of stress, to examine which ones affect each type of projects, and what are the regional patterns for the causes of stress. The analysis will also provide indications to potential investors regarding what type of stress risk is significant for each type of project and by region, and therefore where particular vigilance in designing risk mitigation strategies should be exercised ex ante.

4.2 To understand the causes of stress, a survey of electricity projects under stress was done, using a standardized analytical framework, or "scorecard." The scorecard is attached in Annex 3, and the aggregated data from the scorecard analysis are attached in Annex 4. The scorecard was structured in three sections:

i. Characteristics of the project, following the classification of Chapter 3

ii. Causes of stress, classified under 5 main categories and 25 subcategories:

   a. Sociopolitical causes

   b. Macroeconomic causes

   c. Regulation and price issues

   d. Project structural problems

   e. Investors' performance issues

iii. Consequences of stress for the project (analyzed in Chapter 5).

4.3 Each of the 42 electricity projects under stress (counting Pakistan projects as one case) listed in Annex 1 were studied through the analysis of the information entered in the scorecard, which were obtained from relevant private investor members of the Working Group, the WBG Regional and Sector staff, and public sources.

Overview

4.4 The causes of stress fall into two broad areas: issues related to the behavior of the host government or the regulator that are specific to the power sector and may not have affected other private infrastructure projects—categories (a), (c), (d), and (e) listed above relate to this area—and macroeconomic shocks in the project environment, which are not directly related to the power sector and are likely to have equally affected all private investment in infrastructure—category (b) listed above relates to this area.

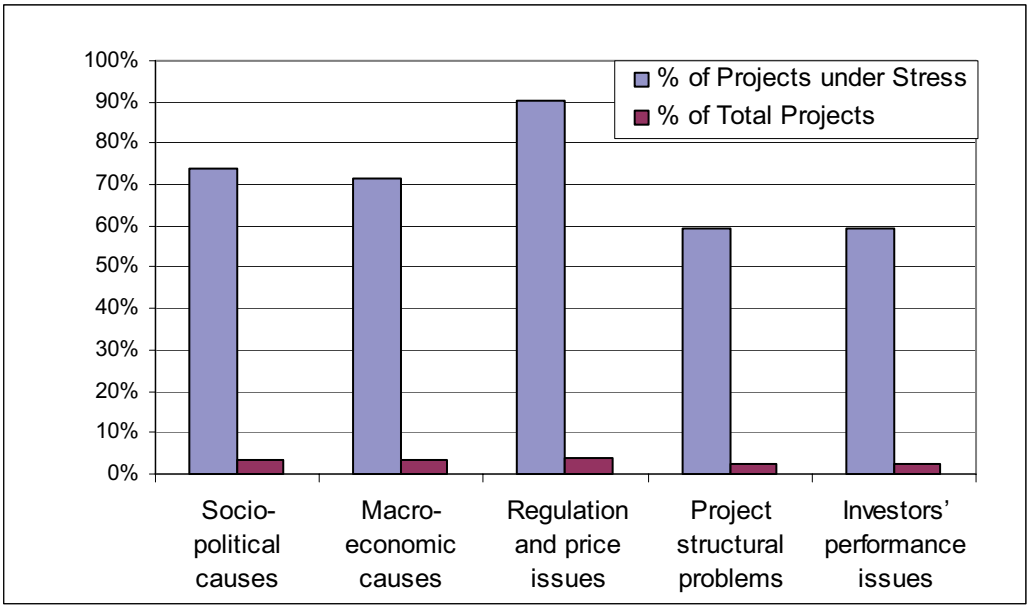
4.5 Although certain projects may have been affected by both sector-specific and macroeconomic causes of stress, the allocation between the two types of causes of stress suggests that power projects are mainly affected by sector-specific issues. However, it was noted that there is a strong colinearity between causes and that most projects were rated simultaneously on several closely related items such as compliance with price mechanisms and government interference.

4.6 One or more of the five main causes of stress were found in 93 percent of the projects under stress. This concentration suggests that the most relevant causes of stress to be addressed through workout are limited in number and correspond to a few typical patterns.

4.7 The result presented in Figure 4.1 shows that the most frequent causes of stress are:

- Regulatory and price-setting issues (4 percent of PPI projects and 90.3 percent of projects under stress)
- Sociopolitical issues (3.3 percent of PPI projects and 73.8 percent of projects under stress)
- Macroeconomic issues (3.2 percent of PPI projects and 71.4 percent of projects under stress)
- Project structural problems (2.6 percent of PPI projects and 59 percent of projects under stress)
- Investors' performance, which was rated good in 71 percent of the stress cases and poor in 11.9 percent of the cases (net 6.1 percent on an inverted scale).

Figure 4.1: Frequency of Causes of Stress



Source: WG1.

4.8 The analysis (see Annex 3 for detailed figures by categories and subcategories of stress) shows that:

- Regulatory and pricing issues constitute the most frequent cause of stress, and within this category, noncompliance with the pricing formula and government interference are identified as the most critical issues, whereas regulatory changes, quality of regulation, and quality of relationship with the host government are less critical.
- Sociopolitical resistance to private sector involvement comes second in the causes of stress, and within this category, the most frequent issue is the lack or change in political commitment of the government, as well as social resistance from the public or special interest groups. Interestingly, resistance from the unions seems to be rarely a cause of project failure.
- Macroeconomic causes appear equally important, and within this category, exchange rate instability comes as the most frequent issue, exemplified by the Argentinean projects, followed by low demand due to macroeconomic crisis and other macro events. Unavailability of local financing seems less critical, and fluctuations in fuel prices—although mentioned in 16.7 percent of the cases of stress—seem less important.
- Faulty project structure comes significantly behind the three previous causes of stress, and within this category, project exposure to foreign exchange (forex) risk through the mismatch between nonhedged foreign exchange risk on borrowing and the currency of project revenues is clearly the most frequent

cause of stress; overly aggressive bidding for concessions or new projects was a rare cause of stress, and error in the choice of technology was not an issue.

- The performance of the investors was considered strong in 71.4 percent of the cases (rated essentially by the investors themselves); however, it was recognized that it was non-satisfactory in 12 percent of the cases. Interestingly, the performance of the investors is rated stronger in the area of technical performance, which was rarely a cause of stress, than in the area of investment financing (62 percent positive) and of commercial performance and quality of service (only 48 percent positive in both areas). Commercial performance and quality of service appear as the weaker performance area of investors and a significant cause of stress. This suggests that the areas where private investors do worse are precisely two of the most frequently mentioned justifications for private sector involvement.

4.9 The overall analysis of the causes of stress for PPI electricity projects leads to the following conclusions, which should be integrated into the design of workout strategies and instruments:

- The most frequent causes of stress are essentially project and sector-specific and can be addressed through sector-specific workout strategies and instruments.
- The political dimension of project stress situations resulting from the lack of popular support for PPI is often underestimated, but comes back as an important factor in many cases. It confirms the importance of consensus building and consultation at the national level before recommending private sector involvement in the electricity sector, rather than deciding on private sector participation and then seeking to justify it to the public. In the context of project workout, it leads to the conclusion that transparence, open communication, and participation of the public should be part of the workout process to address the underlying political tensions.
- External macroeconomic shocks are important. They cannot be handled through sector-specific strategies, but through country-specific strategies, which would apply to other sectors as well.

Causes of Stress by Type of PPI

Greenfield Projects

4.10 The top five causes of stress for greenfield projects are shown in Figure 4.2 and explained as follows:

- Regulation and pricing issues (92 percent of the cases) are the most frequent cause of stress, with a relatively high incidence of noncompliance with non-price-related clauses (58 percent) and a relatively low incidence of noncompliance with pricing clauses (41.7 percent). This pattern can be

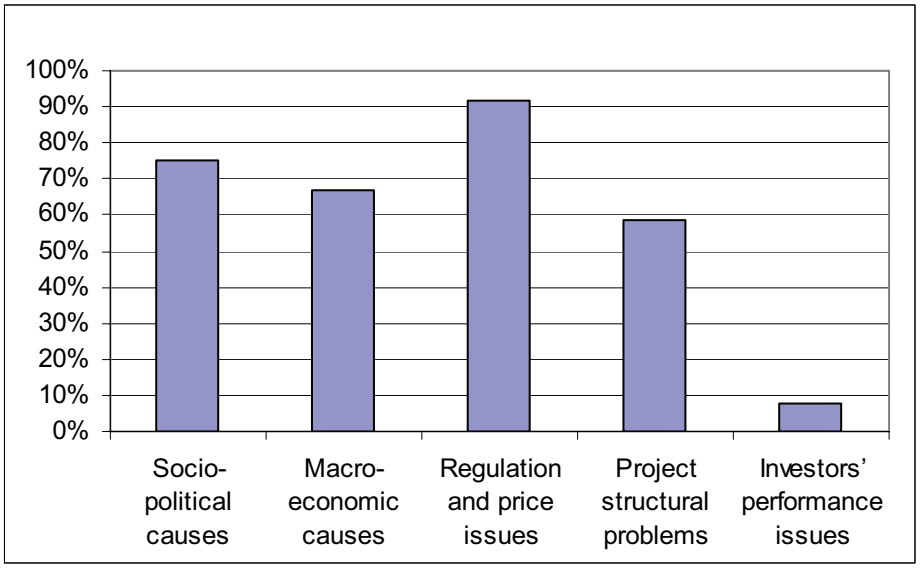
explained by the lesser visibility to the public of greenfield projects, which makes price adjustment less controversial politically, while the high incidence of other regulatory issues reflects issues with taxation, off-take, and dispatch.

- Sociopolitical issues are a strong second cause of stress (75 percent incidence), but with a concentration on political issues (governance and political commitment) and a lesser incidence of problems involving the public (30 percent) or unions (20 percent). This pattern may be explained by the fact that many greenfield projects that went into stress were awarded through direct negotiation, with little public knowledge. Subsequent political issues arose when the political majority changed and the origin of the transactions was submitted to closer scrutiny. It also hints that ethics and governance may have been a problem in certain cases in the past, with responsibility to be shared between local political circles and western investors. In the case of greenfield projects, the risk of social unrest is lower than for the privatization of existing utilities.
- Macroeconomic issues come third, with a 67 percent incidence. It suggests that greenfield projects are less sensitive to macroeconomic stress than concession projects, but marginally more than divestitures. Exchange rate fluctuation (41.7 percent) and low demand (33 percent) are the key causes of stress within this category. Fuel price fluctuations, however, are a relatively important cause of stress (25 percent) because most of the greenfield projects were fossil fuel–fired. Availability of local financing was an issue in only 16 percent of the cases. The relatively low incidence of macroeconomic issues for greenfield projects suggests that the various contracts surrounding greenfield projects are relatively effective in protecting the projects against economic events in the surrounding environment. The main vulnerability remains with massive devaluations, as was the case in Latin America and the Caribbean, and slowdown in demand resulting from financial crisis in East Asia and the Pacific, which may make PPI projects too expensive for countries under economic stress. The issue raised by this observation is whether long-term contracts attached to greenfield projects should be made more flexible and allow for organizing renegotiation in case of economic shock amounting to force majeure.
- Flaws in project structure were a cause of stress in 58 percent of the projects examined, and specifically, it was the mismatch between currencies of project funding and the currency of revenues that caused stress when the exchange rates were moving in diverging directions. This pattern reflects the higher degree of dependence of greenfield projects on commercial lending compared with other forms of PPI (divestitures or concessions of existing power companies) and the unavailability of financing in local currency, which obliged investors to resort to hard currency borrowing and exposed projects to

unmitigated foreign exchange risk, as was the case in Latin America and the Caribbean, East Asia and the Pacific, and South Asia.

- Investors' performance was not a major cause of stress for greenfield projects, with only 8 percent of the projects being affected. The only issue there was the capacity of investors to raise financing for funding agreed investment programs (25 percent of the cases). This reflects the relative technical simplicity of greenfield projects, compared with other forms of PPI, and the capacity of private investors to control and manage the technical risk.

Figure 4.2: Frequency of Causes of Stress in Greenfield Projects



Source: WG1.

4.11 Greenfield projects are altogether rather less risky than other types of PPI (2.3 percent stress rate); the main causes of stress are related to the quality of sector regulation, like other forms of PPI, but non-transparently awarded greenfields tend to be more exposed politically. Because of their capital-intensive nature and their high leveraging, they tend to be more exposed than other forms of PPI to macro risks, particularly exchange rate variation. This point is illustrated by a case study of a greenfield project in Pakistan, which is presented in Box 1.

Box 1: Hub River Power Company, Pakistan

Greenfield Generation

1. Brief Overview

The Hub River Power Plant (HUBCO) is situated in Pakistan and is owned largely by National Power International Plc., Entergy Corporation, Japanese Overseas Economic Cooperation Fund, and Xenel Industries Ltd. It is a product of a strategic policy plan adopted by the Government of Pakistan in July 1992 for power sector privatization and was awarded on a negotiated basis.

2. Project Summary

The plant is a 1292-MW greenfield power plant and the first operational IPP in the South Asia region. HUBCO was to supply fuel through a 78-kilometer pipeline. It was hailed as a landmark in the field of infrastructure finance at the time of financial close in 1995. Pakistan earned high praise among international developers and financiers and was a model for private sector development in the power sector in the mid-1990s. It was described as "the best energy policy in the whole world" by the U.S. Secretary of Energy following a trip to Karachi in September 1994. However, by 1998, the government had issued notices of intent to terminate 11 IPPs, representing two-thirds of private power capacity contracted, on alleged corruption or technical grounds or both.

3. Causes of Stress

The main causes of stress lay in the political environment, where governance was an issue. The government failed to comply with payment obligations as stated in the contract clauses. Perceptions by the project sponsors of excessive coercion, harassment, and heavy-handed legal and other actions initiated by the government to renegotiate tariffs or cancel contracts contributed to Pakistan's fall from grace in the eyes of the international private sector community. HUBCO was faced with problems in receiving payments for its electricity supply to the Pakistan Water and Power Development Authority (WAPDA), and it took the case to the courts.

4. Nature of Stress

The nature of the stress was both operational and financial. A turbulent three-year workout period followed, during which most contracts were ultimately renegotiated, which coincided with the period when Pakistan was brought to the brink of financial collapse.

5. Summary of What Happened during the Crisis

The government was of the view that further tariff increases would be politically difficult if there were no accommodation with IPPs, especially given its perceptions that IPP prices were out of line with the international market, that IPPs are too profitable for the investors, and that there may have been corruption in some of the transactions approved by the previously elected government. Thus, in 1997, against a worsening fiscal background and unwillingness to adjust retail tariffs, the government attempted to lower IPP payments through various committees of inquiry and sponsor-by-sponsor negotiations.

6. Role for the World Bank

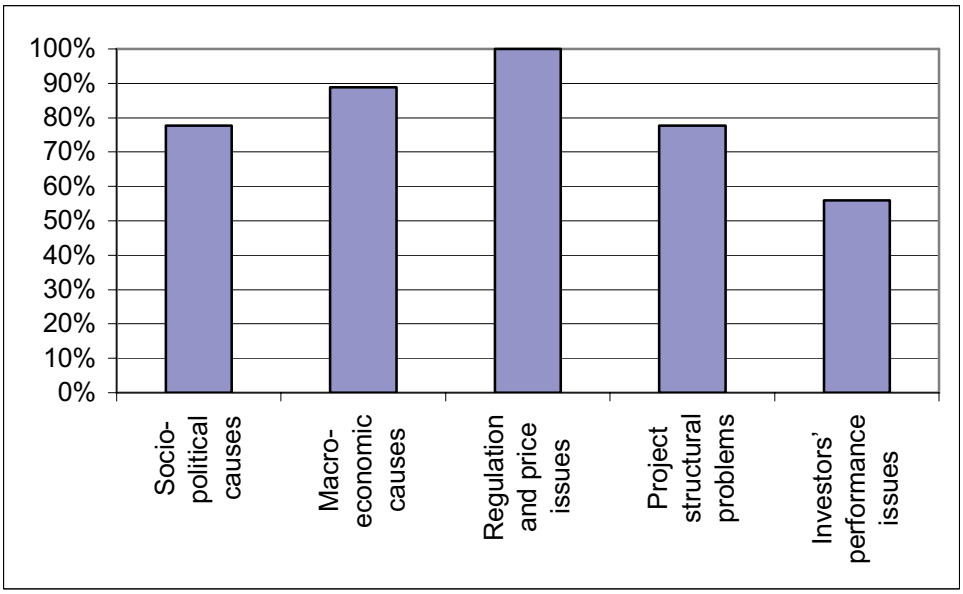
On one hand, the Bank was receiving messages of coercive tactics against the private investors. On the other hand, Pakistani authorities were pressing the Bank to live up to its zero-tolerance policy on corruption. The Bank's strategy was to avert a default by facilitating an orderly resolution of the immediate disputes and preparing for a permanent solution to the underlying causes of the IPP problem through providing support for the implementation of the power sector reform. The Bank assisted the government in adopting the so-called "Orderly Framework for IPP Negotiations" in late 1998 to prevent further deterioration in the situation.

Concessions

4.12 Concessions are only 6 percent of PPIs, but they show a high stress rate of 16 percent. The causes of stress are spread among all major categories and exceed the other categories of PPI in all five types of stress. The top five types of stress for this project type are shown in Figure 4.3 and explained as follows:

- Regulatory and price-setting issues affected 100 percent of concessions under stress, suggesting that a problem with concessions is the complexity of managing the continued relationship between the government and the investor throughout the life of the project. The political visibility of most concessions, which concern generally activities selling electricity to the public, explains the high frequency of pricing issues: although tariffs applied by concessions are commercial in nature, the public tends to hold the government accountable politically for price increases. A lesson to be learned from the political sensitivity of postprivatization price increases is that tariffs should be raised to financially viable levels before awarding concessions to the private sector.
- Macroeconomic issues are also significantly higher for concessions than for other forms of PPI (89 percent). An important issue seems to be the higher exposure of this type of PPI to forex risk (66 percent, much higher than for any other form of PPI) and the difficulty of raising local financing to manage the forex risk (77 percent). The explanation of the high macroeconomic risk of concessions is that they generally involve substantial capital investment and therefore borrowing in foreign currency.
- The sociopolitical risk is also high (78 percent), shared equally between the lack of political commitment (56 percent) and social concerns (56 percent). This suggests that concessions, though less prone to governance issues than other forms of PPI (11 percent), possibly because of the more frequent recourse to tendering procedure than for greenfields, may have been conducted too quickly, without adequate prior consensus building and with insufficient ownership of the process by governments and by their constituents.
- Faulty project structure is also a frequent cause of stress (78 percent). The most frequent flaws were (a) mismatch between the borrowing currency and the currency of revenues (78 percent), which is a more frequent cause of stress for concessions than for other forms of PPIs, and (b) overly aggressive bidding (22 percent of cases), leading to the ex post renegotiation of the concession agreements under crisis situations. A point that may warrant further analysis is whether the overly aggressive bidding risk is the result of the tendering process, which may incentivize certain bidders to bid high, with the intent to renegotiate the terms of the agreements at a later date.
- Investors' performance is the lowest for concessions (56 percent), mainly because of investors' failure to deliver on investment commitments (78 percent) and of weak commercial performance, including control of losses. The investors' incapacity to deliver on two of the strongest justifications for PPI calls for further analysis and a reassessment on an objective basis of the benefits of PPI, based on what investors can actually deliver in the present context of availability of financing on the market, appetite of lenders for emerging markets risk, and availability of quality managers to run power utilities in developing countries.

Figure 4.3: Frequency of Causes of Stress in Concession Projects



Source: WG1.

4.13 Concessions seem to be weaker than other forms of PPI, possibly because of their more complex contractual nature, the need for a sustained partnership between the investor and the government, and the higher risk of finding ex post hidden weaknesses in these complex deals.

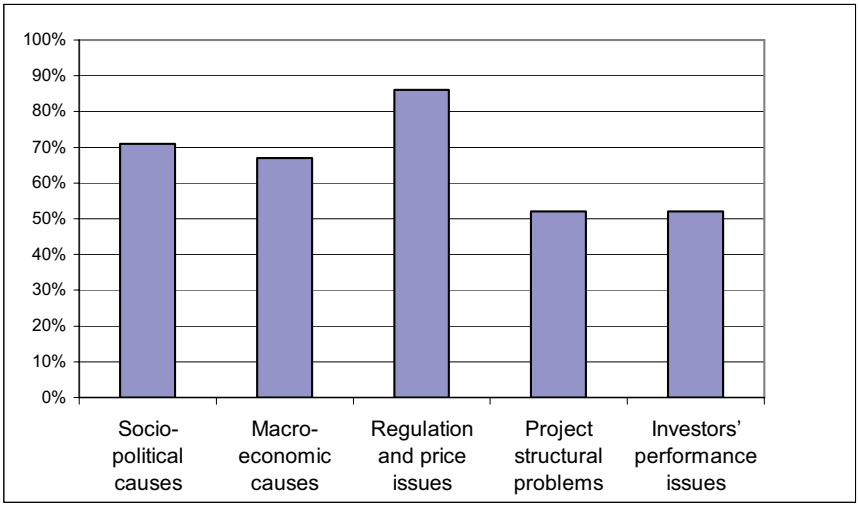
Divestitures

4.14 Divestitures represent 40 percent of electricity PPIs and have a stress probability of 5.7 percent, which is above the 4.4 percent overall average. It looks similar in stress pattern to concessions, though with a lesser risk level. The top five causes of stress for divestitures are shown in Figure 4.4 and explained as follows:

- Regulatory and price-setting issues are the main issue in this category as well, with 86 percent of the divestiture projects under stress being affected; there is also a high occurrence of issues involving the regulator (28.6 percent) and a lower occurrence, compared with other types of PPIs, of issues related to compliance with contract clauses by the government. The reason for this pattern may be that countries that embarked on outright divestitures were those where the government was more committed to reduce its involvement in the sector and was more willing to delegate the management of the interaction with privatized utilities to an independent regulator, with a correspondingly higher frequency of issues involving the latter. However, even if issues involving the government and the regulator are combined, divestitures seem less prone to disputes on contract enforcement and regulation than concessions (47 percent and 87 percent, respectively).

- Sociopolitical issues affected 71 percent of divestitures under stress, less than other types of PPIs, but the issues seem to be more related to social and union issues than for other forms of PPIs. Political commitment and other political issues seem to affect divestitures less than other types of PPIs. This pattern reflects the fact that divestitures, as the most advanced form of PPI, was generally backed by a stronger political commitment than other forms of PPIs, though it may not have been preceded by sufficient preparation and dialogue with the public and employees, leading to more social than political resistance.
- Macroeconomic shocks affect divestitures less than other forms of PPI (67 percent), because they relate to the purchase of existing assets, often from the cash flow of the investor, and more rarely involve forex exposure of the project through borrowing, except for additional postdivestiture investment. This is reflected in the relatively low incidence of exchange rate fluctuation (47 percent) as a cause of stress, except in countries such as Argentina.
- Investors' performance was satisfactory in only 48 percent of the cases, suggesting that the challenge posed by the management of privatized electricity enterprises may be underestimated and may play a role in generating stress situations. The weakest point is the commercial performance of the new owner, which was found strong in only 23 percent of cases, together with the quality of services, which was found to be strong in only 38 percent of stress cases. The conclusions are similar to those drawn for concessions: the capacity of private investors to raise financing and deliver on management turnaround in today's market should be evaluated realistically.

Figure 4.4: Frequency of Causes of Stress in Divestiture Projects



Source: WG1.

Box 2: Eletropaulo Metropolitana, Brazil

Distribution Divestiture

1. Brief Overview

State-owned giant utility Eletropaulo's distribution business was unbundled into two separate companies: Metropolitana, covering the city of São Paulo, and Bandeirante, in the interior of the state. Eletropaulo Metropolitana is the largest electricity distributor in Latin America, serving 4.3 million customers in 24 towns, including the city of São Paulo and the ABC industrial region.

2. Project Summary

The project was an affermage or lease. In January 2000, AES purchased 43.05 percent of Eletropaulo's shares from the Brazilian state-owned bank BNDES for US$1.1 billion. In early 2000, Eletropaulo issued US$476 million in debentures; in September 2000, the company issued an additional US$50 million in Euro commercial paper to roll over part of its debt and received US$225 million in syndicated loans. In January 2001, Eletropaulo was awarded an additional US$350 million in loans. The resources have been used to restructure Eletropaulo's debts and to finance its capital investment expenditures.

3. Causes of Stress

The causes of stress are macroeconomic issues because of the devaluation of the currency and low demand due to power rationing; mismatch between debt currency and currency of revenues; poor project structuring (high level of debt in USD; too much debt with short- and medium-term maturities); unequal treatment in tariff increases (tariff based on "provisional" asset value for too long compared with other companies, refusal of regulator to recognize large pension costs inherited from privatization (which were originally understood to be included in tariff), and so forth); and sociopolitical sensitivity of tariff increases.

4. Nature of Stress

Cash flow shortage, reduced return, and risk of default on the debt.

5. Summary of What Happened during the Crisis

After interim debt restructuring in 2002, AES was unable to meet payment for its scheduled maturities, and in early 2003 its loans from BNDES entered into default (US$1.2 billion). After several months of negotiations with BNDES, a restructuring plan—a debt-for-equity swap—was proposed, whereby a new holding company, Brasiliana Energia S.A., would comprise AES's 50.01 percent of common shares and BNDES's 49.99 percent of common shares and nonvoting preferred shares. The agreement also called for the transfer of AES's stakes in the generation facilities AES Tiete and AES Uruguaiana to the holding company Brasiliana Energia and an AES payment of US$90 million in cash upon signing the agreement. In December 2003, BNDES and the AES group signed a restructuring agreement, and the transfer of corporate control of Eletropaulo to the holding Brasiliana was expected to happen in early 2004. AES also restructured its outstanding debt with its commercial lenders in 2003 and was expecting a confirmation of the restructuring in early 2004. Workout has been initiated, based on innovative financial engineering.

6. Role for the World Bank

No Bank involvement was observed.

4.15 The specificity of divestiture PPIs is that they seem to reflect a stronger political commitment to PPI than other forms of PPI; hence, relations with the government are less frequently a cause of stress, compared with other forms of PPI. The acceptance of this more radical form of privatization by the public, however, seems to be no higher than for other types of PPIs, fueled possibly by the difficulties met by investors to improve commercial performance and quality of service in line with the expectations of the public (see case study on a divestiture project in Brazil in Box 2).

Causes of Stress by Subsector

4.16 Chapter 3 concluded that stress risk is differentiated by sub-sector within the power industry. The purpose of this section is to examine what are the risks specific to each sub-sector and whether each sub-sector has a specific risk pattern.

Generation

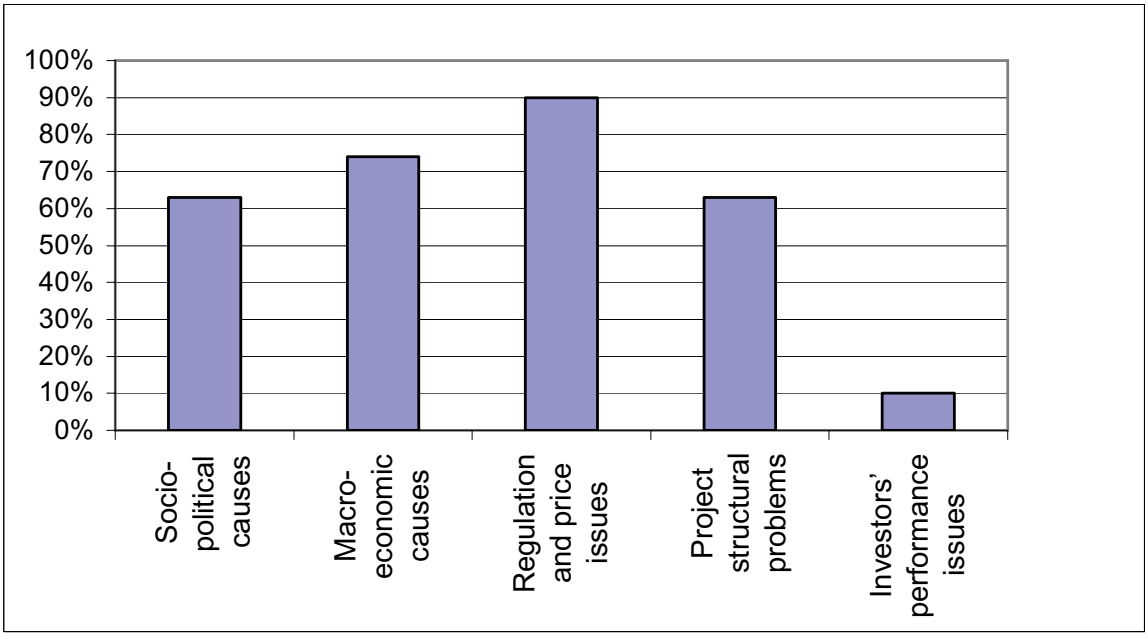
4.17 The probability of the five main causes of stress, based on the analysis of the 19 generation projects under stress, is shown in Figure 4.5 and explained as follows:

- Regulation and pricing issues are the highest risk, with a frequency of occurrence of 90 percent. But this percentage is lower than for other type of PPI activities, suggesting that the essentially contractual foundation of this type of project is less prone to dispute than the regulation basis that applies to other PPIs. This is confirmed by the relatively high number of cases in which compliance with contractual clauses is mentioned as a cause of stress (47 percent, higher than for other types of PPI projects), as well as the low incidence of issues with the regulator (10.5 percent) and the relatively rare occurrence of relationship problems involving the government (15.8 percent).
- Macroeconomic issues are a frequent cause of stress, with a 74 percent occurrence, which is higher than for any of the other two categories, suggesting that generation projects, mainly IPPs, are more vulnerable than other forms of PPI to macroeconomic shocks. Exchange rate instability appears as a major factor, with an occurrence of 57.9 percent, which reflects the high leveraging of most IPPs in hard currencies, resulting in an exposure to exchange risk fluctuation and stress, even if (or because) the exchange risk is reflected most of the time in the PPA structure and allocated to the government. The stress may result from the difficulty to pass through the exchange rate fluctuation, despite contractual agreements in case of severe exchange rate fluctuation. This risk was clearly an important cause of stress for projects in East Asia and the Pacific and Latin America and the Caribbean. The second important cause of stress under the macro category was the lower-than-expected demand, which affected generation projects more than the other projects (21 percent). These two macroeconomic causes of stress are illustrated in a case study in Indonesia presented in Box 3. PPAs generally seek to manage this risk through take-or-pay clauses, but the practice shows that they do not prevent stress, as was the case for all projects in East Asia and the Pacific under stress and for half of the generation projects in Latin America and the Caribbean that went into stress.
- Sociopolitical issues rank as the third most important cause of stress or risk for generation projects (63 percent), though it remains significantly lower than for other types of PPI projects. This reflects the lower sociopolitical visibility of generation projects, which typically employ a small number of staff, and of the tariff, which is often not a point of focus of the attention of the public (though it may be important for the government). The main sociopolitical risk is the risk

of political change (36.8 percent), though it remains significantly lower than for the other categories of projects. The sociopolitical risk, including governance, affected only projects in Latin America and the Caribbean and South Asia. It may have been an indirect consequence of the macroissues in Latin America and the Caribbean and of the insufficient preliminary dialogue and consultation in South Asia, combined with governance issues that affected India and Pakistan generation projects, often awarded through direct negotiation.

- Faulty project structure is a lesser risk factor for generation projects, with a 63 percent occurrence among projects under stress. When it occurred, it was the result of a mismatch between debt currency and revenue currency and affected mainly the South Asia generation projects and the Latin America and the Caribbean projects.
- Investors' performance was not a major cause of stress for generation projects (10 percent) and was markedly lower than for other types of projects. This strong performance reflects the nature of generation projects, for which the technical operation of the unit, in general a strong performance area for the investors, is more important than the commercial and service quality aspects, which tend to be a weaker performance area for investors.

Figure 4.5: Frequency of Causes of Stress in Generation Projects



Source: WG1.

Box 3: Karaha Bodas Company, Indonesia

Greenfield Generation

1. Brief Overview

The Karaha Bodas Company (KBC) was a joint venture between Caithness Energy of Switzerland (40 percent), Florida Power and Light of the United States (40 percent), Tomen Corporation of Japan, and PT Sumarah Daya Sakti of Indonesia for a geothermal project in West Java. The company entered into contract with Pertamina, the state-owned energy company, in 1994. The project had a 30-year power purchase agreement, which should have run from 1998 to 2028.

2. Project Summary

Type of project: Greenfield. KBC entered into contracts with the State Electricity Corporation (PLN) in 1994 to develop the 400-megawatt Karaha Bodas Geothermal Plant in West Java at a cost of $380 million. When the Asian Financial Crisis began in mid-1997, the project was only partially constructed. Because of the crisis, the government had to renegotiate 26 power plant IPP projects out of 27. KBC claimed to have invested over $100 million in project development up to that point in time.

3. Causes of Stress

Because of the fall in demand after the Asian crisis, Presidential Decree No. 39/1997 postponed the project before its completion. KBC went to arbitration, and in December 2000, it received an arbitration award of $261 million. However, PLN and Pertamina offered two other options for settling the dispute. The first option was to offer KBC the possibility of finishing the project. The second option was to award the project to another developer willing to pay KBC's claim.

4. Nature of Stress

Macroeconomic stress, including the currency devaluation, as well as a decrease in power demand that followed the Asian financial crisis, were the main causes of stress. The consequence was the failure of the government to comply with contract clauses (payment obligations).

5. Summary of What Happened during the Crisis

The project sponsors could hardly reflect in their business plan the postponement of the project, because the finance structure of the project imposes strict debt-servicing schedules. In addition, the currency devaluation had a negative impact on the off-take tariff at a time when the national economy was depressed, and the end-user tariff could not easily absorb an increase in the power purchase cost in local currency. The stress on the project was exacerbated by the rigidity inherent in the IPP project finance structure. The project was not subjected to renegotiation and workout, but went directly to arbitration and then to court, following the legal recourse route. The settlement of the dispute has taken six years.

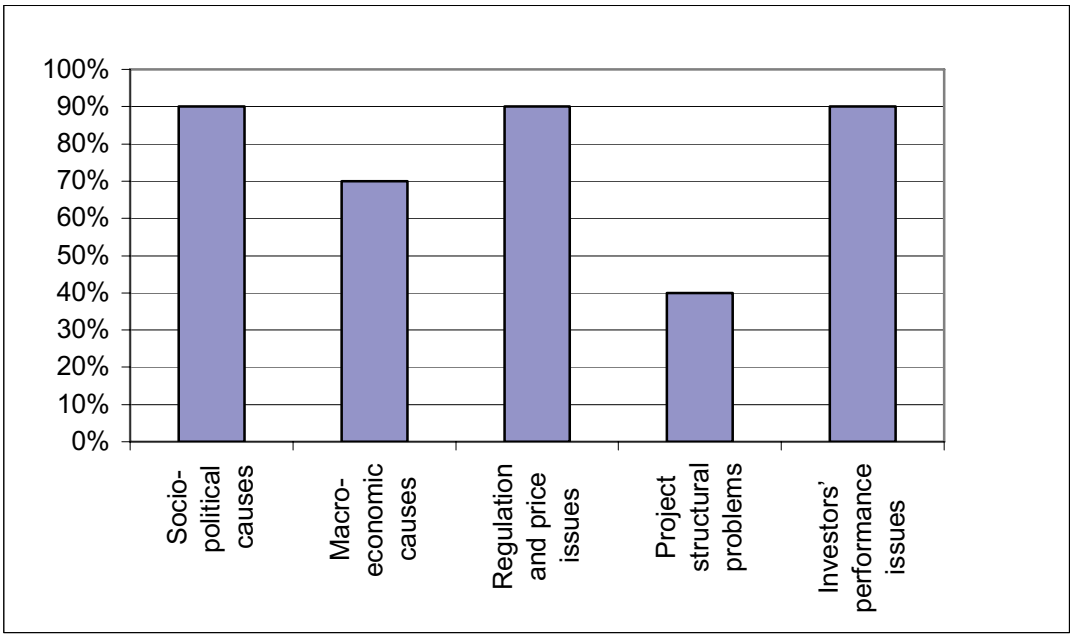
6. Role for the World Bank

No direct involvement.

Utilities

4.18 The probability of the five main causes of stress for utilities is shown in Figure 4.6 and explained as follows:

Figure 4.6: Frequency of Causes of Stress in Utility Projects



- Performance of investors was the most important cause of stress of utility PPIs. Their performance was strong in only 10 percent of the projects under stress. Investors' performance was particularly weak in Africa (where, in 66 percent of stress cases, the performance was found poor) and in Latin America and the Caribbean (where it was found to be strong in only 25 percent of the cases). The weaker points were (a) the commercial performance, with only 10 percent rating good (66 percent of the utilities under stress in Africa having investors performing poorly commercially and their commercial performance being indifferent in Latin America and the Caribbean) and (b) investment financing, with only 10 percent of utilities under stress being free of investment financing issues (33 percent of utilities under stress in Africa having noncompliance with investment commitment as a cause of stress and the Eastern Europe and Central Asia utilities doing indifferently in this respect). Unexpected difficulties encountered by investors in raising financing and in commercial operation in developing countries affect utilities more than other types of PPIs. This pattern for utilities results from the combination of high investment commitments for the future not covered up-front (to the difference of generation IPPs) and high exposure to electricity consumers' scrutiny.
- Sociopolitical issues affected as much as 90 percent of the utility projects under stress. This proportion is significantly higher than for other types of PPIs. The allocation of the causes of stress within this category suggests that the sociopolitical issues are spread among all subcategories, with a higher occurrence, however, for governance issues and sociopolitical acceptance issues. There is also a noticeably strong presence of local bias and lack of

political commitment as causes of stress. It suggests that this category of PPIs is more exposed to stress for sociopolitical reasons because, most of the time, PPI utilities have a monopolistic national or regional position, which may create some nervousness with the public and successive governments facing a private monopoly, particularly when the regulators may be less than fully effective and independent. This is confirmed by the high percentage of Africa projects under stress with sociopolitical issues (100 percent) and social issues (33 percent) and affected by political resistance (66 percent). Latin America and the Caribbean PPI utilities under stress were also affected by sociopolitical issues in 100 percent of the cases, but the underlying factor in that region seemed to be the uneasiness of the public with private monopolies.

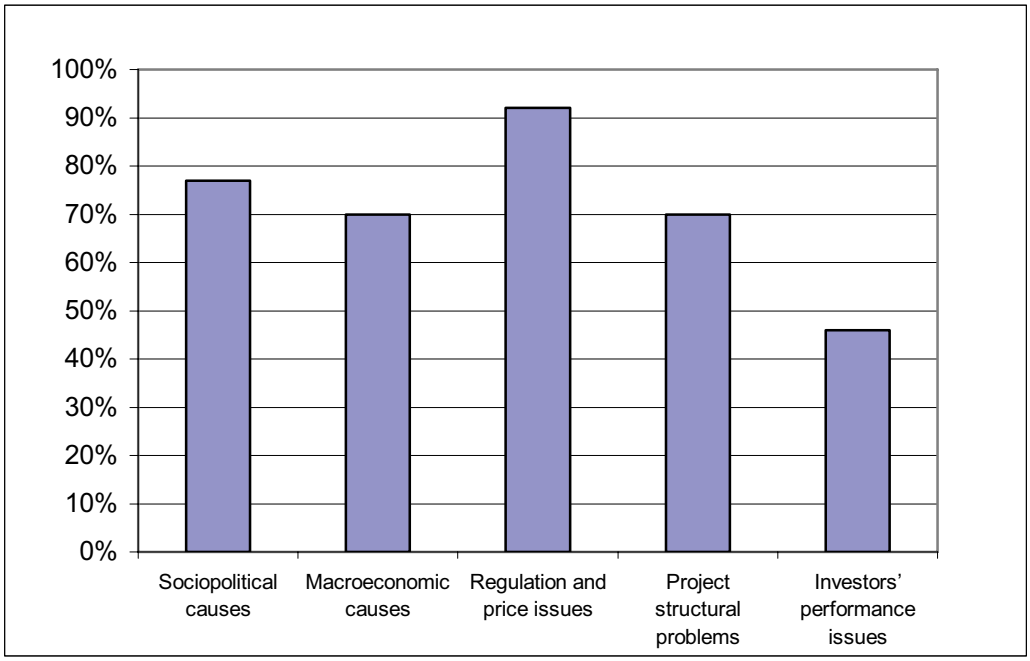
- Regulation and price issues also affected 90 percent of PPI utilities under stress, the most important aspects being the enforcement of price formulas (50 percent, mainly in Latin America and the Caribbean and in Eastern Europe and Central Asia) and weak regulators (50 percent), which affect Africa and Eastern Europe and Central Asia, regions where concerns with the quality of regulation have often been voiced, and less in Latin America and the Caribbean, where the quality of regulation is stronger. The underlying issue with regulation and price setting for utilities is the consequence of the political uneasiness with the effectiveness of the regulation of private monopolies, and reluctance to revise prices as expected by private investors.
- Macroeconomic problems affected 70 percent of the PPI utilities under stress. The specific causes of stress were fuel price variations and lack of local financing in Africa, whereas in Latin America and the Caribbean, the main macro issues were unexpected fluctuations in exchange rate and demand lower than expected. The relatively high incidence of macroeconomic issues on utilities is consistent with the exposure of this type of PPI to the local market risk, which is affected by the overall macroeconomic climate and which cannot be mitigated through contractual clauses (to the difference with generation projects).
- Project structure was a cause of stress in only 40 percent of the cases, in line with the relatively simpler structure of utilities financing.

4.19 Utilities appear as higher risk projects because of their inherent characteristics: sociopolitical visibility, complexity of regulation of private monopolies, uncovered future investment commitments, and complexity of management. In addition, PPI utilities seem to be more frequent in small systems (Africa and Latin America and the Caribbean), where regulation issues are more likely to occur.

Distribution

4.20 Stress affected 9 percent of distribution PPI projects. This proportion is higher than for the other two subsectors, suggesting that distribution projects are more risky for investors. Private distribution projects under stress are located mainly in Latin America and the Caribbean and subsidiarily in Eastern Europe and Central Asia and in South Asia.

Figure 4.7: Frequency of Causes of Stress in Distribution Projects



Source: WG1.

4.21 The main five causes of stress are presented in Figure 4.7 and explained as follows:

- Regulation and pricing issues affected 92 percent of the distribution projects under stress, because of government interference and unreliable regulation. They affected distribution projects in South Asia (100 percent) and also in Latin America and the Caribbean (87 percent) and in Eastern Europe and Central Asia (83 percent). This pattern reflects the political sensitivity of price adjustments in private distribution projects, particularly in Latin America and the Caribbean, and because of the macroeconomic context in Eastern Europe and Central Asia and in South Asia.
- Sociopolitical issues affected 77 percent of distribution projects under stress, with social issues (61 percent) and political commitment (46 percent) being the most critical issues. Social aspects were important factors of stress in Eastern Europe and Central Asia (50 percent) and in Latin America and the Caribbean (78 percent), whereas governance and social issues were prominent in South Asia and in Eastern Europe and Central Asia. The importance of sociopolitical

issues as causes of stress for distribution projects reflects their political sensitivity and visibility and the importance of a strong political consensus up front.

- Macroeconomic issues contributed to stress in 70 percent of distribution projects under stress, most of which related to currency instability (53 percent), the general impact of macro shocks (46 percent), and low demand (15 percent). Low demand and general macro effects affected mainly Eastern Europe and Central Asia and South Asia, whereas Latin America and the Caribbean was mainly affected by exchange rate instability. This pattern is consistent with the higher exposure of distribution projects to market risk.
- Distribution projects' structure was a cause of stress in a high 70 percent of cases, which is more than for any of the other types of projects. It resulted from the mismatch between the financing of the projects, in hard currency, and the currency of revenues in 78 percent of distribution projects under stress in Latin America and the Caribbean and 100 percent in South Asia. Distribution projects' financial risks seem to be ineffectively handled through pricing formulas.
- Investors' performance was rated good in only 56 percent of distribution projects under stress, suggesting that they meet with difficulties in this type of project. The problems are particularly with regard to commercial performance (only23 percent good) and quality of service (only 38 percent good). These issues appeared mainly in Latin America and the Caribbean and in Eastern Europe and Central Asia.

4.22 Distribution PPIs go under stress because of their political visibility, their potential for politically sensitive disputes with the government and the regulator over prices, the project exposure to macroeconomic risk in the absence of politically acceptable mitigation methods, and unexpected post-privatization operational difficulties related to commercial management and quality of service. All these causes can be found in the case study of the Telasi project in Georgia, which is presented in Box 4.

Box 4: Telasi, Georgia

Divestiture of a Distribution Company

1. Brief Overview

Telasi is the electricity distribution company of Tbilisi, Georgia. The system was unbundled in 1999. The issues expected to be addressed through sector restructuring were:

- Poor system maintenance
- Ineffective commercial billing and revenue collection
- High losses
- Low investment.

2. Project Summary

AES acquired through a tender a 75 percent interest in Telasi for approximately $25.5 million. Telasi serves 370,000 industrial, commercial, and residential customers and buys power from a state-owned utility, Sakenergo, and from various hydroelectric power stations. Subsequently, AES purchased some thermal generation capacity.

In December 1999, a US$60 million loan was approved by the European Bank for Reconstruction and Development (EBRD) and the International Finance Corporation (IFC) to finance improvements in the electricity distribution network, install power meters, and improve transmission efficiency.

The project was to bring the distribution system of AES Telasi in line with modern utility practices. Total project cost was US$147 million, to be financed by an IFC A Loan of US$30 million, a parallel EBRD loan of US$30 million, and an AES sponsor-subordinated loan of US$87 million.

3. History of Events Leading to Stress

AES and the lenders provided financing for capital investment, and the investment program was initiated. Expected benefits in terms of revenue collection and reduction of losses failed to materialize. Reliability of power supply from generators continued to be poor, affecting Telasi's capacity to provide quality service. Management of Telasi failed to reduce power losses and improve collection because of weak support from the government and the social issues related to the supply of electricity in the severely depressed Georgian economy, and quality of service could not be sustainably improved. In 2003, after several years of effort, AES decided to exit Georgia because of extreme difficulties facing Telasi and pressure from AES shareholders to clean up nonperforming assets. The IFC and EBRD loans were prepaid in July 2003, and AES subsequently sold its interest in Telasi to a Russian company.

4. Nature of Stress

- Sociopolitical stress, due to the social impact of loss reduction and payment discipline under weak government political support; resistance of the public to PPI and sector reforms
- Macroeconomic stress, resulting in inability of certain users to pay because of contraction of the economy
- Performance of investors, who underestimated the management challenge of power distribution in Georgia.

5. Summary of How the Workout of the Stress Situation Was Handled

Telasi appeals to United Distribution Power Company and suggests concrete plan for resolution of problems.

6. Role for the World Bank

The WBG supported the initial privatization through a postprivatization loan to Telasi. It was not involved in the discussions that led to the abandonment of the project.

Causes of Stress by Region

4.23 As analyzed in Chapter 3, the percentage of electricity projects that went through stress varies significantly by region, with the Middle East and North Africa showing the lowest risk level (0 percent), followed by East Asia and the Pacific with a low risk level of 1.1 percent, followed by Eastern Europe and Central Asia (3.3 percent), South Asia (5.6 percent), Latin America and the Caribbean (6.4 percent), and Africa (11 percent).

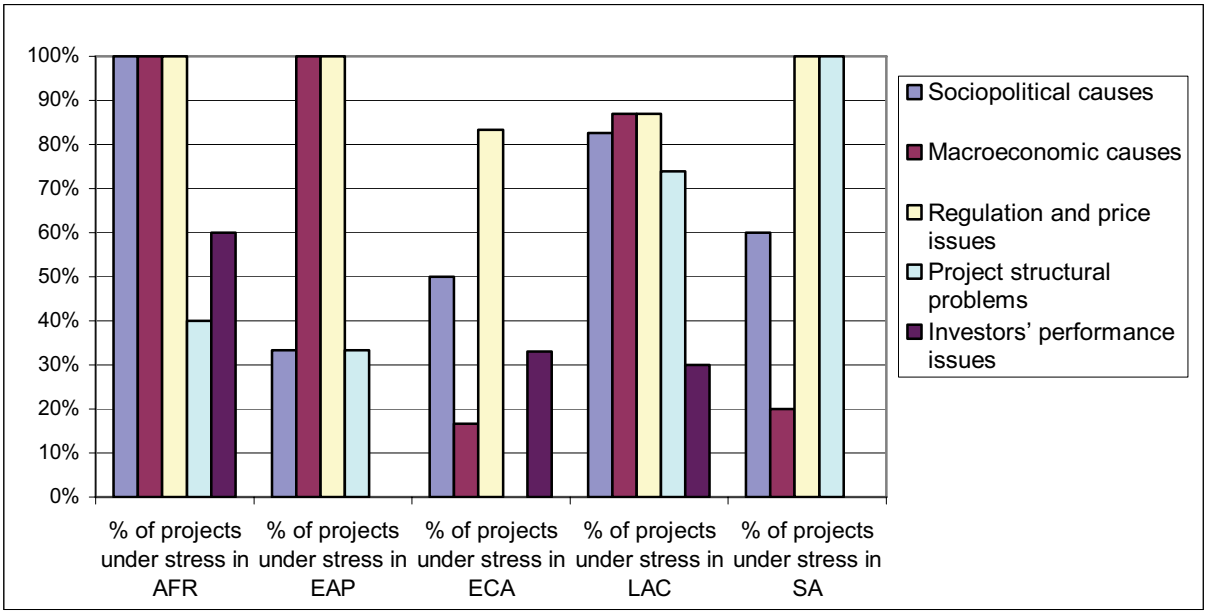
4.24 Causes of stress depend upon the specific context of the region (macro stress in Latin America and the Caribbean and in East Asia and the Pacific, political resistance to sector reforms in Eastern Europe and Central Asia and in Africa, and governance issues in South Asia), and on the type of PPI developed in each region (full sector privatization in Latin America and the Caribbean, complex PPPs in Africa, and preference for IPPs in Asia), each bearing specific risk factors (contractual, political, and regulatory risks in African concessions and utilities; market and macroeconomic risks in Latin America and the Caribbean; and political, commercial, and regulatory risks in the Eastern Europe and Central Asia distribution and utility companies). The five main causes of stress with PPIs by region are presented in Figure 4.8 and explained as follows:

- Africa had a high (100 percent) rate of occurrence of sociopolitical stress (negative reaction of certain social groups: 75 percent; governance: 25 percent; and lack of political commitment: 25 percent), of regulation and pricing issues (because of government interference: 50 percent; weak regulator: 50 percent; and noncompliance with terms of agreements by governments: 50 percent), and of macroeconomic stress (low demand: 50 percent; unavailability of local financing: 75 percent; and fuel price instability: 50 percent). The conclusion is that the high African risk of stress is due mainly to the low level of commitment to PPI, the resistance of the public and the governments to control of the sector through vertically integrated utilities, and (subsidiarily) macroeconomic issues external to the sector. The Africa region is the one where the performance of investors was weakest, compared with other regions. (The causes are detailed in a case study on Energie du Mali (EDM) project presented in Box 5.)
- In Latin America and the Caribbean, the causes of stress are multiple and relate to regulatory issues (87 percent), macroeconomic shocks (87 percent), and weak project structure (70 percent). It seems that the determining factor was the macroeconomic crises that affected Argentina and Brazil and the sociopolitical resistance in Central America and the Caribbean (Dominican Republic).
- In South Asia, the main issues were with regulation and price setting (100 percent) and with project structure (100 percent), particularly the mismatch between project financing currencies and revenue currencies.
- In Eastern Europe and Central Asia, the risk of stress was rather low and concentrated on regulatory and pricing issues (83 percent) and sociopolitical issues (50 percent). This pattern suggests that the main causes of stress in

Eastern Europe and Central Asia are related to the political and social resistance to sector reforms and PPI, as well as insufficient consensus building before engaging in reforms and PPIs.

- In the low-risk East Asia and the Pacific region, the main causes of stress relate to the compliance with contract clauses under stress (100 percent) and to the impact of macroeconomic shocks (currency instability and low demand due to macroeconomic crises). Political commitment to the specific reforms of the region (PPIs essentially limited to generation) seems not to be an issue. If it were not for the occurrence of unexpected macro crises in East Asia and the Pacific, the region would prove to have very few projects under stress, and the risk of stress would be low.
- In the Middle East and North Africa, only 16 PPI projects occurred during the period under study, significantly less than in other regions. But the few PPI projects did not go through any significant stress.

Figure 4.8: Frequency of Causes of Stress by Region



Source: WG1.

Box 5: Energie du Mali (EDM) Project

Utility Divestiture

1. **Brief Overview**
   The organization responsible for the electricity supply industry in Mali is Energie du Mali (EDM). The company also distributes water. The Government of Mali (GOM) privatized EDM in November 2000 through a tender as a vertically integrated monopoly. There is a Sector Regulator in Mali (CREE).
2. **Project Summary**
   Ownership of EDM is Saur International of France (65 percent) and IPS, a member of the Aga Khan fund for Economic development (35 percent). Fifty-two percent of installed capacity is hydro-powered, with the remaining fossil-fuel-fired. EDM has a monopoly over power generation (except for the multinational Manantali project on the Senegal river), transmission, and distribution. EDM has an investment obligation, as well as minimum quality standards and efficiency improvement targets to meet. Prices are set through a multiple-index formula overseen by CREE.
3. **History of Events Leading to Stress**
   EDM has pledged to extend the electricity grid to 60 new towns by the end of its franchise in 2022. The GOM, however, is concerned by the slow progress of access in rural areas and the concentration of EDM system extensions in urban areas. They claim that EDM investment is substantially below the agreed objectives in the concession agreement. EDM has already indicated that meeting the agreed investment targets may be difficult and would require (additional) government funding. The quality of energy supply has somewhat improved, but the reduction of electricity losses has been below the agreed targets with significant financial implications, and users complain about EDM's pricing policy. Despite switching to cheaper hydro-electricity from Manantali, but because of the increase in imported petroleum products prices, EDM increased its rates twice (by 5 per cent in July 2001 and 4.57 per cent in January 2002) before reducing them very slightly in September 2002. The GOM decided to freeze the tariff in 2003 while compensating EDM for the deviation from the application of the pricing formula. The process has been difficult to implement because EDM, CREE, and GOM could not agree on the amount of the compensation and GOM has been slow in paying EDM, putting the company under financial stress.
4. **Causes of Stress**
   - Inability of investor to execute agreed investment plan
   - Operational performance of investor below government expectation
   - Dispute on application of pricing formula
   - Sociopolitical resistance to PPI.
5. **Summary of How the Workout of the Stress Situation Was Handled**
   GOM, CREE, and EDM have been in negotiations for the past two years, with the Bank playing a facilitator role. Progress was made with the payment of government dues to EDM. Revisions of the price formula and of a number of other provisions of the privatization agreement have been discussed in the same group. The viability of the privatization is under scrutiny, and a shift to an affermage structure is under discussion.
6. **Role for the World Bank**
   The role of the World Bank has been to facilitate the discussion between GOM, CREE, and EDM, using its convening power, and to explore jointly with IFC a possible financing package for the sector investment plan.

Conclusions to Chapter 4

4.25 The analysis of the causes of stress led to a number of conclusions that are important for future PPI decisions by investors and for the formulation of differentiated and targeted workout strategies. It provides also useful pointers regarding the risks inherent to the various types of projects and to each region.

Regarding the Formulation of Workout Strategies

- The importance of contractual- and regulation-related issues indicates that many stress issues can potentially be addressed through a workout process.
- Financing- and exchange rate–related issues are the second priority to be addressed in project workout, through the deployment of specific financial engineering instruments.
- The importance of poor governance, communication, and consensus building as causes of stress suggests that communication should be included in workout strategies and that effective communication should be applied to the workout process itself for the transaction to receive political and social support.
- The workout process should not be restricted to the contractual or financial issues: it should also include the formulation of a management strategy, because the performance of investors was perfectible on occasions in the area of commercial management and quality of services. These issues should be included in workout strategies for utilities and distribution companies.
- Workout strategies should be differentiated by type of projects, and the main issues to be addressed for each type of project have been listed above. And regional context.

Regarding the Stress Risk for Investors and Lenders

- Stress situations are in fact rare and affect only 5 percent of electricity PPIs.
- Risk management instruments that are expected to deal with contract compliance (including prices) do not prevent stress under extreme circumstances, though they were supposed to deal with such situations; the possibility of renegotiation of contracts under severe macroeconomic conditions should be included to ensure that the balance between the interests of the parties is maintained, even under extreme situations.
- The current practice of commercial confidentiality, which is the rule for transactions between commercial entities, shows serious limitations when it comes to electricity sector PPIs that involve the government (even more when they affect directly the public through tariffs). The effective or perceived lack of transparency in the negotiation of a number of electricity sector PPIs seems to be a major cause of stress. A conclusion is that the closing of a deal with the government is not sufficient for a successful PPI. It needs to be accompanied

and even preceded by a possibly lengthy communication and consensus-building process with the public.

- Investors embarking on electricity PPI projects involving commercial activities should consider carefully up front if they have the right staff to handle the commercial function or check carefully the availability of expertise on the local market, because the disappointing commercial performance has proven to be a surprisingly frequent cause of stress for utility and distribution PPIs.
- There is a clear regional differentiation in risk of stress, with East Asia and the Pacific and its IPPs being the lowest-risk region. Countries with rather sophisticated sector reforms, such as Latin America and the Caribbean or Eastern Europe and Central Asia did not better resist macroeconomic stress or contractual disputes. In the Africa region, the uncertain national adherence to adopted sector reforms highlighted the fact that reforms that are not based on an effective consensus are an additional risk; the relatively high stress risk in Africa also demonstrates that when simple PPI solutions (IPPs, divestitures) are not possible for political or economic reasons, the recourse to more complex legal structures such as concessions may increase the risk of stress.

5

Consequences of Stress

5.1 The previous chapter examined the main causes of stress that affected electricity projects and identified the stress patterns specific to different types of projects and different regions. This chapter will examine the consequences of the stress that was generated by the identified causes.

5.2 The consequences of stress are categorized into two areas: financial distress and administrative and licensing distress. Financial distress includes (a) cash flow shortage leading to lower return to investors, (b) risk of default to lenders, (c) inability to pay dues to the host government, and (d) inability to finance the investment program from internally generated cash. Administrative and licensing distress mainly includes threat of cancellation of license or non-renewal. The analysis shows that:

- Most projects under stress experience financial distress: more than 90 percent of the projects under stress report at least one type of financial issue, mainly inadequate return on equity and risk of default on debt.
- About 25 percent of the projects report a risk of cancellation or non-renewal of license.

5.3 This pattern suggests that the actions taken by the governments, which were discussed in the previous chapter, aim at correcting what they perceive as excessively favorable financial terms of PPIs, particularly in the case of macroeconomic crisis, rather than challenging the principle of PPIs, because governments seem to seek to take actions to squeeze the cash flow of the electricity sector PPIs while keeping them in operation, rather than attempting to cancel altogether the projects through administrative action. Even in cases of governance issues in South Asia, the aim of the government seemed to be to renegotiate the tariffs at a lower level, rather than seeking to cancel the deals based on corrupt practices.

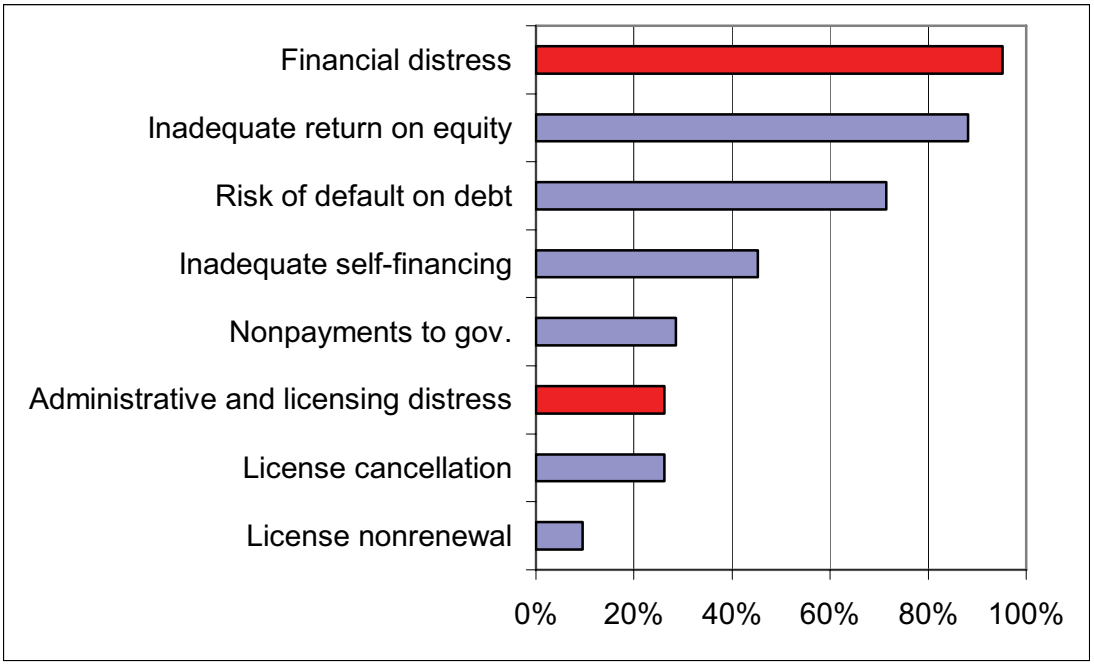
Overview of Consequences of Stress

5.4 As shown in Figure 5.1, the most frequent consequence of project stress is the risk of a lower return on equity (88 percent of projects), as could be expected from the classic cash flow “waterfall” in PPI. The next two most frequent consequences, however, do not

follow the expected order, with the risk of default on debt (71 percent) coming before the risk of insufficient self-financing (45 percent). The reason for this anomaly is that the survey aggregated projects of different types, including IPPs that generally do not have investment obligations. Last, the risk of nonpayment of government dues stands low at 28 percent, in line with the senior status of taxes in the project cash flow waterfall.

5.5 The risk of license cancellation because of stress situation is relatively low (26 percent). Interestingly, more detailed analysis shows that this risk is rarely an indirect consequence of financial difficulties (the correlation between the two is rather low), but rather a self-standing consequence of political causes of stress. An explanation of the low risk of nonrenewal of licenses is that most PPIs are relatively young, and most of them are still several years away from license renewal date.

Figure 5.1: Most Frequent Consequences of Stress

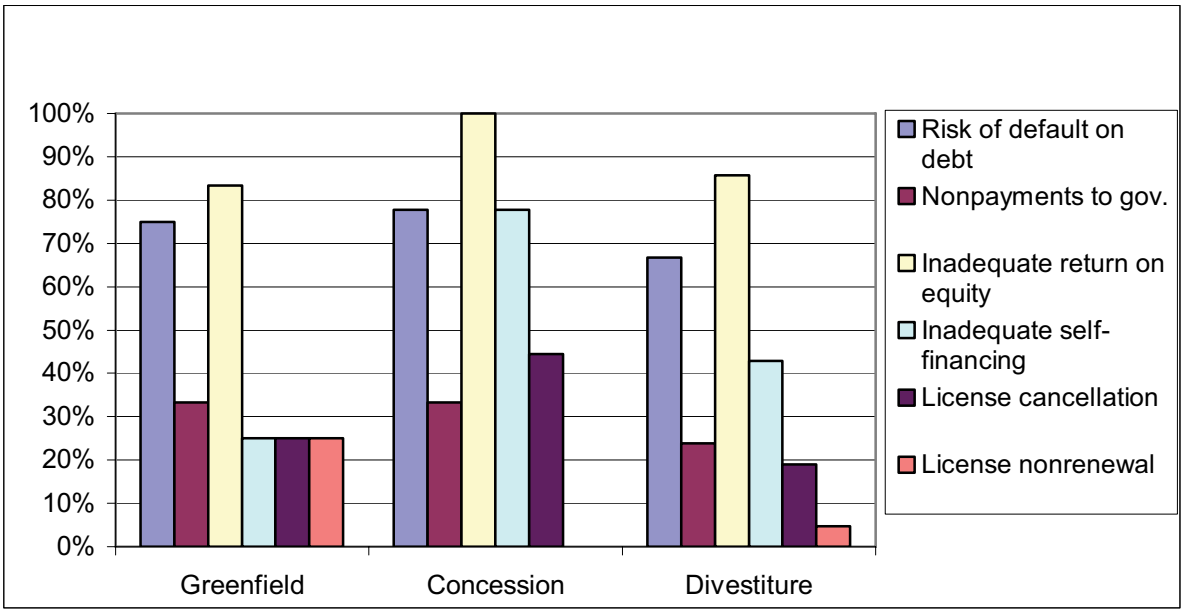


Source: WG1.

Consequences of Stress by Types of Project

5.6 Frequency of consequences of stress by type of project (greenfield projects, concession projects, and divestiture projects) is shown in Figure 5.2.

Figure 5.2: Consequences of Stress by Types of Project



Greenfield Projects

5.7 In 95 percent of greenfield projects under stress, the main consequence was financial distress, mainly a lower return on equity (83 percent) and next a risk of default on the debt (75 percent). Because these projects are generally structured on a project finance basis and comprise only the construction and operation of a single plant, there were few consequences of stress related to the project investment program, which was generally fully financed up front. The risk of nonpayment of government dues as a consequence of project stress is low, at 33 percent, reflecting possibly the privileged creditor status of the government or the fact that many greenfield projects are largely tax-exempt for a number of years. The administrative risk of license cancellation was much lower, with a frequency of only 25 percent. This low frequency suggests that the host governments aim less at the cancellation or confiscation of the project than at revising the financial terms of the projects, in favor of electricity users and at the expenses of private investors and lenders.

Concessions

5.8 All concession projects under stress presented a financial risk, which affected in all cases the potential return on equity and the company's self-financing capacity (in 77 percent of cases), as well as debt repayment capacity (77 percent). Similarly to greenfield projects, the risk of nonpayment of government taxes was also low at 33 percent. Because concessions more rarely benefit from tax exemptions, the reason is probably the privileged creditor status of the government for tax collection purposes. Concessions, however, show a higher risk of cancellation of their license (44 percent) compared with other types of projects. This may be because the ownership of assets in concessions

remains with the government, and in the case of a cancellation of the license, they would return directly to the government, rather than get stranded in a non-licensed project company,[13] providing an incentive for the governments to seek repossession of the company's assets.

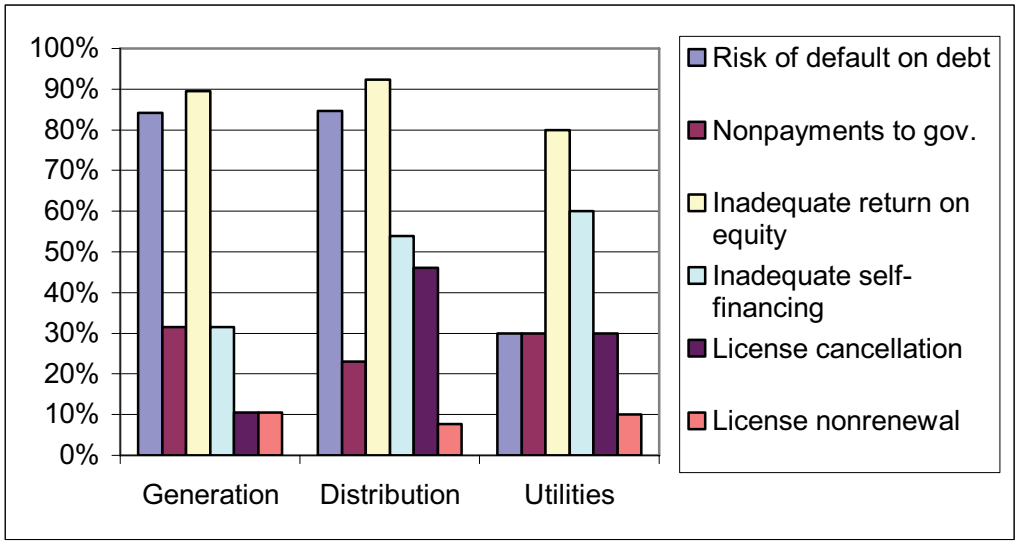
Divestitures

5.9 The consequences of stress on divestiture projects are similar to those of greenfield projects, except that the financial consequences are more rarely a possible default on the debt (66 percent). This is probably due to the financial structure of divestiture projects, which are often less indebted than greenfield projects. However, the risk of insufficient cash flow for sustaining the project investment program is higher (42 percent) because divestiture projects typically have a large investment program to carry out and to be financed to a large extent from internally generated cash flow, whereas greenfield projects rarely have such an obligation. The risk of license cancellation under stress is low (19 percent), possibly because of the complex legal implications of license cancellation for a divestiture project and the potential consequences for the quality of services to users.

Consequences of Stress by Subsector

5.10 The main consequences of stress by subsector of activity (generation, distribution, and utilities) are shown in Figure 5.3.

Figure 5.3: Consequences of Stress by Subsector



[13] Many greenfield projects include clauses dealing with this risk and automatically sell the project to the government in case of license cancellation, but the process of transfer back to the government is less direct than in the case of concessions.

Generation

5.11 Stress always had a financial impact on generation projects. The consequences are mainly a lower return on equity (89 percent) and a risk of default on debt (84 percent). The potential impact on the investment program is low (31 percent), because most generation projects are IPPs with no or limited future additional investment requirements, except when the stress situation occurs when the project is still under construction. The risk of license cancellation for generation projects under stress is lower than for other types of PPIs, at 10 percent, but it was a risk in the case of the India generation projects, including Dhabol. The low probability of license cancellation for generation projects may reflect their lower political visibility, compared with distribution projects and utilities, which makes them a less appealing target in case of macroeconomic stress or change in political majority.

Distribution

5.12 Stress always had a financial impact on distribution projects, mainly on return to equity (92 percent) and capacity to repay lenders (84 percent), reflecting the fact that distribution companies often raise some debt (in addition to their internally generated cash flow) for the implementation of their rehabilitation or extension programs. As could be expected, the potential impact on the distribution companies' investment program is higher (at 53 percent) than for generation companies, because distribution companies have longer-term and non-up-front financed investment programs than IPPs. The higher risk of cancellation of distribution licenses (46 percent) reflects the relatively large number of cases in which distribution projects went under stress because of sociopolitical issues (see previous chapter).

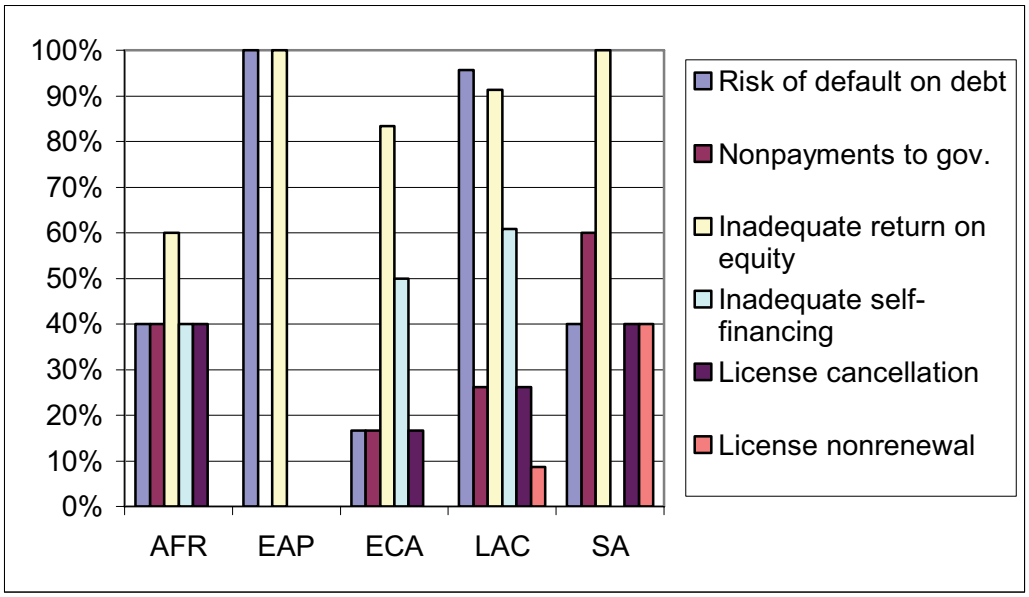
Utilities

5.13 The consequences of stress for integrated utilities are very similar to those for distribution projects with a high incidence of financial issues, within which shortage of cash flow for self-financing of future investment features prominently (60 percent), but risk of default on debt is low (30 percent) compared with other types of PPIs. This reflects the generally low financial gearing ratio of utilities, at least in the initial years after privatization, compared with other forms of PPIs, particularly generation PPIs, but also compared with some distribution companies, which sometimes have ambitious debt-funded connection programs. License cancellation risk is also relatively high (46 percent), presumably for the same sociopolitical reasons as for distribution projects.

Consequences of Stress by Region

5.14 The regional analysis shows that the impact of stress of PPI projects is largely dependent upon the type of PPIs, which tends to be region-specific (see Chapter 2), and the regional political climate toward PPIs. The consequences of stress by region are shown in Figure 5.4.

Figure 5.4: Consequences of Stress by Region



Sub-Saharan Africa

5.15 The consequences of stress reflect the fact that nearly all projects under stress in the region are utilities or concessions. For this type of project, the financial consequences of project stress (80 percent) are the lower expected financial return, indeed, but also the inability to finance post-privatization investment programs (40 percent), whereas the risk of default on the debt is low (40 percent) compared with other regions, because this type of project is generally less dependent on debt than greenfield generation projects. In contrast, the risk of cancellation of licenses is high (40 percent) compared with other regions, indicating the political sensitivity of electricity projects involving direct contact between the PPI and the public in the Africa region, as well as the apparently low level of acceptance of PPI in distribution by the public.

East Asia and the Pacific

5.16 All PPI projects under stress in East Asia and the Pacific reported the same consequences of stress situations: financial issues and no license cancellation risks. The financial consequences of stress were unanimously a lower rate of return for the investors and a risk of default on the debts. This pattern is explained by the fact that all projects under stress in the East Asia and the Pacific region are highly leveraged IPPs, for which there is no future investment program to be financed, and special tax regimes are often applicable to the projects.

Eastern Europe and Central Asia

5.17 In Eastern Europe and Central Asia, most projects under stress were not aiming at increasing available capacity, but improving the management and efficiency of

distribution companies and utilities with little indebtedness or with debts carried on the balance sheet of the parent company. This pattern explains the high risk of financial distress (83 percent), but the low risk of default on the debt (17 percent), and the existence of a relatively high risk of license cancellation (17 percent), which applies in general to distribution and utility projects with high political visibility. It suggests that the political acceptance by the public of PPIs in distribution is rather lower than in other regions (except Africa).

Latin America and the Caribbean

5.18 In Latin America and the Caribbean, most projects under stress were generation greenfields, followed by a smaller number of distribution projects. This structure is reflected in the consequences of stress, which are always financial, with a high risk of default on the debt (96 percent) because both generation and distribution companies in Latin America and the Caribbean have significant debt exposure, and a significant risk on future investment programs of the distribution companies (61 percent). Latin America and the Caribbean has also a 26 percent risk of license cancellation, mainly on distribution projects.

South Asia

5.19 The South Asia projects under stress are split nearly evenly between generation and distribution projects, which are more important in proportion than in other regions (except for Africa). The preponderance of distribution projects and the frequent emergence of governance and sociopolitical issues in projects under stress are reflected in the high proportion of projects in risk of license cancellation (40 percent). The high number of highly leveraged generation projects, on the other hand, explains the relatively high risk of default on the debt, which is 40 percent.

Conclusions of Chapter 5

5.20 Three conclusions can be drawn from the analysis of the consequences of stress by region:

- In all regions, the consequences were essentially similar: primarily financial and subsidiarily administrative.
- Interregional variations seem to reflect the level of political support for sector reforms and for PPIs. The most frequent occurrence of administrative threat to PPIs because of a stress situation is in Africa and in Eastern Europe and Central Asia; in East Asia and the Pacific, where the reforms may be less structural, the administrative threat to PPIs is much less.
- The financial consequences in each region are related to the type of predominant PPI projects in the region, rather than to the type of stress: regions with a high number of IPPs under stress showed a high risk of default to lenders (East Asia and the Pacific and Latin America and the Caribbean). Regions where PPIs were developed mainly in utilities or in the distribution sector

(Africa and Eastern Europe and Central Asia) show less risks for the lenders, though more risk for the consumers in the long run, because the PPIs are likely to be unable to generate adequate cash to sustain their long-term investment programs.

6

Conclusion

FDI in Electricity

- FDI in electricity has been more volatile than total FDI in developing countries and has been more affected by the post-2000 decline.
- Investment was heavily concentrated in generation (70 percent) and much less so in distribution (14 percent), suggesting an aversion of investors toward taking market and commercial risk. The concentration in generation is similar in terms of amounts invested and number of projects.
- FDI occurred mainly in Latin America and the Caribbean and in East Asia and the Pacific, with very different investment patterns: greenfield IPPs in East Asia and the Pacific, with little sector reforms; more investment in distribution—though with significant investment in generation, as well—with major sector reforms in Latin America and the Caribbean.

Electricity projects under stress

- Overall, a stress situation in the electricity sector is a rare event, affecting only 4 percent of power projects in number and 10 percent in value.
- Some 21 percent of the projects that incurred stress were ultimately worked out, suggesting that effective workout procedure and instruments do play an important role in addressing stress situations.
- The level of energy sector private investment in the country anticipates future credit rating movement.
- South Asia had the highest percentage of projects under stress. However, if the special effect of Pakistan is eliminated, Sub-Saharan Africa becomes the highest stress regions, with a percentage of 11 percent. The Latin America and the Caribbean region also had a relatively high percentage, 6 percent. The Eastern Europe and Central Asia and the East Asia and the Pacific regions have relatively low percentages, 3 percent and 1 percent, respectively. The

frequency pattern of stress by region is generally consistent with the regional risk perception.

- Complexity of operation and interaction with end-users as well as exposure to market risk lead to higher stress frequency: Divestiture projects and Concessions, which also often involve an interface with end users, show a high percentage of stress. On the contrary, greenfield projects, which are mainly IPPs for power generation based on long-term power purchase agreements (PPAs), are less prone to stress.
- IPP generation projects are less risky than other types of electricity projects (3 percent in number of projects). On the other hand, distribution projects have the highest stress probability of stress (9 percent), slightly higher than utility projects (8 percent).
- Overall, the distribution of the risk of stress by sub-sectors reflects the exposure to end users and market risk of each type of project: the stress risk is significantly higher for distribution projects with higher market risk exposure, compared with IPP projects relying on PPAs. State-backed off-takers have a lower probability of becoming insolvent because they have the implicit guarantee from the government.

Causes of stress

6.1 The analysis of the causes of stress led to a number of conclusions that are important for future PPI decisions by investors and for the formulation of differentiated and targeted workout strategies. It provides also useful pointers regarding the risks inherent to the various types of projects and to each region.

Regarding the Formulation of Workout Strategies

- Many stress issues are contractual and can potentially be addressed through a workout process.
- Financing- and exchange rate–related issues are the second priority to be addressed in project workout, through the deployment of specific financial engineering instruments.
- Effective communication should be included in workout strategies for the transaction to receive political and social support.
- The workout process should include the formulation of a management strategy, particularly for utilities and distribution companies.
- Workout strategies should be differentiated by type of projects, as they different types of projects have different causes of stress to be addressed.

Regarding the Stress Risk for Investors and Lenders

- Regulatory and pricing issues constitute the most frequent cause of stress; sociopolitical resistance to private sector involvement comes second; macroeconomic causes appear equally important; the poor performance of the investors comes fourth; and faulty project structure comes significantly behind.
- Risk management instruments that are expected to deal with contract compliance (including prices) do not prevent stress under extreme circumstances. The possibility of renegotiation of contracts under severe macroeconomic conditions should be included in PPI documentation to ensure that the balance between the interests of the parties is maintained, even under extreme situations.
- The closing of a deal with the government is not sufficient for a successful PPI. It needs to be accompanied and even preceded by an effective communication and consensus-building process with the public.
- The disappointing commercial performance of investors has proven to be a surprisingly frequent cause of stress for utility and distribution PPIs. Investors embarking on electricity PPI projects involving commercial activities should ensure they have the right staff to handle the commercial function or check carefully the availability of expertise on the local market.
- There is a clear regional differentiation in risk of stress, with East Asia and the Pacific being the lowest-risk region and Africa and South Asia are the highest investment risk.
- Countries with rather sophisticated sector reforms, such as Latin America and the Caribbean or Eastern Europe and Central Asia did not better resist macroeconomic stress or contractual disputes. In the Africa region, the uncertain national adherence to adopted sector reforms highlighted the fact that reforms that are not based on an effective consensus are an additional risk.

Consequences of stress

6.2 Three conclusions can be drawn from the analysis of the consequences of stress by region:

- In all regions, the consequences were essentially similar: primarily financial and subsidiarily administrative.
- Interregional variations seem to reflect the level of political support for sector reforms and for PPIs. The most frequent occurrence of administrative threat to PPIs because of a stress situation is in countries with significant sector reforms (Africa and Eastern Europe and Central Asia); in East Asia and the Pacific, where the reforms may be less structural, the administrative threat to PPIs is much less.

- The financial consequences in each region are related to the type of predominant PPI projects in the region: regions with a high number of IPPs showed a high risk of default to lenders (East Asia and the Pacific and Latin America and the Caribbean). Regions where PPIs were developed mainly in utilities or in the distribution sector (Africa and Eastern Europe and Central Asia) show less risks for the lenders, though more risk for the consumers in the long run, because the PPIs may be unable to generate adequate cash to sustain their long-term investment programs.

Annex 1

List of Electricity Projects under Stress

No.	Region	Country	Status (cancelled, under stress, worked out)	Project name	Sponsor(s)
1	LAC	Argentina	Under stress	AES Parana	AES Corporation, PSEG Global Inc.
2	LAC	Argentina	Under stress	Central Termica Agua del Cajon (Capex)	Astra Capsa, El Paso Energy International
3	LAC	Argentina	Under stress	Edenor S.A (Empresa Distribuidora Norte SA)	Electricitè de France, Endesa (Spain)
4	LAC	Argentina	Cancelled	Empresa de Distribucion de Electricidad de Entre Rios SA (Edeersa)	PSEG Global Inc.
5	LAC	Argentina	Under stress	Empresa Distribuidora Electrica Norte SA (Eden)	AES Corporation, Community Energy Alternatives (CEA)
6	LAC	Argentina	Under stress	Empresa Distribuidora Electrica Sur SA (Edes)	AES Corporation, Community Energy Alternatives (CEA)
7	LAC	Argentina	Under stress	Empresa Provincial de Energia La Plata SA (Edelap)	Empresa Provincial de Energia La Plata SA (Edelap)
8	LAC	Argentina	Under stress	Hidroelectrica Alicura SA	Mirant (sold to AES)
9	LAC	Argentina	Under stress	Hidroelectrica Piedra del Aguila SA (HPDA)	TOTAL AUSTRAL (71%) a fully owned subsidiary of Total Fina Elf.
10	LAC	Argentina	Under stress	EMDERSA	First Energy
11	LAC	Bolivia	Under stress	Empresa Valle Hermoso SA	Constellation Power Inc., Light and Power, Ogden

					Corporation
12	LAC	Brazil	Worked Out	AES Sul	AES Corporation
13	LAC	Brazil	Worked Out	Companhia de Geracao de Energia Eletrica Tiete (AES Tiete and Holding Companies)	AES Corporation
14	LAC	Brazil	Under stress	Companhia Energetica de Minas Gerais (CEMIG) (Southern Electric Brazil)	AES Corporation, Mirant (Southern Electric, Opportunity Fund)
15	LAC	Brazil	Cancelled	Companhia Energetica do Maranhao (CEMAR)	Pennsylvania Power & Light
16	LAC	Brazil	Under stress	Eletropaulo Metropolitana de Eletricidade SA (Eletropaulo Metropolitana)	AES Corporation, Light Rio Servicos de Electricidade SA
17	AFR	Cameroon	Worked out	AES Sonel	AES Corp.
18	LAC	Chile	Worked out	ENERGÍA DEL NORTE (EDELNOR)	MIRANT (1993-2002) AND SUEZ-TRACTEBEL (as from 2002)
19	LAC	Colombia	Worked out	Chivor SA	Gener (Chilgener) / AES Corporation
20	LAC	Colombia	Cancelled	TermoCandelaria	AES Corporation
21	LAC	Colombia	Under stress	Termotasajero	Others
22	AFR	Comoros	Cancelled	Electricite et Eaux des Comores	Veolia Environnement
23	LAC	Dominican Republica	Under stress	AES Andres	AES Corporation
24	LAC	Dominican Republica	Cancelled	Empresa de Distribucion Norte-Sur (Edenorte, Edesur)	Union Fenosa
25	LAC	Dominican Republica	Under stress	Empresa Distribuidora Electrica Este (Ede Este)	AES Corporation
26	ECA	Georgia	Worked Out	Telasi	AES Corporation
27	SAS	India	Cancelled	Central Electricity Supply Company of Orissa (CESCO)	AES Corporation

28	SAS	India	Cancelled	Dabhol LNG-Fired Power Plant - Phase I	Enron
29	SAS	India	Cancelled	Dabhol LNG-Fired Power Plant - Phase II	Enron
30	SAS	India	Under stress	Orissa Power Generation Corp. (OPGC) (only distribution is under stress)	AES Corporation
31	EAP	Indonesia	Cancelled	Dieng Geothermal Power Plant	CalEnergy, Kiewit SonsInc
32	EAP	Indonesia	Cancelled	Karaha Bodas Company	Caithness Energy, Florida Power & Light
33	EAP	Indonesia	Cancelled	Patuha Power Ltd.	CalEnergy
34	ECA	Kazakhstan	Cancelled	Almaty Power Consolidated	Suez
35	ECA	Kazakhstan	Worked Out	Karaganda 4 Coal Fired Power Plant	Ormat Turbines Ltd
36	ECA	Kazakhstan	Worked Out	AES Power Generation	AES Corporation
37	AFR	Mali	Under stress	Energie du Mali (EDM)	Saur International, IPS
38	ECA	Moldova	Under stress	Chisinau Red Centru Sud	Union Fenosa
39	SAS	Pakistan	Worked out	Hub Power Company	International Power, Xenel Industries Ltd
40	SAS	Pakistan	Worked out	AES Lal Pir (Pakistan) Ltd.	AES Corporation
41	SAS	Pakistan	Worked out	AES Pak Gen (Pakistan) Ltd.	AES Corporation, Pak Gen Power
42	SAS	Pakistan	Worked out	Agrilectric Larkana Power Plant	Agrilectric Power Inc.
43	SAS	Pakistan	Worked out	Altern Energy Ltd.	Altern Inc.
44	SAS	Pakistan	Worked out	Davis Energen Ltd.	Davis Energen Ltd., Fimkassar Power
45	SAS	Pakistan	Worked out	Fauji Kabirwala Power Company Ltd.	El Paso Energy International, Fauji Foundation
46	SAS	Pakistan	Worked out	Gul Ahmed Energy Ltd.	Gul Ahmed Group, Tomen Corp.
47	SAS	Pakistan	Worked out	Japan Power Generation Company	Mitsubishi, Toyota Tsusho Corp.
48	SAS	Pakistan	Worked out	Kohinoor Energy Ltd.	Saigol Family and Associates, Tomen Corp.
49	SAS	Pakistan	Worked out	Liberty Power Company	Tenaga Nasional Bhd.

50	SAS	Pakistan	Worked out	Nishat Power Plant	Nishat Group of Industries
51	SAS	Pakistan	Worked out	Northern Electric Power Project	Northern Electric Co. Ltd.
52	SAS	Pakistan	Worked out	Power Gen Hydro	Power Gencorp Ltd., Synergics
53	SAS	Pakistan	Worked out	Quetta Habibulah Power Plant	Coastal Power, Habibulah Energy Ltd.
54	SAS	Pakistan	Worked out	Raiwind Diesel Power Plant	Kilborn Engineering Pacific, SNC Lavalin
55	SAS	Pakistan	Worked out	Rousch Independent Power Co. Ltd	Siemens AG
56	SAS	Pakistan	Worked out	Saba Power Company Ltd.	Coastal Power
57	SAS	Pakistan	Worked out	Tapal Energy Limited	Amejee Valejee & Sons, Wartsila Power Development
58	SAS	Pakistan	Worked out	TriStar Power Company	TriStar Energy
59	SAS	Pakistan	Worked out	Uch Power Ltd.	GE Capital, GPU International, Tenaska International LLC
60	SAS	Pakistan	Worked out	Wak Port Qasim Power Company	WAK Gas
61	AFR	Senegal	Cancelled	Societe Nationale d'Electricite du Senegal (SENELEC)	Hydro-Quebec International, Suez
62	AFR	Uganda	Cancelled	Bujagali	AES Corporation
63	ECA	Ukraine	Under stress	Sevastopol Heat Supply Improvement Project (Sevastopolmiskenergo)	Vykhodoslovenske Energeticke Sovody (VSE)

Annex 2

Supporting Tables

Chapter 2

Table A2.1: Private Participation by Region, Developing Countries, 1984–2003

Region	Countries	Projects	Investment (2003 US$ Billion)
East Asia and the Pacific	9	254	77.2
Europe and Central Asia	18	179	23.6
Latin America and the Caribbean	25	370	115.8
Middle East and North Africa	5	16	10.7
South Asia	5	89	23.2
Sub-Saharan Africa	27	44	5.6
Total	89	952	256.3

Source: World Bank, PPI Project Database.

Table A2.2: Private Participation in Electricity Projects by Type, 1984–2003

Type of Private Participation	Number of Projects	Investment (2003 US$ Billion)
Concessions	41	12.0
Divestitures	370	102.8
Greenfield projects	524	141.3
Management and lease contracts	17	0.0
Total	952	256.3

Table A2.3: Private Participation in Electricity Projects by Subsector, 1984–2003

	Number of Projects	Investment (2003 US$ Billion)
Electricity generation	675	177.9
Electricity distribution	115	40.9
Electricity transmission	28	4.5
Integrated utilities	107	20.0
Electricity distribution and generation	18	8.5
Electricity generation and transmission	2	0.6
Electricity distribution and transmission	7	3.9
Total	952	256.3

Chapter 3

Table A2.4: Number, Value, and Percentage of Electricity Projects under Stress

By Project Status	# of Projects	Value of Projects (US$ Million)	% of the Overall Population, by # of Projects	% of the Overall Population, by Value of Projects
Cancelled	14	5,830	1	2
Under stress	19	12,081	2	5
Worked out	9	7,943	1	3
Total	42	25,854	4	10

Table A2.5: Regional Distribution of Electricity Projects under Stress

Region	# of Projects	Value of Projects (US$ Million)	% of the Overall Population, by # of Projects	% of the Overall Population, by Value of Projects
East Asia and the Pacific	3	1,480.0	1	2
Europe and Central Asia	6	405.8	3	2
Latin America and the Caribbean	23	14,042.2	6	12
Middle East and North Africa	0	0	0	0
South Asia	5	8,900.4	6	38
Sub-Saharan Africa	5	1,024.9	11	18
Total	42	25,853.3	4	10

Table A2.6: Electricity Projects under Stress by Type of Private Sector Involvement

By Type of Private Sector Involvement	# of Projects	Value of Projects (US$ Million)	% of the Overall Population, by # of Projects	% of the Overall Population, by Value of Projects
Greenfield	11	11,369	2	8
Concession	9	1,980	22	16
Divestiture	22	12,504	6	12

Table A2.7: Electricity Projects under Stress by Subsector

By Segment	# of Projects	Value of Projects (US$ Million)	% of the Overall Population, by # of Projects	% of the Overall Population, by Value of Projects
Generation	19	14,261	3	8
Distribution	13	7,032	9	14
Utilities	10	4,560	8	16

Table A2.8: Conversion of Credit Rating into Chart Position

Rating	Chart Position	Rating	Chart Position	Rating	Chart Position
AAA	10	BBB+	7.25	CCC+	4.25
AAA-	9.75	BBB	7	CCC	4
AA+	9.25	BBB-	6.75	CCC-	3.75
AA	9	BB+	6.25	CC+	3.25
AA-	8.75	BB	6	CC	3
A+	8.25	BB-	5.75	CC-	2.75
A	8	B+	5.25	R (regulatory supervision)	2
A-	7.75	B	5	SD (selective default) or D (default)	1
		B-	4.75	NR (not rated)	0

Annex 3

Result of the Survey of the Power Projects under Stress

Table A3.1: Number of stress cases by type of Projects and sub-sector

	Causes																															Consequenses								
	Total number of PPI Electricity	Local bias	Governance	**Political commitment**	Social	Labor Unions	Special Interest groups	Local partner	*Socio-poical*	Inability to withstand shocks	Low demand	**Exchange Rate**	Fuel prices	local financing	*Macro*	Compliance with contrat clauses	**G interference**	Relatiobship G/inv	**Non compliace with prices**	Non-grandfathered changes	Weak Regulaor	*Regulation and prices*	Technical options	**Funding and tariff currencies**	Aggressive bidding	*Project structure*	Technical performance	Investment commitment	Commercial performance	Quality of service	*Investor's perfo*		Risk of default on debt	Non payments to gov.	Inadequate return on equity	Inadequate self=financing	*Financial impact*	License cancellation	License non-renewal	*Administrative impact*	Additional obligations on the project
Projects under stress Overall	952	**6**	**12**	**18**	**14**	**5**	**14**	**2**	**31**	**16**	**-8**	**21**	**7**	**14**	**30**	**17**	**23**	**8**	**24**	**15**	**9**	**38**	**2**	**23**	**6**	**25**	**30**	**26**	**20**	**20**	**25**		**30**	**12**	**37**	**19**	**40**	**11**	**4**	**11**	**2**
gross minus		0	0	0	0	0	0	0	0	0	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30		0	0	0	0	0	0	0	0	0
gross plus		0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-5		0	0	0	0	0	0	0	0	0
By type of project	952																																							
Total Concessions	**58**	2	1	5	5	1	2	0	7	7	-4	6	1	7	8	6	5	1	7	5	2	9	2	7	4	7	6	7	4	2	4		7	3	9	7	9	4	0	4	1
Total Divestitures	**370**	3	7	7	8	4	8	2	15	4	0	10	3	5	14	4	12	3	12	7	6	18	0	9	2	11	12	10	5	8	10		14	5	18	9	20	4	1	4	1
Total Greenfields	**524**	1	4	6	1	0	4	0	9	5	-4	5	3	2	8	7	6	4	5	3	1	11	0	7	0	7	12	9	11	10	11		9	4	10	3	11	3	3	3	0
By sub-sector	952																																							
Total Distribution	**124**	2	3	6	8	3	3	0	10	6	-2	7	2	5	9	5	10	3	8	7	2	12	1	9	3	9	8	9	5	3	7		11	3	12	7	13	6	1	6	1
Total Generation	**677**	1	4	7	3	0	5	1	12	8	-4	11	2	4	14	9	10	3	11	7	2	17	0	11	1	12	18	16	14	14	17		16	6	17	6	19	2	2	2	0
Total Utilities	**151**	3	5	5	3	2	6	1	9	2	-2	3	3	5	7	3	3	2	5	1	5	9	1	3	2	4	4	1	1	3	1		3	3	8	6	8	3	1	3	1

Table A3.2: Number of Stress Cases by Region

	Causes																																			Consequenses								
	Total number of PPI Electricity	Local bias	Governance	**Political commitment**	Social	Labor Unions	Special Interest groups	Local partner	*Socio-poical*	Inability to withstand shocks	Low demand	**Exchange Rate**	Fuel prices	Local financing	*Macro*	Compliance with contrat clauses	**G interference**	Relatiobship G/inv	**Non compliace with prices**	Non-grandfathered changes	Weak Regulaor	*Regulation and prices*	Technical options	**Funding and tariff currencies**	Aggressive bidding	*Project structure*	Technical performance	Investment commitment	Commercial performance	Quality of service	*Investor's perfo*		Risk of default on debt	Non payments to gov.	Inadequate return on equity	Inadequate self=financing	*Financial impact*	License cancellation	License non-renewal	*Administrative impact*	Additional obligations on the project
By Region	952																																											
Total Africa	**44**	1	2	2	1	1	4	0	5	1	1	0	2	3	5	3	1	2	1	0	2	5	1	1	1	2	0	-3	-1	-1	-3		2	2	3	2	4	2	0	2	0
Total EAP	**254**	0	1	0	0	0	0	0	1	3	-3	3	0	0	3	3	0	0	0	0	0	3	0	1	0	1	3	3	3	3	3		3	0	3	0	3	0	0	0	0
Total MENA	**16**																																										
Total ECA	**179**	0	2	1	2	0	2	0	3	1	-1	0	0	0	1	0	5	1	3	0	3	5	0	0	0	0	4	3	3	4	4		1	1	5	3	5	1	0	1	0
Total LAC	**370**	5	4	13	11	3	8	2	19	11	-4	18	5	11	20	8	14	3	18	15	3	20	1	16	5	17	18	18	10	9	16		22	6	21	14	23	6	2	6	2
Total South Asia	**89**	0	3	2	0	1	0	0	3	0	-1	0	0	0	1	3	3	2	2	0	1	5	0	5	0	5	5	5	5	5	5		2	3	5	0	5	2	2	2	0

Table A3.3: Number of Stress Cases by Region and sub-sector

	Causes																															Consequences								
	Total number of PPI Electricity	Local bias	Governance	**Political commitment**	Social	Labor Unions	Special Interest groups	Local partner	*Socio-poical*	Inability to withstand shocks	Low demand	**Exchange Rate**	Fuel prices	Local financing	*Macro*	Compliance with contrat clauses	**G interference**	Relatiobship G/inv	**Non compliace with prices**	Non-grandfathered changes	Weak Regulaor	*Regulation and prices*	Technical options	**Funding and tariff currencies**	Aggressive bidding	*Project structure*	Technical performance	Investment commitment	Commercial performance	Quality of service	*Investor's perfo*		Risk of default on debt	Non payments to gov.	Inadequate return on equity	Inadequate self-financing	*Financial impact*	License cancellation	License non-renewal	**Administrative impact**	Additional obligations imposed on the project
By region and sub-sector	952																																							
Africa	44	1	2	2	1	1	4	0	5	1	1	0	2	3	5	3	1	2	1	0	2	5	1	1	1	2	0	-3	-1	-1	-3		2	2	3	2	4	2	0	2	0
Total Distribution	8																																							
Total Generation	22	0	0	0	0	0	1	0	1	0	1	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	1	-1	1	1	0		1	0	0	0	1	0	0	0	0
Total Utility	14	1	2	2	1	1	3	0	4	1	0	0	2	3	4	3	0	1	1	0	2	4	1	1	1	2	-1	-2	-2	-2	-3		1	2	3	2	3	2	0	2	0
East Asia	254	0	1	0	0	0	0	0	1	3	-3	3	0	0	3	3	0	0	0	0	0	3	0	1	0	1	3	3	3	3	3		3	0	3	0	3	0	0	0	0
Total Distribution	2																																							
Total Generation	244	0	1	0	0	0	0	0	1	3	-3	3	0	0	3	3	0	0	0	0	0	3	0	1	0	1	3	3	3	3	3		3	0	3	0	3	0	0	0	0
Total utility	8																																							
MENA	16																																							
Total Distribution	4																																							

Total Generation	**11**																																									
Total Utility	**1**																																									
ECA	**179**	0	2	1	2	0	2	0	3	1	-1	0	0	0	1	0	5	1	3	0	3	5	0	0	0	0	4	3	3	4	4		1	1	5	3	5	1	0	1	0
Total distribution	**41**	0	1	0	1	0	1	0	1	1	-1	0	0	0	1	0	2	1	0	0	0	2	0	0	0	0	1	2	0	1	1		1	1	2	0	2	1	0	1	0
Total Generation	**69**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0	0	0	1	1	1	1	1		0	0	1	1	1	0	0	0	0
Total Utility	**69**	0	1	1	1	0	1	0	2	0	0	0	0	0	0	0	2	0	2	0	2	2	0	0	0	0	2	0	2	2	2		0	0	2	2	2	0	0	0	0
LAC	**370**	5	4	13	11	3	8	2	19	11	-4	18	5	11	20	8	14	3	18	15	3	20	1	16	5	17	18	18	10	9	16		22	6	21	14	23	6	2	6	2
Total Distribution	**65**	2	1	6	7	2	2	0	8	5	-1	7	2	5	8	5	7	2	8	7	1	8	1	7	3	7	5	5	3	0	4		9	2	8	7	9	5	1	5	1
Total Generation	**248**	1	1	5	3	0	4	1	8	5	-1	8	2	4	9	3	6	0	8	7	1	9	0	7	1	8	10	10	6	6	10		11	3	10	5	11	0	0	0	0
Total Utility	**57**	2	2	2	1	1	2	1	3	1	-2	3	1	2	3	0	1	1	2	1	1	3	0	2	1	2	3	3	1	3	2		2	1	3	2	3	1	1	1	1
South Asia	**89**	0	3	2	0	1	0	0	3	0	-1	0	0	0	1	3	3	2	2	0	1	5	0	5	0	5	5	5	5	5	5		2	3	5	0	5	2	2	2	0
Total Distribution	**4**	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	2	0	2	0	2	2	2	2	2	2		1	0	2	0	2	0	0	0	0
Total Generation	**83**	0	2	2	0	0	0	0	2	0	-1	0	0	0	1	3	2	2	2	0	0	3	0	3	0	3	3	3	3	3	3		1	3	3	0	3	2	2	2	0
Total Utility	**2**																																									

Table A3.4: Percentage of stress cases compared to overall total of PPI by Type of Project and sub-sector

	Causes																															Consequences								
	Total number of PPI Electricity	Local bias	Governance	**Political commitment**	Social	Labor Unions	Special Interest groups	Local partner	*Socio-poical*	Inability to withstand shocks	Low demand	**Exchange Rate**	Fuel prices	Local financing	*Macro*	Compliance with contrat clauses	**G interference**	Relatiobship G/inv	**Non compliace with prices**	Non-grandfathered changes	Weak Regulaor	*Regulation and prices*	Technical options	**Funding and tariff currencies**	Aggressive bidding	*Project structure*	Technical performance	Investment commitment	Commercial performance	Quality of service	*Investor's perfo*		Risk of default on debt	Non payments to gov.	Inadequate return on equity	Inadequate self=financing	*Financial impact*	License cancellation	License non-renewal	*Administrative impact*	Additional obligations on the project
Projects under stress Overall	**952**	0.6	1.3	1.9	1.5	0.5	1.5	0.2	3.3	1.7	-0.8	2.2	0.7	1.5	3.2	1.8	2.4	0.8	2.5	1.6	0.9	4.0	0.2	2.4	0.6	2.6	3.2	2.7	2.1	2.1	2.6		3.2	1.3	3.9	2.0	4.2	1.2	0.4	1.2	0.2
gross minus	**952**										-1.5																				3.2										
gross plus	**952**										0.6																				-0.5										
By type of project	**952**																																								
Total Concessions	**58**	3.4	1.7	8.6	8.6	1.7	3.4	0.0	12.1	12.1	-6.9	10.3	1.7	12.1	13.8	10.3	8.6	1.7	12.1	8.6	3.4	15.5	3.4	12.1	6.9	12.1	10.3	12.1	6.9	3.4	6.9		12.1	5.2	15.5	12.1	15.5	6.9	0.0	6.9	1.7
Total Divestitures	**370**	0.8	1.9	1.9	2.2	1.1	2.2	0.5	4.1	1.1	0.0	2.7	0.8	1.4	3.8	1.1	3.2	0.8	3.2	1.9	1.6	4.9	0.0	2.4	0.5	3.0	3.2	2.7	1.4	2.2	2.7		3.8	1.4	4.9	2.4	5.4	1.1	0.3	1.1	0.3
Total Greenfields	**524**	0.2	0.8	1.1	0.2	0.0	0.8	0.0	1.7	1.0	-0.8	1.0	0.6	0.4	1.5	1.3	1.1	0.8	1.0	0.6	0.2	2.1	0.0	1.3	0.0	1.3	2.3	1.7	2.1	1.9	2.1		1.7	0.8	1.9	0.6	2.1	0.6	0.6	0.6	0.0
By sub-sector	**952**																																							
Total Distribution	**124**	1.6	2.4	4.8	6.5	2.4	2.4	0.0	8.1	4.8	-1.6	5.6	1.6	4.0	7.3	4.0	8.1	2.4	6.5	5.6	1.6	9.7	0.8	7.3	2.4	7.3	6.5	7.3	4.0	2.4	5.6		8.9	2.4	9.7	5.6	10.5	4.8	0.8	4.8	0.8
Total Generation	**677**	0.1	0.6	1.0	0.4	0.0	0.7	0.1	1.8	1.2	-0.6	1.6	0.3	0.6	2.1	1.3	1.5	0.4	1.6	1.0	0.3	2.5	0.0	1.6	0.1	1.8	2.7	2.4	2.1	2.1	2.5		2.4	0.9	2.5	0.9	2.8	0.3	0.3	0.3	0.0
Total Utilities	**151**	2.0	3.3	3.3	2.0	1.3	4.0	0.7	6.0	1.3	-1.3	2.0	2.0	3.3	4.6	2.0	2.0	1.3	3.3	0.7	3.3	6.0	0.7	2.0	1.3	2.6	2.6	0.7	0.7	2.0	0.7		2.0	2.0	5.3	4.0	5.3	2.0	0.7	2.0	0.7

Table A3.5: Percentage of stress cases compared to overall total of PPI by Region

	Causes																															Consequences								
	Total number of PPI Electricity	Local bias	Governance	**Political commitment**	Social	Labor Unions	Special Interest groups	Local partner	*Socio-poical*	Inability to withstand shocks	Low demand	**Exchange Rate**	Fuel prices	Local financing	*Macro*	Compliance with contrat clauses	**G interference**	Relatiobship G/inv	**Non compliace with prices**	Non-grandfathered changes	Weak Regulaor	*Regulation and prices*	Technical options	**Funding and tariff currencies**	Aggressive bidding	*Project structure*	Technical performance	Investment commitment	Commercial performance	Quality of service	*Investor's perfo*		Risk of default on debt	Non payments to gov.	Inadequate return on equity	Inadequate self=financing	*Financial impact*	License cancellation	License non-renewal	*Administrative impact*	Additional obligations on the project
By Region	**952**																																							
Total Africa	**44**	2.3	4.5	4.5	2.3	2.3	9.1	0.0	11.4	2.3	2.3	0.0	4.5	6.8	11.4	6.8	2.3	4.5	2.3	0.0	4.5	11.4	2.3	2.3	2.3	4.5	0.0	-6.8	-2.3	-2.3	-6.8		4.5	4.5	6.8	4.5	9.1	4.5	0.0	4.5	0.0
Total EAP	**254**	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.4	1.2	-1.2	1.2	0.0	0.0	1.2	1.2	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.4	0.0	0.4	1.2	1.2	1.2	1.2	1.2		1.2	0.0	1.2	0.0	1.2	0.0	0.0	0.0	0.0
Total MENA	**16**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total ECA	**179**	0.0	1.1	0.6	1.1	0.0	1.1	0.0	1.7	0.6	-0.6	0.0	0.0	0.0	0.6	0.0	2.8	0.6	1.7	0.0	1.7	2.8	0.0	0.0	0.0	0.0	2.2	1.7	1.7	2.2	2.2		0.6	0.6	2.8	1.7	2.8	0.6	0.0	0.6	0.0
Total LAC	**370**	1.4	1.1	3.5	3.0	0.8	2.2	0.5	5.1	3.0	-1.1	4.9	1.4	3.0	5.4	2.2	3.8	0.8	4.9	4.1	0.8	5.4	0.3	4.3	1.4	4.6	4.9	4.9	2.7	2.4	4.3		5.9	1.6	5.7	3.8	6.2	1.6	0.5	1.6	0.5
Total South Asia	**89**	0.0	3.4	2.2	0.0	1.1	0.0	0.0	3.4	0.0	-1.1	0.0	0.0	0.0	1.1	3.4	3.4	2.2	2.2	0.0	1.1	5.6	0.0	5.6	0.0	5.6	5.6	5.6	5.6	5.6	5.6		2.2	3.4	5.6	0.0	5.6	2.2	2.2	2.2	0.0

Table A3.6: Percentage of stress cases compared to overall total of PPI by Region and sub-sector

	Causes																															Consequences								
	Total number of PPI Electricity	Local bias	Governance	**Political commitment**	Social	Labor Unions	Special Interest groups	Local partner	*Socio-poical*	Inability to withstand shocks	Low demand	**Exchange Rate**	Fuel prices	Local financing	*Macro*	Compliance with contrat clauses	**G interference**	Relatioship G/inv	**Non compliace with prices**	Non-grandfathered changes	Weak Regulaor	*Regulation and prices*	Technical options	**Funding and tariff currencies**	Aggressive bidding	*Project structure*	Technical performance	Investment commitment	Commercial performance	Quality of service	*Investor's perfo*		Risk of default on debt	Non payments to gov.	Inadequate return on equity	Inadequate self=financing	*Financial impact*	License cancellation	License non-renewal	*Administrative impact*	Additional obligations on the project
By region and sub- sector	**952**																																						
Africa	**44**	2.3	4.5	4.5	2.3	2.3	9.1	0.0	11.4	2.3	2.3	0.0	4.5	6.8	11.4	6.8	2.3	4.5	2.3	0.0	4.5	11.4	2.3	2.3	2.3	4.5	0.0	-6.8	-2.3	-2.3	-6.8		4.5	4.5	6.8	4.5	9.1	4.5	0.0	4.5	0.0
Total Distribution	**8**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Generation	**22**	0.0	0.0	0.0	0.0	0.0	4.5	0.0	4.5	0.0	4.5	0.0	0.0	0.0	4.5	0.0	4.5	4.5	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	4.5	-4.5	4.5	4.5	0.0		4.5	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0
Total Utility	**14**	7.1	14.3	14.3	7.1	7.1	21.4	0.0	28.6	7.1	0.0	0.0	14.3	21.4	28.6	21.4	0.0	7.1	7.1	0.0	14.3	28.6	7.1	7.1	7.1	14.3	-7.1	-14.3	-14.3	-14.3	-21.4		7.1	14.3	21.4	14.3	21.4	14.3	0.0	14.3	0.0
East Asia	**254**	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.4	1.2	-1.2	1.2	0.0	0.0	1.2	1.2	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.4	0.0	0.4	1.2	1.2	1.2	1.2	1.2		1.2	0.0	1.2	0.0	1.2	0.0	0.0	0.0	0.0
Total Distribution	**2**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Generation	**244**	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.4	1.2	-1.2	1.2	0.0	0.0	1.2	1.2	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.4	0.0	0.4	1.2	1.2	1.2	1.2	1.2		1.2	0.0	1.2	0.0	1.2	0.0	0.0	0.0	0.0
Total utility	**8**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MENA	**16**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Total Distribution	**4**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Generation	**11**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Utility	**1**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ECA	**179**	0.0	1.1	0.6	1.1	0.0	1.1	0.0	1.7	0.6	-0.6	0.0	0.0	0.0	0.6	0.0	2.8	0.6	1.7	0.0	1.7	2.8	0.0	0.0	0.0	0.0	2.2	1.7	1.7	2.2	2.2	0.6	0.6	2.8	1.7	2.8	0.6	0.0	0.6	0.0
Total distribution	**41**	0.0	2.4	0.0	2.4	0.0	2.4	0.0	2.4	2.4	-2.4	0.0	0.0	0.0	2.4	0.0	4.9	2.4	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	2.4	4.9	0.0	2.4	2.4	2.4	2.4	4.9	0.0	4.9	2.4	0.0	2.4	0.0
Total Generation	**69**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	1.4	0.0	1.4	1.4	0.0	0.0	0.0	0.0	1.4	1.4	1.4	1.4	1.4	0.0	0.0	1.4	1.4	1.4	0.0	0.0	0.0	0.0
Total Utility	**69**	0.0	1.4	1.4	1.4	0.0	1.4	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	2.9	0.0	2.9	2.9	0.0	0.0	0.0	0.0	2.9	0.0	2.9	2.9	2.9	0.0	0.0	2.9	2.9	2.9	0.0	0.0	0.0	0.0
LAC	**370**	1.4	1.1	3.5	3.0	0.8	2.2	0.5	5.1	3.0	-1.1	4.9	1.4	3.0	5.4	2.2	3.8	0.8	4.9	4.1	0.8	5.4	0.3	4.3	1.4	4.6	4.9	4.9	2.7	2.4	4.3	5.9	1.6	5.7	3.8	6.2	1.6	0.5	1.6	0.5
Total Distribution	**65**	3.1	1.5	9.2	10.8	3.1	3.1	0.0	12.3	7.7	-1.5	10.8	3.1	7.7	12.3	7.7	10.8	3.1	12.3	10.8	1.5	12.3	1.5	10.8	4.6	10.8	7.7	7.7	4.6	0.0	6.2	13.8	3.1	12.3	10.8	13.8	7.7	1.5	7.7	1.5
Total Generation	**248**	0.4	0.4	2.0	1.2	0.0	1.6	0.4	3.2	2.0	-0.4	3.2	0.8	1.6	3.6	1.2	2.4	0.0	3.2	2.8	0.4	3.6	0.0	2.8	0.4	3.2	4.0	4.0	2.4	2.4	4.0	4.4	1.2	4.0	2.0	4.4	0.0	0.0	0.0	0.0
Total Utility	**57**	3.5	3.5	3.5	1.8	1.8	3.5	1.8	5.3	1.8	-3.5	5.3	1.8	3.5	5.3	0.0	1.8	1.8	3.5	1.8	1.8	5.3	0.0	3.5	1.8	3.5	5.3	5.3	1.8	5.3	3.5	3.5	1.8	5.3	3.5	5.3	1.8	1.8	1.8	1.8
South Asia	**89**	0.0	3.4	2.2	0.0	1.1	0.0	0.0	3.4	0.0	-1.1	0.0	0.0	0.0	1.1	3.4	3.4	2.2	2.2	0.0	1.1	5.6	0.0	5.6	0.0	5.6	5.6	5.6	5.6	5.6	5.6	2.2	3.4	5.6	0.0	5.6	2.2	2.2	2.2	0.0
Total Distribution	**4**	0.0	25.0	0.0	0.0	25.0	0.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0	25.0	50.0	0.0	50.0	0.0	50.0	50.0	50.0	50.0	50.0	50.0	25.0	0.0	50.0	0.0	50.0	0.0	0.0	0.0	0.0
Total Generation	**83**	0.0	2.4	2.4	0.0	0.0	0.0	0.0	2.4	0.0	-1.2	0.0	0.0	0.0	1.2	3.6	2.4	2.4	2.4	0.0	0.0	3.6	0.0	3.6	0.0	3.6	3.6	3.6	3.6	3.6	3.6	1.2	3.6	3.6	0.0	3.6	2.4	2.4	2.4	0.0
Total Utility	**2**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	952	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table A3.7: Percentage of causes of stress within the population of projects under stress by Type of Project and sub-sector

	Causes																												Consequences								
	Number of projects under stress	Local bias	Governance	**political commitment**	Social	Labor Unions	Special Interest groups	Local partner	*Socio-poical*	Inability to withstand shocks	Low demand	**Exchange Rate**	Fuel prices	Local financing	*Macro*	Compliance with contrat clauses	**G interference**	Relatiobship G/inv	**Non compliace with prices**	Non-grandfathered changes	Weak Regulaor	*Regulation and prices*	Technical options	**Funding and tariff currencies**	Aggressive bidding	*Project structure*	Technical performance	Investment commitment	Commercial performance	Quality of service	*Investor's perfo*		Risk of default on debt	Non payments to gov.	Inadequate return on equity	Inadequate self=financing	*Financial impact*	License cancellation	License non-renewal	*Administrative impact*	Additional obligations on the project
Projects under stress Overall	**42**	14.3	28.6	42.9	33.3	11.9	33.3	4.8	73.8	38.1	-19	50.0	16.7	33.3	71.4	40.5	54.8	19.0	57.1	35.7	21.4	90.5	4.8	54.8	14.3	59.5	71.4	61.9	47.6	47.6	59.5		71.4	28.6	88.1	45.2	95.2	26.2	9.5	26.2	4.8
gross minus	**42**										-33.3																				71.4									
gross plus	**42**										14.3																				-11.9									
By type of project	**42**																																							
Total Concessions	**9**	22.2	11.1	55.6	55.6	11.1	22.2	0.0	77.8	77.8	-44.4	66.7	11.1	77.8	88.9	66.7	55.6	11.1	77.8	55.6	22.2	100	22.2	77.8	44.4	77.8	66.7	77.8	44.4	22.2	44.4		77.8	33.3	100	77.8	100	44.4	0.0	44.4	11.1
Total Divestitures	**21**	14.3	33.3	33.3	38.1	19.0	38.1	9.5	71.4	19.0	0.0	47.6	14.3	23.8	66.7	19.0	57.1	14.3	57.1	33.3	28.6	85.7	0.0	42.9	9.5	52.4	57.1	47.6	23.8	38.1	47.6		66.7	23.8	85.7	42.9	95.2	19.0	4.8	19.0	4.8
Total Greenfields	**12**	8.3	33.3	50.0	8.3	0.0	33.3	0.0	75.0	41.7	-33.3	41.7	25.0	16.7	66.7	58.3	50.0	33.3	41.7	25.0	8.3	91.7	0.0	58.3	0.0	58.3	100	75.0	91.7	83.3	91.7		75.0	33.3	83.3	25.0	91.7	25.0	25.0	25.0	0.0
By sub-sector	**42**																																							
Total Distribution	**13**	15.4	23.1	46.2	61.5	23.1	23.1	0.0	76.9	46.2	-15.4	53.8	15.4	38.5	69.2	38.5	76.9	23.1	61.5	53.8	15.4	92.3	7.7	69.2	23.1	69.2	61.5	69.2	38.5	23.1	53.8		84.6	23.1	92.3	53.8	100	46.2	7.7	46.2	7.7
Total Generation	**19**	5.3	21.1	36.8	15.8	0.0	26.3	5.3	63.2	42.1	-21.1	57.9	10.5	21.1	73.7	47.4	52.6	15.8	57.9	36.8	10.5	89.5	0.0	57.9	5.3	63.2	94.7	84.2	73.7	73.7	89.5		84.2	31.6	89.5	31.6	100	10.5	10.5	10.5	0.0
Total Utilities	**10**	30.0	50.0	50.0	30.0	20.0	60.0	10.0	90.0	20.0	-20	30.0	30.0	50.0	70.0	30.0	30.0	20.0	50.0	10.0	50.0	90.0	10.0	30.0	20.0	40.0	40.0	10.0	10.0	30.0	10.0		30.0	30.0	80.0	60.0	80.0	30.0	10.0	30.0	10.0

Table A3.8: Percentage of causes of stress within the population of projects under stress by Region

	Causes																													Consequences								
	Number of projects under stress	Local bias	Governance	**political commitment**	Social	Labor Unions	Special Interest groups	Local partner	*Socio-poical*	Inability to withstand shocks	Low demand	**Exchange Rate**	Fuel prices	Local financing	*Macro*	Compliance with contrat clauses	**G interference**	Relatiobship G/inv	**Non compliace with prices**	Non-grandfathered changes	Weak Regulaor	*Regulation and prices*	Technical options	**Funding and tariff currencies**	Aggressive bidding	*Project structure*	Technical performance	Investment commitment	Commercial performance	Quality of service	*Investor's perfo*		Risk of default on debt	Non payments to gov.	Inadequate return on equity	Inadequate self=financing	*Financial impact*	License cancellation	License non-renewal	*Administrative impact*	Additional obligations on the project
By Region	**42**																																						
Total Africa	**5**	20.0	40.0	40.0	20.0	20.0	80.0	0.0	100	20.0	20.0	0.0	40.0	60.0	100	60.0	20.0	40.0	20.0	0.0	40.0	100.	20.0	20.0	20.0	40.0	0.0	-60	-20	-20	-60		40.0	40.0	60.0	40.0	80.0	40.0	0.0	40.0	0.0
Total EAP	**3**	0.0	33.3	0.0	0.0	0.0	0.0	0.0	33.3	100.0	-100	100	0.0	0.0	100	100	0.0	0.0	0.0	0.0	0.0	100.	0.0	33.3	0.0	33.3	100	100	100	100	100		100	0.0	100	0.0	100	0.0	0.0	0.0	0.0
Total MENA	**0**																																						
Total ECA	**6**	0.0	33.3	16.7	33.3	0.0	33.3	0.0	50.0	16.7	-16.7	0.0	0.0	0.0	16.7	0.0	83.3	16.7	50.0	0.0	50.0	83.3	0.0	0.0	0.0	0.0	66.7	50.0	50.0	66.7	66.7		16.7	16.7	83.3	50.0	83.3	16.7	0.0	16.7	0.0
Total LAC	**23**	21.7	17.4	56.5	47.8	13.0	34.8	8.7	82.6	47.8	-17.4	78.3	21.7	47.8	87.0	34.8	60.9	13.0	78.3	65.2	13.0	87	4.3	69.6	21.7	73.9	78.3	78.3	43.5	39.1	69.6		95.7	26.1	91.3	60.9	100	26.1	8.7	26.1	8.7
Total South Asia	**5**	0.0	60.0	40.0	0.0	20.0	0.0	0.0	60.0	0.0	-20	0.0	0.0	0.0	20.0	60.0	60.0	40.0	40.0	0.0	20.0	100	0.0	100	0.0	100	100	100	100	100	100		40.0	60.0	100	0.0	100	40.0	40.0	40.0	0.0

Table A3.9: Percentage of causes of stress within the population of projects under stress by Region and Sector

	Causes																															Consequences								
	Number of projects under stress	Local bias	Governance	**political commitment**	Social	Labor Unions	Special Interest groups	Local partner	*Socio-poical*	Inability to withstand shocks	Low demand	**Exchange Rate**	Fuel prices	Local financing	*Macro*	Compliance with contrat clauses	**G interference**	Relatiobship G/inv	**Non compliace with prices**	Non-grandfathered changes	Weak Regulaor	*Regulation and prices*	Technical options	**Funding and tariff currencies**	Aggressive bidding	*Project structure*	Technical performance	Investment commitment	Commercial performance	Quality of service	*Investor's perfo*		Risk of default on debt	Non payments to gov.	Inadequate return on equity	Inadequate self=financing	*Financial impact*	License cancellation	License non-renewal	*Administrative impact*	Additional obligations on the project
By region and sector	**42**																																						
Africa	**5**	20.0	40.0	40.0	20.0	20.0	80.0	0.0	100	20.0	20.0	0.0	40.0	60.0	100	60.0	20.0	40.0	20.0	0.0	40.0	100	20.0	20.0	20.0	40.0	0.0	-60	-20	-20	-60		40.0	40.0	60.0	40.0	80.0	40.0	0.0	40.0	0.0
Total Distribution	**0**																																						
Total Generation	**1**	0.0	0.0	0.0	0.0	0.0	100	0.0	100	0.0	100	0.0	0.0	0.0	100	0.0	100	100	0.0	0.0	0.0	100	0.0	0.0	0.0	0.0	100	-100	100	100	0.0		100	0.0	0.0	0.0	100	0.0	0.0	0.0	0.0
Total Utility	**4**	25.0	50.0	50.0	25.0	25.0	75.0	0.0	100	25.0	0.0	0.0	50.0	75.0	100	75.0	0.0	25.0	25.0	0.0	50.0	100	25.0	25.0	25.0	50.0	-25.	-50	-50	-50	-75		25.0	50.0	75.0	50.0	75.0	50.0	0.0	50.0	0.0
East Asia	**3**	0.0	33.3	0.0	0.0	0.0	0.0	0.0	33.3	100	-100	100	0.0	0.0	100	100	0.0	0.0	0.0	0.0	0.0	100	0.0	33.3	0.0	33.3	100	100	100	100	100		100	0.0	100	0.0	100	0.0	0.0	0.0	0.0
Total Distribution	**0**																																						
Total Generation	**3**	0.0	33.3	0.0	0.0	0.0	0.0	0.0	33.3	100	-100	100	0.0	0.0	100	100	0.0	0.0	0.0	0.0	0.0	100	0.0	33.3	0.0	33.3	100	100	100	100	100		100	0.0	100	0.0	100	0.0	0.0	0.0	0.0
Total utility	**0**																																						
MENA		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Distribution		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Generation		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Utility		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ECA	6	0.0	33.3	16.7	33.3	0.0	33.3	0.0	50.0	16.7	-16.7	0.0	0.0	0.0	16.7	0.0	83.3	16.7	50.0	0.0	50.0	83.3	0.0	0.0	0.0	0.0	66.7	50.0	50.0	66.7	66.7		16.7	16.7	83.3	50.0	83.3	16.7	0.0	16.7	0.0
Total distribution	2	0.0	50.0	0.0	50.0	0.0	50.0	0.0	50.0	50.0	-50	0.0	0.0	0.0	50.0	0.0	100	50.0	0.0	0.0	0.0	100	0.0	0.0	0.0	0.0	50.0	100	0.0	50.0	50.0		50.0	50.0	100	0.0	100	50.0	0.0	50.0	0.0
Total Generation	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100	0.0	100	0.0	100	100	0.0	0.0	0.0	0.0	100	100	100	100	100		0.0	0.0	100	100	100	0.0	0.0	0.0	0.0
Total Utility	3	0.0	33.3	33.3	33.3	0.0	33.3	0.0	66.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7	0.0	66.7	0.0	66.7	66.7	0.0	0.0	0.0	0.0	66.7	0.0	66.7	66.7	66.7		0.0	0.0	66.7	66.7	66.7	0.0	0.0	0.0	0.0
LAC	23	21.7	17.4	56.5	47.8	13.0	34.8	8.7	82.6	47.8	-17.4	78.3	21.7	47.8	87.0	34.8	60.9	13.0	78.3	65.2	13.0	87.0	4.3	69.6	21.7	73.9	78.3	78.3	43.5	39.1	69.6		95.7	26.1	91.3	60.9	100	26.1	8.7	26.1	8.7
Total Distribution	9	22.2	11.1	66.7	77.8	22.2	22.2	0.0	88.9	55.6	-11.1	77.8	22.2	55.6	88.9	55.6	77.8	22.2	88.9	77.8	11.1	88.9	11.1	77.8	33.3	77.8	55.6	55.6	33.3	0.0	44.4		100	22.2	88.9	77.8	100	55.6	11.1	55.6	11.1
Total Generation	11	9.1	9.1	45.5	27.3	0.0	36.4	9.1	72.7	45.5	-9.1	72.7	18.2	36.4	81.8	27.3	54.5	0.0	72.7	63.6	9.1	81.8	0.0	63.6	9.1	72.7	90.9	90.9	54.5	54.5	90.9		100	27.3	90.9	45.5	100	0.0	0.0	0.0	0.0
Total Utility	3	66.7	66.7	66.7	33.3	33.3	66.7	33.3	100	33.3	-66.7	100	33.3	66.7	100	0.0	33.3	33.3	66.7	33.3	33.3	100	0.0	66.7	33.3	66.7	100	100	33.3	100	66.7		66.7	33.3	100	66.7	100	33.3	33.3	33.3	33.3
South Asia	5	0.0	60.0	40.0	0.0	20.0	0.0	0.0	60.0	0.0	-20	0.0	0.0	0.0	20.0	60.0	60.0	40.0	40.0	0.0	20.0	100	0.0	100	0.0	100	100	100	100	100	100		40.0	60.0	100	0.0	100	40.0	40.0	40.0	0.0
Total Distribution	2	0.0	50.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	50.0	100	0.0	100	0.0	100	100	100	100	100	100		50.0	0.0	100	0.0	100	0.0	0.0	0.0	0.0
Total Generation	3	0.0	66.7	66.7	0.0	0.0	0.0	0.0	66.7	0.0	-33.3	0.0	0.0	0.0	33.3	100	66.7	66.7	66.7	0.0	0.0	100	0.0	100	0.0	100	100	100	100	100	100		33.3	100	100	0.0	100	66.7	66.7	66.7	0.0
Total Utility	0																																							

Joint UNDP/World Bank

ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAMME (ESMAP)

LIST OF REPORTS ON COMPLETED ACTIVITIES

Region/Country	*Activity/Report Title*	*Date*	*Number*
	SUB-SAHARAN AFRICA (AFR)		
Africa Regional	Anglophone Africa Household Energy Workshop (English)	07/88	085/88
	Regional Power Seminar on Reducing Electric Power System Losses in Africa (English)	08/88	087/88
	Institutional Evaluation of EGL (English)	02/89	098/89
	Biomass Mapping Regional Workshops (English)	05/89	--
	Francophone Household Energy Workshop (French)	08/89	--
	Interafrican Electrical Engineering College: Proposals for Short- and Long-Term Development (English)	03/90	112/90
	Biomass Assessment and Mapping (English)	03/90	--
	Symposium on Power Sector Reform and Efficiency Improvement in Sub-Saharan Africa (English)	06/96	182/96
	Commercialization of Marginal Gas Fields (English)	12/97	201/97
	Commercilizing Natural Gas: Lessons from the Seminar in Nairobi for Sub-Saharan Africa and Beyond	01/00	225/00
	Africa Gas Initiative – Main Report: Volume I	02/01	240/01
	First World Bank Workshop on the Petroleum Products Sector in Sub-Saharan Africa	09/01	245/01
	Ministerial Workshop on Women in Energy	10/01	250/01
	Energy and Poverty Reduction: Proceedings from a Multi-Sector And Multi-Stakeholder Workshop Addis Ababa, Ethiopia, October 23-25, 2002.	03/03	266/03
	Opportunities for Power Trade in the Nile Basin: Final Scoping Study	01/04	277/04
	Énergies modernes et réduction de la pauvreté: Un atelier multi-sectoriel. Actes de l'atelier régional. Dakar, Sénégal, du 4 au 6 février 2003 (French Only)	01/04	278/04
	Énergies modernes et réduction de la pauvreté: Un atelier multi-sectoriel. Actes de l'atelier régional. Douala, Cameroun du 16-18 juillet 2003. (French Only)	09/04	286/04
	Energy and Poverty Reduction: Proceedings from the Global Village Energy Partnership (GVEP) Workshops held in Africa	01/05	298/05
	Power Sector Reform in Africa: Assessing the Impact on Poor People	08/05	306/05
	The Vulnerability of African Countries to Oil Price Shocks: Major Factors and Policy Options. The Case of Oil Importing Countries	08/05	308/05
Angola	Energy Assessment (English and Portuguese)	05/89	4708-ANG
	Power Rehabilitation and Technical Assistance (English)	10/91	142/91
	Africa Gas Initiative – Angola: Volume II	02/01	240/01
Benin	Energy Assessment (English and French)	06/85	5222-BEN
Botswana	Energy Assessment (English)	09/84	4998-BT
	Pump Electrification Prefeasibility Study (English)	01/86	047/86
	Review of Electricity Service Connection Policy (English)	07/87	071/87
	Tuli Block Farms Electrification Study (English)	07/87	072/87
	Household Energy Issues Study (English)	02/88	--
	Urban Household Energy Strategy Study (English)	05/91	132/91
Burkina Faso	Energy Assessment (English and French)	01/86	5730-BUR
	Technical Assistance Program (English)	03/86	052/86
	Urban Household Energy Strategy Study (English and French)	06/91	134/91
Burundi	Energy Assessment (English)	06/82	3778-BU

Region/Country	*Activity/Report Title*	*Date*	*Number*
Burundi	Petroleum Supply Management (English)	01/84	012/84
	Status Report (English and French)	02/84	011/84
	Presentation of Energy Projects for the Fourth Five-Year Plan (1983-1987) (English and French)	05/85	036/85
	Improved Charcoal Cookstove Strategy (English and French)	09/85	042/85
	Peat Utilization Project (English)	11/85	046/85
	Energy Assessment (English and French)	01/92	9215-BU
Cameroon	Africa Gas Initiative – Cameroon: Volume III	02/01	240/01
Cape Verde	Energy Assessment (English and Portuguese)	08/84	5073-CV
	Household Energy Strategy Study (English)	02/90	110/90
Central African Republic	Energy Assessment (French)	08/92	9898-CAR
Chad	Elements of Strategy for Urban Household Energy The Case of N'djamena (French)	12/93	160/94
Comoros	Energy Assessment (English and French)	01/88	7104-COM
	In Search of Better Ways to Develop Solar Markets: The Case of Comoros	05/00	230/00
Congo	Energy Assessment (English)	01/88	6420-COB
	Power Development Plan (English and French)	03/90	106/90
	Africa Gas Initiative – Congo: Volume IV	02/01	240/01
Côte d'Ivoire	Energy Assessment (English and French)	04/85	5250-IVC
	Improved Biomass Utilization (English and French)	04/87	069/87
	Power System Efficiency Study (English)	12/87	--
	Power Sector Efficiency Study (French)	02/92	140/91
	Project of Energy Efficiency in Buildings (English)	09/95	175/95
	Africa Gas Initiative – Côte d'Ivoire: Volume V	02/01	240/01
Ethiopia	Energy Assessment (English)	07/84	4741-ET
	Power System Efficiency Study (English)	10/85	045/85
	Agricultural Residue Briquetting Pilot Project (English)	12/86	062/86
	Bagasse Study (English)	12/86	063/86
	Cooking Efficiency Project (English)	12/87	--
	Energy Assessment (English)	02/96	179/96
Gabon	Energy Assessment (English)	07/88	6915-GA
	Africa Gas Initiative – Gabon: Volume VI	02/01	240/01
The Gambia	Energy Assessment (English)	11/83	4743-GM
	Solar Water Heating Retrofit Project (English)	02/85	030/85
	Solar Photovoltaic Applications (English)	03/85	032/85
	Petroleum Supply Management Assistance (English)	04/85	035/85
Ghana	Energy Assessment (English)	11/86	6234-GH
	Energy Rationalization in the Industrial Sector (English)	06/88	084/88
	Sawmill Residues Utilization Study (English)	11/88	074/87
	Industrial Energy Efficiency (English)	11/92	148/92
	Corporatization of Distribution Concessions through Capitalization	12/03	272/03
Guinea	Energy Assessment (English)	11/86	6137-GUI
	Household Energy Strategy (English and French)	01/94	163/94
Guinea-Bissau	Energy Assessment (English and Portuguese)	08/84	5083-GUB
	Recommended Technical Assistance Projects (English & Portuguese)	04/85	033/85
	Management Options for the Electric Power and Water Supply Subsectors (English)	02/90	100/90
	Power and Water Institutional Restructuring (French)	04/91	118/91
Kenya	Energy Assessment (English)	05/82	3800-KE
	Power System Efficiency Study (English)	03/84	014/84
	Status Report (English)	05/84	016/84

Region/Country	*Activity/Report Title*	*Date*	*Number*
Kenya	Coal Conversion Action Plan (English)	02/87	--
	Solar Water Heating Study (English)	02/87	066/87
	Peri-Urban Woodfuel Development (English)	10/87	076/87
	Power Master Plan (English)	11/87	--
	Power Loss Reduction Study (English)	09/96	186/96
	Implementation Manual: Financing Mechanisms for Solar Electric Equipment	07/00	231/00
Lesotho	Energy Assessment (English)	01/84	4676-LSO
Liberia	Energy Assessment (English)	12/84	5279-LBR
	Recommended Technical Assistance Projects (English)	06/85	038/85
	Power System Efficiency Study (English)	12/87	081/87
Madagascar	Energy Assessment (English)	01/87	5700-MAG
	Power System Efficiency Study (English and French)	12/87	075/87
	Environmental Impact of Woodfuels (French)	10/95	176/95
Malawi	Energy Assessment (English)	08/82	3903-MAL
	Technical Assistance to Improve the Efficiency of Fuelwood Use in the Tobacco Industry (English)	11/83	009/83
	Status Report (English)	01/84	013/84
Mali	Energy Assessment (English and French)	11/91	8423-MLI
	Household Energy Strategy (English and French)	03/92	147/92
Islamic Republic of Mauritania	Energy Assessment (English and French)	04/85	5224-MAU
	Household Energy Strategy Study (English and French)	07/90	123/90
Mauritius	Energy Assessment (English)	12/81	3510-MAS
	Status Report (English)	10/83	008/83
	Power System Efficiency Audit (English)	05/87	070/87
	Bagasse Power Potential (English)	10/87	077/87
	Energy Sector Review (English)	12/94	3643-MAS
Mozambique	Energy Assessment (English)	01/87	6128-MOZ
	Household Electricity Utilization Study (English)	03/90	113/90
	Electricity Tariffs Study (English)	06/96	181/96
	Sample Survey of Low Voltage Electricity Customers	06/97	195/97
Namibia	Energy Assessment (English)	03/93	11320-NAM
Niger	Energy Assessment (French)	05/84	4642-NIR
	Status Report (English and French)	02/86	051/86
	Improved Stoves Project (English and French)	12/87	080/87
	Household Energy Conservation and Substitution (English and French)	01/88	082/88
Nigeria	Energy Assessment (English)	08/83	4440-UNI
	Energy Assessment (English)	07/93	11672-UNI
	Strategic Gas Plan	02/04	279/04
Rwanda	Energy Assessment (English)	06/82	3779-RW
	Status Report (English and French)	05/84	017/84
	Improved Charcoal Cookstove Strategy (English and French)	08/86	059/86
	Improved Charcoal Production Techniques (English and French)	02/87	065/87
	Energy Assessment (English and French)	07/91	8017-RW
	Commercialization of Improved Charcoal Stoves and Carbonization Techniques Mid-Term Progress Report (English and French)	12/91	141/91
SADC	SADC Regional Power Interconnection Study, Vols. I-IV (English)	12/93	-
SADCC	SADCC Regional Sector: Regional Capacity-Building Program for Energy Surveys and Policy Analysis (English)	11/91	-
Sao Tome and Principe	Energy Assessment (English)	10/85	5803-STP
Senegal	Energy Assessment (English)	07/83	4182-SE

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Senegal	Status Report (English and French)	10/84	025/84
	Industrial Energy Conservation Study (English)	05/85	037/85
	Preparatory Assistance for Donor Meeting (English and French)	04/86	056/86
	Urban Household Energy Strategy (English)	02/89	096/89
	Industrial Energy Conservation Program (English)	05/94	165/94
Seychelles	Energy Assessment (English)	01/84	4693-SEY
	Electric Power System Efficiency Study (English)	08/84	021/84
Sierra Leone	Energy Assessment (English)	10/87	6597-SL
Somalia	Energy Assessment (English)	12/85	5796-SO
Republic of South Africa	Options for the Structure and Regulation of Natural Gas Industry (English)	05/95	172/95
Sudan	Management Assistance to the Ministry of Energy and Mining	05/83	003/83
	Energy Assessment (English)	07/83	4511-SU
	Power System Efficiency Study (English)	06/84	018/84
	Status Report (English)	11/84	026/84
	Wood Energy/Forestry Feasibility (English)	07/87	073/87
Swaziland	Energy Assessment (English)	02/87	6262-SW
	Household Energy Strategy Study	10/97	198/97
Tanzania	Energy Assessment (English)	11/84	4969-TA
	Peri-Urban Woodfuels Feasibility Study (English)	08/88	086/88
	Tobacco Curing Efficiency Study (English)	05/89	102/89
	Remote Sensing and Mapping of Woodlands (English)	06/90	--
	Industrial Energy Efficiency Technical Assistance (English)	08/90	122/90
	Power Loss Reduction Volume 1: Transmission and Distribution System Technical Loss Reduction and Network Development (English)	06/98	204A/98
	Power Loss Reduction Volume 2: Reduction of Non-Technical Losses (English)	06/98	204B/98
Togo	Energy Assessment (English)	06/85	5221-TO
	Wood Recovery in the Nangbeto Lake (English and French)	04/86	055/86
	Power Efficiency Improvement (English and French)	12/87	078/87
Uganda	Energy Assessment (English)	07/83	4453-UG
	Status Report (English)	08/84	020/84
	Institutional Review of the Energy Sector (English)	01/85	029/85
	Energy Efficiency in Tobacco Curing Industry (English)	02/86	049/86
	Fuelwood/Forestry Feasibility Study (English)	03/86	053/86
	Power System Efficiency Study (English)	12/88	092/88
	Energy Efficiency Improvement in the Brick and Tile Industry (English)	02/89	097/89
	Tobacco Curing Pilot Project (English)	03/89	UNDP Terminal Report
	Energy Assessment (English)	12/96	193/96
	Rural Electrification Strategy Study	09/99	221/99
Zaire	Energy Assessment (English)	05/86	5837-ZR
Zambia	Energy Assessment (English)	01/83	4110-ZA
	Status Report (English)	08/85	039/85
	Energy Sector Institutional Review (English)	11/86	060/86
	Power Subsector Efficiency Study (English)	02/89	093/88
	Energy Strategy Study (English)	02/89	094/88
	Urban Household Energy Strategy Study (English)	08/90	121/90
Zimbabwe	Energy Assessment (English)	06/82	3765-ZIM
	Power System Efficiency Study (English)	06/83	005/83
	Status Report (English)	08/84	019/84

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	Power Sector Management Assistance Project (English)	04/85	034/85
	Power Sector Management Institution Building (English)	09/89	--
Zimbabwe	Petroleum Management Assistance (English)	12/89	109/89
	Charcoal Utilization Pre-feasibility Study (English)	06/90	119/90
	Integrated Energy Strategy Evaluation (English)	01/92	8768-ZIM
	Energy Efficiency Technical Assistance Project: Strategic Framework for a National Energy Efficiency Improvement Program (English)	04/94	--
	Capacity Building for the National Energy Efficiency Improvement Programme (NEEIP) (English)	12/94	--
	Rural Electrification Study	03/00	228/00
	EAST ASIA AND PACIFIC (EAP)		
Asia Regional	Pacific Household and Rural Energy Seminar (English)	11/90	--
China	County-Level Rural Energy Assessments (English)	05/89	101/89
	Fuelwood Forestry Preinvestment Study (English)	12/89	105/89
	Strategic Options for Power Sector Reform in China (English)	07/93	156/93
	Energy Efficiency and Pollution Control in Township and Village Enterprises (TVE) Industry (English)	11/94	168/94
	Energy for Rural Development in China: An Assessment Based on a Joint Chinese/ESMAP Study in Six Counties (English)	06/96	183/96
	Improving the Technical Efficiency of Decentralized Power Companies	09/99	222/99
	Air Pollution and Acid Rain Control: The Case of Shijiazhuang City and the Changsha Triangle Area	10/03	267/03
	Toward a Sustainable Coal Sector In China	07/04	287/04
Fiji	Energy Assessment (English)	06/83	4462-FIJ
Indonesia	Energy Assessment (English)	11/81	3543-IND
	Status Report (English)	09/84	022/84
	Power Generation Efficiency Study (English)	02/86	050/86
	Energy Efficiency in the Brick, Tile and Lime Industries (English)	04/87	067/87
	Diesel Generating Plant Efficiency Study (English)	12/88	095/88
	Urban Household Energy Strategy Study (English)	02/90	107/90
	Biomass Gasifier Preinvestment Study Vols. I & II (English)	12/90	124/90
	Prospects for Biomass Power Generation with Emphasis on Palm Oil, Sugar, Rubberwood and Plywood Residues (English)	11/94	167/94
Lao PDR	Urban Electricity Demand Assessment Study (English)	03/93	154/93
	Institutional Development for Off-Grid Electrification	06/99	215/99
Malaysia	Sabah Power System Efficiency Study (English)	03/87	068/87
	Gas Utilization Study (English)	09/91	9645-MA
Mongolia	Energy Efficiency in the Electricity and District Heating Sectors	10/01	247/01
	Improved Space Heating Stoves for Ulaanbaatar	03/02	254/02
	Impact of Improved Stoves on Indoor Air Quality in Ulaanbaatar, Mongolia	08/05	309/05
Myanmar	Energy Assessment (English)	06/85	5416-BA
Papua New Guinea	Energy Assessment (English)	06/82	3882-PNG
	Status Report (English)	07/83	006/83
	Institutional Review in the Energy Sector (English)	10/84	023/84
	Power Tariff Study (English)	10/84	024/84

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Philippines	Commercial Potential for Power Production from Agricultural Residues (English)	12/93	157/93
	Energy Conservation Study (English)	08/94	--
	Strengthening the Non-Conventional and Rural Energy Development Program in the Philippines: A Policy Framework and Action Plan	08/01	243/01
	Rural Electrification and Development in the Philippines: Measuring the Social and Economic Benefits	05/02	255/02
Solomon Islands	Energy Assessment (English)	06/83	4404-SOL
	Energy Assessment (English)	01/92	979-SOL
South Pacific	Petroleum Transport in the South Pacific (English)	05/86	--
Thailand	Energy Assessment (English)	09/85	5793-TH
	Rural Energy Issues and Options (English)	09/85	044/85
	Accelerated Dissemination of Improved Stoves and Charcoal Kilns (English)	09/87	079/87
	Northeast Region Village Forestry and Woodfuels Preinvestment Study (English)	02/88	083/88
	Impact of Lower Oil Prices (English)	08/88	--
	Coal Development and Utilization Study (English)	10/89	--
	Why Liberalization May Stall in a Mature Power Market: A Review of the Technical and Political Economy Factors that Constrained the Electricity Sector Reform in Thailand 1998-2002	12/03	270/03
	Reducing Emissions from Motorcycles in Bangkok	10/03	275/03
Tonga	Energy Assessment (English)	06/85	5498-TON
Vanuatu	Energy Assessment (English)	06/85	5577-VA
Vietnam	Rural and Household Energy-Issues and Options (English)	01/94	161/94
	Power Sector Reform and Restructuring in Vietnam: Final Report to the Steering Committee (English and Vietnamese)	09/95	174/95
	Household Energy Technical Assistance: Improved Coal Briquetting and Commercialized Dissemination of Higher Efficiency Biomass and Coal Stoves (English)	01/96	178/96
	Petroleum Fiscal Issues and Policies for Fluctuating Oil Prices In Vietnam	02/01	236/01
	An Overnight Success: Vietnam's Switch to Unleaded Gasoline	08/02	257/02
	The Electricity Law for Vietnam—Status and Policy Issues—The Socialist Republic of Vietnam	08/02	259/02
	Petroleum Sector Technical Assistance for the Revision of the Existing Legal and Regulatory Framework	12/03	269/03
Western Samoa	Energy Assessment (English)	06/85	5497-WSO

SOUTH ASIA (SAS)

Bangladesh	Energy Assessment (English)	10/82	3873-BD
	Priority Investment Program (English)	05/83	002/83
	Status Report (English)	04/84	015/84
	Power System Efficiency Study (English)	02/85	031/85
	Small Scale Uses of Gas Pre-feasibility Study (English)	12/88	--
	Reducing Emissions from Baby-Taxis in Dhaka	01/02	253/02
India	Opportunities for Commercialization of Non-conventional Energy Systems (English)	11/88	091/88
	Maharashtra Bagasse Energy Efficiency Project (English)	07/90	120/90
	Mini-Hydro Development on Irrigation Dams and Canal Drops Vols. I, II and III (English)	07/91	139/91

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India	WindFarm Pre-Investment Study (English)	12/92	150/92
	Power Sector Reform Seminar (English)	04/94	166/94
	Environmental Issues in the Power Sector (English)	06/98	205/98
	Environmental Issues in the Power Sector: Manual for Environmental Decision Making (English)	06/99	213/99
	Household Energy Strategies for Urban India: The Case of Hyderabad	06/99	214/99
	Greenhouse Gas Mitigation In the Power Sector: Case Studies From India	02/01	237/01
	Energy Strategies for Rural India: Evidence from Six States	08/02	258/02
	Household Energy, Indoor Air Pollution, and Health	11/02	261/02
	Access of the Poor to Clean Household Fuels	07/03	263/03
	The Impact of Energy on Women's Lives in Rural India	01/04	276/04
	Environmental Issues in the Power Sector: Long-Term Impacts And Policy Options for Rajasthan	10/04	292/04
	Environmental Issues in the Power Sector: Long-Term Impacts And Policy Options for Karnataka	10/04	293/04
Nepal	Energy Assessment (English)	08/83	4474-NEP
	Status Report (English)	01/85	028/84
	Energy Efficiency & Fuel Substitution in Industries (English)	06/93	158/93
Pakistan	Household Energy Assessment (English)	05/88	--
	Assessment of Photovoltaic Programs, Applications, and Markets (English)	10/89	103/89
Pakistan	National Household Energy Survey and Strategy Formulation Study: Project Terminal Report (English)	03/94	--
	Managing the Energy Transition (English)	10/94	--
	Lighting Efficiency Improvement Program Phase 1: Commercial Buildings Five Year Plan (English)	10/94	--
	Clean Fuels	10/01	246/01
Regional	Toward Cleaner Urban Air in South Asia: Tackling Transport Pollution, Understanding Sources.	03/04	281/04
Sri Lanka	Energy Assessment (English)	05/82	3792-CE
	Power System Loss Reduction Study (English)	07/83	007/83
	Status Report (English)	01/84	010/84
	Industrial Energy Conservation Study (English)	03/86	054/86
	Sustainable Transport Options for Sri Lanka: Vol. I	02/03	262/03
	Greenhouse Gas Mitigation Options in the Sri Lanka Power Sector: Vol. II	02/03	262/03
	Sri Lanka Electric Power Technology Assessment (SLEPTA): Vol. III	02/03	262/03
	Energy and Poverty Reduction: Proceedings from South Asia Practitioners Workshop How Can Modern Energy Services Contribute to Poverty Reduction? Colombo, Sri Lanka, June 2-4, 2003	11/03	268/03
	EUROPE AND CENTRAL ASIA (ECA)		
Armenia	Development of Heat Strategies for Urban Areas of Low-income Transition Economies. Urban Heating Strategy for the Republic Of Armenia. *Including a Summary of a Heating Strategy for the Kyrgyz Republic*	04/04	282/04
Bulgaria	Natural Gas Policies and Issues (English)	10/96	188/96
	Energy Environment Review	10/02	260/02
Central Asia and The Caucasus	Cleaner Transport Fuels in Central Asia and the Caucasus	08/01	242/01

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Central and Eastern Europe	Power Sector Reform in Selected Countries	07/97	196/97
Central and Eastern Europe	Increasing the Efficiency of Heating Systems in Central and Eastern Europe and the Former Soviet Union (English and Russian)	08/00	234/00
	The Future of Natural Gas in Eastern Europe (English)	08/92	149/92
Kazakhstan	Natural Gas Investment Study, Volumes 1, 2 & 3	12/97	199/97
Kazakhstan & Kyrgyzstan	Opportunities for Renewable Energy Development	11/97	16855-KAZ
Poland	Energy Sector Restructuring Program Vols. I-V (English)	01/93	153/93
	Natural Gas Upstream Policy (English and Polish)	08/98	206/98
	Energy Sector Restructuring Program: Establishing the Energy Regulation Authority	10/98	208/98
Portugal	Energy Assessment (English)	04/84	4824-PO
Romania	Natural Gas Development Strategy (English)	12/96	192/96
	Private Sector Participation in Market-Based Energy-Efficiency Financing Schemes: Lessons Learned from Romania and International Experiences.	11/03	274/03
Slovenia	Workshop on Private Participation in the Power Sector (English)	02/99	211/99
Turkey	Energy Assessment (English)	03/83	3877-TU
	Energy and the Environment: Issues and Options Paper	04/00	229/00
	Energy and Environment Review: Synthesis Report	12/03	273/03

MIDDLE EAST AND NORTH AFRICA (MNA)

Arab Republic of Egypt	Energy Assessment (English)	10/96	189/96
	Energy Assessment (English and French)	03/84	4157-MOR
	Status Report (English and French)	01/86	048/86
Morocco	Energy Sector Institutional Development Study (English and French)	07/95	173/95
	Natural Gas Pricing Study (French)	10/98	209/98
	Gas Development Plan Phase II (French)	02/99	210/99
Syria	Energy Assessment (English)	05/86	5822-SYR
	Electric Power Efficiency Study (English)	09/88	089/88
	Energy Efficiency Improvement in the Cement Sector (English)	04/89	099/89
	Energy Efficiency Improvement in the Fertilizer Sector (English)	06/90	115/90
Tunisia	Fuel Substitution (English and French)	03/90	--
	Power Efficiency Study (English and French)	02/92	136/91
	Energy Management Strategy in the Residential and Tertiary Sectors (English)	04/92	146/92
	Renewable Energy Strategy Study, Volume I (French)	11/96	190A/96
	Renewable Energy Strategy Study, Volume II (French)	11/96	190B/96
	Rural Electrification in Tunisia: National Commitment, Efficient Implementation and Sound Finances	08/05	307/05
Yemen	Energy Assessment (English)	12/84	4892-YAR
	Energy Investment Priorities (English)	02/87	6376-YAR
	Household Energy Strategy Study Phase I (English)	03/91	126/91

LATIN AMERICA AND THE CARIBBEAN REGION (LCR)

LCR Regional	Regional Seminar on Electric Power System Loss Reduction in the Caribbean (English)	07/89	--
	Elimination of Lead in Gasoline in Latin America and the Caribbean (English and Spanish)	04/97	194/97
LCR Regional	Elimination of Lead in Gasoline in Latin America and the Caribbean - Status Report (English and Spanish)	12/97	200/97
	Harmonization of Fuels Specifications in Latin America and the Caribbean (English and Spanish)	06/98	203/98
	Energy and Poverty Reduction: Proceedings from the Global Village Energy Partnership (GVEP) Workshop held in Bolivia	06/05	202/05
	Power Sector Reform and the Rural Poor in Central America	12/04	297/04
	Estudio Comparativo Sobre la Distribución de la Renta Petrolera en Bolivia, Colombia, Ecuador y Perú	08/05	304/05
Bolivia	Energy Assessment (English)	04/83	4213-BO
	National Energy Plan (English)	12/87	--
	La Paz Private Power Technical Assistance (English)	11/90	111/90
	Pre-feasibility Evaluation Rural Electrification and Demand Assessment (English and Spanish)	04/91	129/91
	National Energy Plan (Spanish)	08/91	131/91
	Private Power Generation and Transmission (English)	01/92	137/91
	Natural Gas Distribution: Economics and Regulation (English)	03/92	125/92
	Natural Gas Sector Policies and Issues (English and Spanish)	12/93	164/93
	Household Rural Energy Strategy (English and Spanish)	01/94	162/94
	Preparation of Capitalization of the Hydrocarbon Sector	12/96	191/96
	Introducing Competition into the Electricity Supply Industry in Developing Countries: Lessons from Bolivia	08/00	233/00
	Final Report on Operational Activities Rural Energy and Energy Efficiency	08/00	235/00
	Oil Industry Training for Indigenous People: The Bolivian Experience (English and Spanish)	09/01	244/01
	Capacitación de Pueblos Indígenas en la Actividad Petrolera. Fase II	07/04	290/04
	Estudio Sobre Aplicaciones en Pequeña Escala de Gas Natural	07/04	291/04
Brazil	Energy Efficiency & Conservation: Strategic Partnership for Energy Efficiency in Brazil (English)	01/95	170/95
	Hydro and Thermal Power Sector Study	09/97	197/97
	Rural Electrification with Renewable Energy Systems in the Northeast: A Preinvestment Study	07/00	232/00
	Reducing Energy Costs in Municipal Water Supply Operations "Learning-while-doing" Energy M&T on the Brazilian Frontlines	07/03	265/03
Chile	Energy Sector Review (English)	08/88	7129-CH
Colombia	Energy Strategy Paper (English)	12/86	--
	Power Sector Restructuring (English)	11/94	169/94
Colombia	Energy Efficiency Report for the Commercial and Public Sector (English)	06/96	184/96
Costa Rica	Energy Assessment (English and Spanish)	01/84	4655-CR
	Recommended Technical Assistance Projects (English)	11/84	027/84
	Forest Residues Utilization Study (English and Spanish)	02/90	108/90
Dominican Republic	Energy Assessment (English)	05/91	8234-DO

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Ecuador	Energy Assessment (Spanish)	12/85	5865-EC
	Energy Strategy Phase I (Spanish)	07/88	--
	Energy Strategy (English)	04/91	--
	Private Mini-hydropower Development Study (English)	11/92	--
	Energy Pricing Subsidies and Interfuel Substitution (English)	08/94	11798-EC
	Energy Pricing, Poverty and Social Mitigation (English)	08/94	12831-EC
Guatemala	Issues and Options in the Energy Sector (English)	09/93	12160-GU
	Health Impacts of Traditional Fuel Use	08/04	284/04
Haiti	Energy Assessment (English and French)	06/82	3672-HA
	Status Report (English and French)	08/85	041/85
	Household Energy Strategy (English and French)	12/91	143/91
Honduras	Energy Assessment (English)	08/87	6476-HO
	Petroleum Supply Management (English)	03/91	128/91
Jamaica	Energy Assessment (English)	04/85	5466-JM
	Petroleum Procurement, Refining, and Distribution Study (English)	11/86	061/86
	Energy Efficiency Building Code Phase I (English)	03/88	--
	Energy Efficiency Standards and Labels Phase I (English)	03/88	--
Jamaica	Management Information System Phase I (English)	03/88	--
	Charcoal Production Project (English)	09/88	090/88
	FIDCO Sawmill Residues Utilization Study (English)	09/88	088/88
	Energy Sector Strategy and Investment Planning Study (English)	07/92	135/92
Mexico	Improved Charcoal Production Within Forest Management for the State of Veracruz (English and Spanish)	08/91	138/91
	Energy Efficiency Management Technical Assistance to the Comisión Nacional para el Ahorro de Energía (CONAE) (English)	04/96	180/96
	Energy Environment Review	05/01	241/01
Nicaragua	Modernizing the Fuelwood Sector in Managua and León	12/01	252/01
Panama	Power System Efficiency Study (English)	06/83	004/83
Paraguay	Energy Assessment (English)	10/84	5145-PA
	Recommended Technical Assistance Projects (English)	09/85	--
	Status Report (English and Spanish)	09/85	043/85
Peru	Energy Assessment (English)	01/84	4677-PE
	Status Report (English)	08/85	040/85
	Proposal for a Stove Dissemination Program in the Sierra (English and Spanish)	02/87	064/87
	Energy Strategy (English and Spanish)	12/90	--
	Study of Energy Taxation and Liberalization of the Hydrocarbons Sector (English and Spanish)	120/93	159/93
	Reform and Privatization in the Hydrocarbon Sector (English and Spanish)	07/99	216/99
	Rural Electrification	02/01	238/01
Saint Lucia	Energy Assessment (English)	09/84	5111-SLU
St. Vincent and the Grenadines	Energy Assessment (English)	09/84	5103-STV
Sub Andean	Environmental and Social Regulation of Oil and Gas Operations in Sensitive Areas of the Sub-Andean Basin (English and Spanish)	07/99	217/99
Trinidad and Tobago	Energy Assessment (English)	12/85	5930-TR

GLOBAL

Energy End Use Efficiency: Research and Strategy (English)	11/89	--
Women and Energy--A Resource Guide The International Network: Policies and Experience (English)	04/90	--
Guidelines for Utility Customer Management and Metering (English and Spanish)	07/91	--
Assessment of Personal Computer Models for Energy Planning in Developing Countries (English)	10/91	--
Long-Term Gas Contracts Principles and Applications (English)	02/93	152/93
Comparative Behavior of Firms Under Public and Private Ownership (English)	05/93	155/93
Development of Regional Electric Power Networks (English)	10/94	--
Roundtable on Energy Efficiency (English)	02/95	171/95
Assessing Pollution Abatement Policies with a Case Study of Ankara (English)	11/95	177/95
A Synopsis of the Third Annual Roundtable on Independent Power Projects: Rhetoric and Reality (English)	08/96	187/96
Rural Energy and Development Roundtable (English)	05/98	202/98
A Synopsis of the Second Roundtable on Energy Efficiency: Institutional and Financial Delivery Mechanisms (English)	09/98	207/98
The Effect of a Shadow Price on Carbon Emission in the Energy Portfolio of the World Bank: A Carbon Backcasting Exercise (English)	02/99	212/99
Increasing the Efficiency of Gas Distribution Phase 1: Case Studies and Thematic Data Sheets	07/99	218/99
Global Energy Sector Reform in Developing Countries: A Scorecard	07/99	219/99
Global Lighting Services for the Poor Phase II: Text Marketing of Small “Solar” Batteries for Rural Electrification Purposes	08/99	220/99
A Review of the Renewable Energy Activities of the UNDP/ World Bank Energy Sector Management Assistance Programme 1993 to 1998	11/99	223/99
Energy, Transportation and Environment: Policy Options for Environmental Improvement	12/99	224/99
Privatization, Competition and Regulation in the British Electricity Industry, With Implications for Developing Countries	02/00	226/00
Reducing the Cost of Grid Extension for Rural Electrification	02/00	227/00
Undeveloped Oil and Gas Fields in the Industrializing World	02/01	239/01
Best Practice Manual: Promoting Decentralized Electrification Investment	10/01	248/01
Peri-Urban Electricity Consumers—A Forgotten but Important Group: What Can We Do to Electrify Them?	10/01	249/01
Village Power 2000: Empowering People and Transforming Markets	10/01	251/01
Private Financing for Community Infrastructure	05/02	256/02
Stakeholder Involvement in Options Assessment: Promoting Dialogue in Meeting Water and Energy Needs: A Sourcebook	07/03	264/03
A Review of ESMAP’s Energy Efficiency Portfolio	11/03	271/03
A Review of ESMAP’s Rural Energy and Renewable Energy Portfolio	04/04	280/04

ESMAP Renewable Energy and Energy Efficiency Reports 1998-2004 (CD Only)	05/04	283/04
Regulation of Associated Gas Flaring and Venting: *A Global Overview and Lessons Learned from International Experience*	08/04	285/04
ESMAP Gender in Energy Reports and Other related Information (CD Only)	11/04	288/04
ESMAP Indoor Air Pollution Reports and Other related Information (CD Only)	11/04	289/04
Energy and Poverty Reduction: Proceedings from the Global Village Energy Partnership (GVEP) Workshop on the Pre-Investment Funding. Berlin, Germany, April 23-24, 2003.	11/04	294/04
Global Village Energy Partnership (GVEP) Annual Report 2003	12/04	295/04
Energy and Poverty Reduction: Proceedings from the Global Village Energy Partnership (GVEP) Workshop on Consumer Lending and Microfinance to Expand Access to Energy Services, Manila, Philippines, May 19-21, 2004	12/04	296/04
The Impact of Higher Oil Prices on Low Income Countries And on the Poor	03/05	299/05
Advancing Bioenergy for Sustainable Development: Guideline For Policymakers and Investors	04/05	300/05
ESMAP Rural Energy Reports 1999-2005	03/05	301/05
Renewable Energy and Energy Efficiency Financing and Policy Network: Options Study and Proceedings of the International Forum	07/05	303/05
Implementing Power Rationing in a Sensible Way: Lessons Learned and International Best Practices	08/05	305/05
Pioneering New Approaches in Support of Sustainable Development In the Extractive Sector: Community Development Toolkit, also Includes a CD containing Supporting Reports	10/05	310/05
Analysis of Power Projects with Private Participation Under Stress	10/05	311/05

Last report added to this list: ESMAP Formal Report 311/05