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Study on Investment and Private Sector Participation in Power Distribution in Latin America and the Caribbean Region

December 2005

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Energy Sector Management Assistance Program
(ESMAP)

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Preface

In the 1990s, there has been a significant involvement of private investors in the electricity sector in the Latin America and the Caribbean, which was interrupted abruptly near the end of the decade. It appears that investment in the region has still not recovered, while future energy needs for funding in the sector cannot be met without significant re-animation of private sector interest in the region and the sector – most countries operate under tight fiscal constraints that preclude extended public investment. There are a number of lessons learnt through experiences in the various countries in the last 15 years that argue for further studies in more detail on what happened and why it went wrong in some places, or worked well in others.

The desk study presents the results of a survey and analysis of the data available on private participation in the power sector in the period 1990-2002, pointing to a series of preliminary findings, and identifies areas where deeper policy analysis is needed so that modalities for public-private partnerships can be proposed and the sector can again attract the needed investments. The final goal of this desk study is to select two or three countries for further analysis. It would be the objective of a subsequent phase, to analyze case studies and present key lessons learnt in selected countries and compare them with international experience.

Acknowledgement

This four-part study was commissioned under ESMAP Activity P093135 and carried out by Jan Kappen and Rafael Herz (consultants) and Lucio Monari, Lead Energy Economist, LCSFE, World Bank.

The first part reviews the recent trends and features of the private Sector Participation in the Latin America and the Caribbean power sector. This section is based on an analysis of existing databases and on a review of studies and a survey conducted in 2003. The second section presents an analysis of the key barriers to investments based on a review of the existing literature and the experience of the authors. The third section present estimates of investment for the next ten years based on consultants' own analysis of past and projected demand growth scenarios and compared them with estimates from the International Energy Agency. The last section briefly makes a proposal for a detailed country analysis.

Special thanks to Ms. Nidhi Sachdeva for desktopping the final report and to Ms. Marjorie Araya for coordinating the publications process, both from ESMAP.

1

Survey of Private Participation in the Latin American and Caribbean Power Sector

Regional Overview

1.1 Throughout most of the 1990s, many Latin American countries were very successful in attracting a large share of worldwide private investment in infrastructure. Investors were predominantly attracted by a widespread confidence in economic stability, commitment to public sector reforms and far-reaching privatizations of state owned enterprises. During the early 1980s, Chile was the first country to introduce comprehensive reforms aimed at opening the power sector to private participation and competition. By the end of the 1990s, Latin America had the largest share of private electricity projects among all developing regions worldwide. More than 38 percent of the total investment in the developing world power sectors was placed in Latin America.

1.2 As a result of this development, private investors absorbed an increasing part of the necessary expansion and modernization investments particularly in generation capacity and, to a less extent, distribution networks and thereby reduced the budgetary pressure on governments strained by large transfers of tax money to state owned utilities.

1.3 Towards the end of the 1990s, after more than 7 years of dynamic investment growth, macroeconomic shocks as well as overall political and economic instability radically undermined the prospects for growth and private participation in infrastructure. The power sector was the infrastructure sector most affected by this decline with many developers suffering a tremendous increase in their cost of capital[1] and subsequently being forced to swiftly divest and pull back from the Latin American market.[2]

1.4 After having grown from 6 percent in 1990 to 43 percent in 1997, when private capital flows into the Latin American and Caribbean power sector reached their peak, the share of annual investment in the power sector plunged back to 16 percent in 2001.

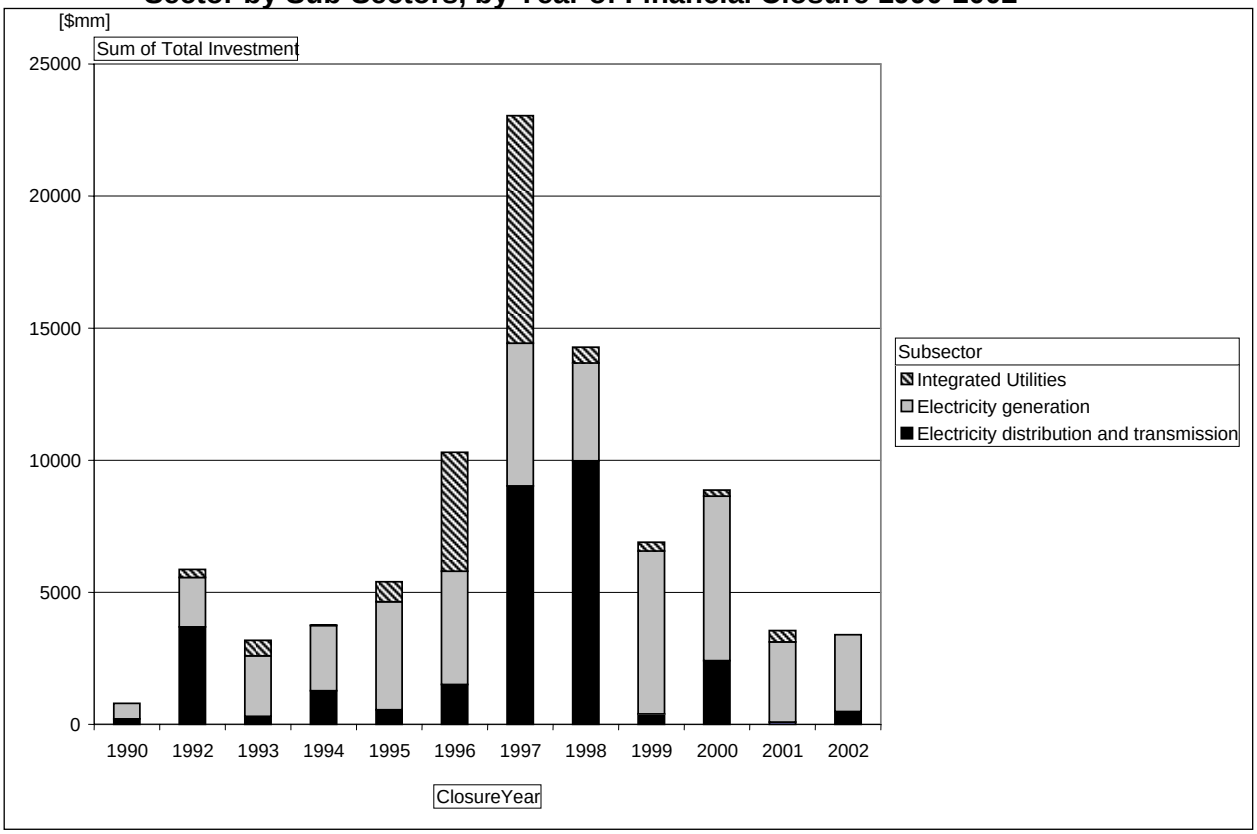
[1] see Table 1.1
[2] see section 1.5

During the above period, total annual investments in the power sector dropped from 23 billion to less than 4 billion Dollars, the lowest level since 1994.[3]

1.5 The collapse of investment was particularly drastic for private funds invested in acquisitions of distribution-, transmission and integrated utilities. The magnitude of the slowdown was a consequence of the conclusion of major divestiture programs in these areas and, to some degree, a result of the region's economic crisis[4]. Following 1998, with many sectoral privatization programs coming to an end, new private investment remained small and was largely dominated by the addition of new generation capacity through greenfield projects. There were also a number of international factors which contributed to the slowdown in investments, including the over-arching expectations about returns in the developing countries by investors (which did not materialize), and the ENRON crisis. These important supply side effects are not the subject of this preliminary study, which focuses on the demand side factors.

[3] Izaguirre / Hahn / Khuu / Nellis (2004)
[4] Izaguirre / Hahn / Khuu / Nellis (2004)

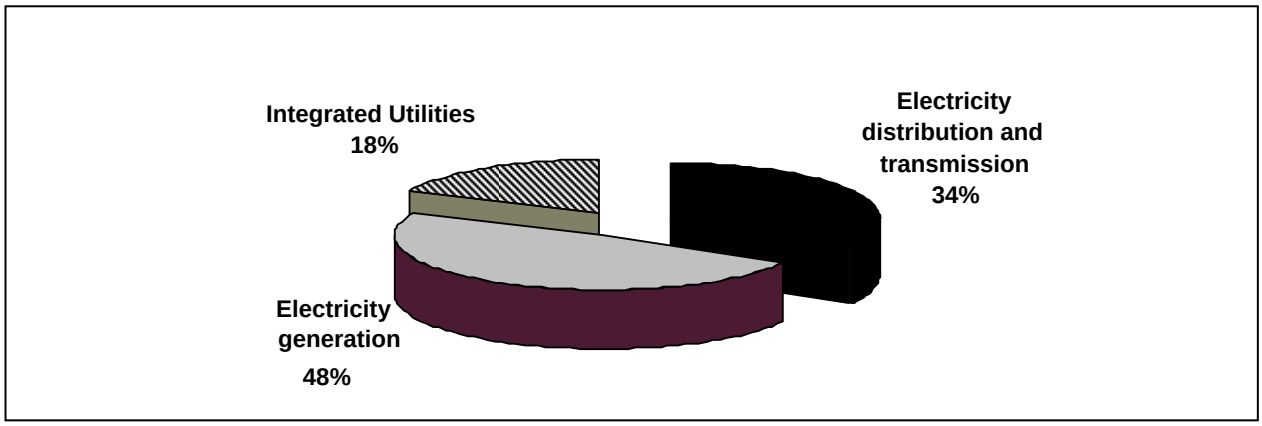
Figure 1.1: Annual Private Investment[5] in the Latin American and Caribbean Power Sector by Sub-Sectors, by Year of Financial Closure 1990-2002



Source: PPI database (2004), ECLAC (2001), own calculations

[5] Investments in infrastructure projects have generally been recorded on a commitment basis in the year of financial closure (for which data are typically available). Actual disbursements are not tracked. Where divestitures are phased or where investment requirements are defined by requirements on service coverage and quality and data are available (such as for large privatized electricity and telecommunications companies), the investments are recorded in the years in which the transactions take place. Where investments in acquiring government assets are due over the period of a concession, an estimate of their present value is recorded in the year of financial closure.

Figure 1.2: Percent-Shares of Annual Private Investment in the Latin American and Caribbean Power Sector by Subsectors, 1990-2002 cumulated



Source: PPI database (2004), ECLAC (2001), own calculations

Table 1.1: Investor Downgrading Following 2001

Developer	S&P Rating August 2001	S&P Rating March 2003
Enron	BBB+/Stable	D
NRG Energy Inc.	BBB-/Stable	D
Reliant Energy Power.	BBB+/Stable	B-/Watch Dev.
Endesa	A+/Neg.	BBB-/Neg.
CMS Energy	BB/Stable	BB/Neg.
ABB	AA+/Neg.	BB+/Neg.
AES Corp.	BB/Positive	B+/Neg.
Cogentrix Energy Corp	BB+/Stable	BB/Watch Neg.
Edison Mission Energy	BBB-/Stable	BB-/Neg.

Source: Bloomberg Online

1.6 Despite the meltdown of private investment at the end of the decade, the surge of private participation during the 90s dramatically changed the landscape of the Latin American power sector. In particular the generation sub-sector experienced a drastic shift from exclusive state ownership to the considerable private sector participation.

1.7 However, as Table 1.2 shows, privatization of the electricity sector is far from complete in Latin America and the Caribbean. In most countries, the state still controls sizeable amounts of the generation, transmission and distribution segments. Conflicts of interest may arise within the government itself. This may be caused by the fact that the government assumes many different roles with respect to the electricity industry, as legislator, regulator, owner and purchaser of electricity. Multiplicity of roles may give origin to conflicts of interest and to the erosion of regulatory power.[6]

[6] Milan/Lora/Micco (2001)

Table 1.2: Private Participation in the Power Sector, 2001 Estimate

	Generation	Transmission	Distribution
Argentina	60%	100%	70%
Bolivia	90%	90%	90%
Brazil	30%	10%	60%
Chile	90%	90%	90%
Colombia	70%	10%	50%
Costa Rica	10%	0%	10%
Dominican Republic	60%	0%	50%
Ecuador	20%	0%	30%
El Salvador	40%	0%	100%
Guatemala	50%	0%	100%
Jamaica	20%	0%	0%
Mexico	10%	0%	0%
Paraguay	0%	0%	0%
Peru	60%	20%	80%
Trinidad & Tobago	40%	0%	0%
Uruguay	0%	0%	0%
Venezuela	20%	10%	40%

Source: Espinasa (2001).

1.8 In 2002, more than 30 percent of the generation capacity in the Latin American and Caribbean region was operated and managed by corporations where private investors owned at least a 30 percent stake of the equity.[7]

1.9 Yet, Table 1.3 illustrates that many countries with a large share of hydropower in their generation mix (i.e. Brazil, Argentina, Peru) were apparently reluctant to exceed a certain level of private participation in their generation capacities involving large dams and other significant hydropower facilities.

1.10 In some cases, the simple explanation for the lower share of private participation in generation capacity is the fact that in many Latin American countries a large share of hydropower stems from bi- or multinational projects (i.e. Itaipu, involving Argentina, Brazil and Paraguay, or Yacyreta between Argentina and Paraguay) that for political and regulatory reasons are difficult to transfer into private ownership or management. Other reasons for the unwillingness to privatize sizeable shares of hydropower resources are oftentimes the important social implications of the management of hydropower facilities and in particular large dams (i.e. environmental, irrigation, transport routes) as well as the ability of private hydropower operators to influence market prices in their favor.

1.11 Colombia, even though it features a 63 percent-share of hydropower in its generation mix and at the same time an impressive 58 percent-share of private participation in power generation, is not an exception to the above phenomenon. The

[7] see Table 1.3

main goal of the Colombian sector reform program that started in the beginning of the 90s was to drastically increase the share of thermoelectric capacity, which more than doubled in the decade thereafter. Therefore, compared to the new thermoelectric capacity that is almost 100 percent in private hands, the bulk of hydroelectric capacity is still predominantly under public ownership.

Table 1.3: Ownership of Generation Capacity, 2002 Estimate

Country	Total generation capacity [MW][1]	% private ownership[2]	% hydro[3]
Brazil	76,139	29%	83%
Mexico	42,484	15%	23%
Argentina	27,039	63%	35%
Venezuela	21,226	1%	62%
Colombia	13,141	58%	63%
Chile	10,269	61%	40%
Peru	5,906	38%	50%
Cuba	4,411	5%	1%
Ecuador	3,136	18%	56%
Dominican Republic	3,081	72%	13%
Costa Rica	1,715	13%	72%
Guatemala	1,697	52%	32%
Jamaica	1,584	53%	4%
Trinidad and Tobago	1,417	99%	0%
Panama	1,260	82%	49%
Bolivia	1,227	75%	30%
El Salvador	1,134	46%	36%
Honduras	914	27%	47%
Nicaragua	643	35%	16%
Grand Total	218,421	32%	55%

Source: PPI database (2004), OLADE (2003), own calculations
(1) OLADE (2003)
(2) Percentage of generation facilities with more than 30 percent private sector participation
(3) Share of electricity from hydroelectric facilities

1.12 Probably the most typical feature of private participation in the Latin American power sector has been the striking predominance of divestitures and greenfield projects.[8] Up until 1999, divestitures have been the most common form for introducing private participation in electricity, unlike in other areas of infrastructure reform, such as the water sector, where privatizations have been relatively scarce.[9]

[8] see Figure 1.3
[9] Izaguirre (1998)

1.13 Of the total investment in private electricity projects, about 67 percent has been directed to the 144 divestitures, and 32 percent to the 167 greenfield projects[10]. Interestingly, despite the dramatic meltdown of investment at the end of the 90s, greenfield investments appeared to be more resistant to the unfavorable macroeconomic environment, and continued to develop at almost unchanged pace and magnitude across most countries of the Latin American and Caribbean Region.

1.14 Conversely, concessions[11] as well as management or lease operations contracts[12] which were quite frequent in the region's water sector have been very rare in the electricity sector. In the years from 1990 to 2002 only five concession contracts have been signed, all of which were subject to the operation and/or refurbishment of power generation facilities.[13] In the same period, only two very small-scale management contracts have been signed in the entire Latin American and Caribbean Region. Of these two, only one contract (Electricité de Haiti) involved a capital expenditure by private sponsors (EDF, Hydro-Quebec, 4.7 Million) in expanding or rehabilitating facilities. The other contract (Empresa Distribuidora de Electricidad de San Luis, Edesal, Argentina) simply transferred the management of distribution facilities to a private operator (Union Fenosa) while leaving the public sector responsible for new investments.

1.15 The predominant "sub-types" of private participation were full or partial privatization, greenfield projects operated as merchant plants in the more liberalized markets such as Argentina and Chile, and "Build, Own, and Operate" contracts in other countries.[14] A "Build, Own, and Operate" contract is a commercial agreement, wherein a private sponsor builds a new facility largely at its own risk, transfers ownership to the government, leases the facility from the government and operates it at its own risk, and eventually receives full ownership of the facility at the end of the concession period. The

[10] Izaguirre (1998)

[11] *Concessions:* A private entity takes over the management of a state-owned enterprise for a given period during which it also assumes significant investment risk. The PPI - database, from where the data of this survey is extracted, classifies concessions in the following three categories (see PPI-Glossary):

1. *Rehabilitate, operate, transfer.* A private sponsor rehabilitates an existing facility, then operates and maintains the facility at its own risk for the contract period.
2. *Rehabilitate, lease or rent, transfer.* A private sponsor rehabilitates an existing facility at its own risk, leases or rents the facility from the government owner, then operates and maintains the facility at its own risk for the contract period.
3. *Build, rehabilitate, operate, transfer.* A private developer builds an add-on to an existing facility or completes a partially built facility and rehabilitates existing assets, then operates and maintains the facility at its own risk for the contract period.

[12] *Management and lease contracts:* According to the PPI-database, these contracts can be divided into two subclasses:

1. *Management contract.* Usually the government pays a private operator to manage the facility and retains much of the operating risk.
2. *Lease contract.* A private operator typically pays a fee to the government for the right to manage the facility and takes on most of the operating risk.

[13] Izaguirre / Hahn / Khuu / Nellis (2004)

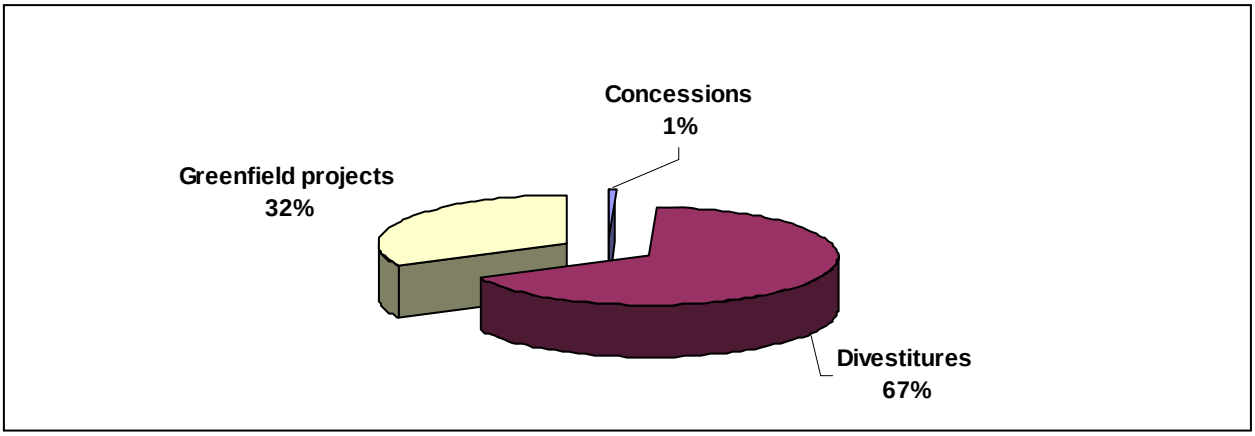
[14] see Figure 1.4

government usually provides revenue guarantees through long-term take-or-pay contracts for bulk supply facilities or minimum traffic revenue guarantees.[15]

1.16 Temporary arrangements such as management contracts as well as forms of private participation where ownership after the expiration of a concession period is transferred back to the state ("Build, Own, Transfer", or "Build, Own, Operate, Transfer") where almost never employed.[16]

1.17 From 1990-2002, of all funds employed for divestitures in the region, more than 25 percent have been spent on expanding or rehabilitating the facilities of utilities that were privatized beforehand. Of all greenfield projects that reached financial closure in the region by 2002, "Build, Own, Operate" or "Build, Own, Transfer" schemes made up for about 73 percent and the remainder consisted of merchant power plants. Most of the investment into "Build, Own, Operate" or "Build, Own, Transfer" schemes was captured by projects in Colombia, Brazil, and Guatemala, countries that had already embarked on comprehensive reform of their electricity sectors. The other nineteen contracts were signed by Costa Rica, Jamaica, the Dominican Republic, and Honduras, which in most cases have adopted the Asian model of private participation.[17]

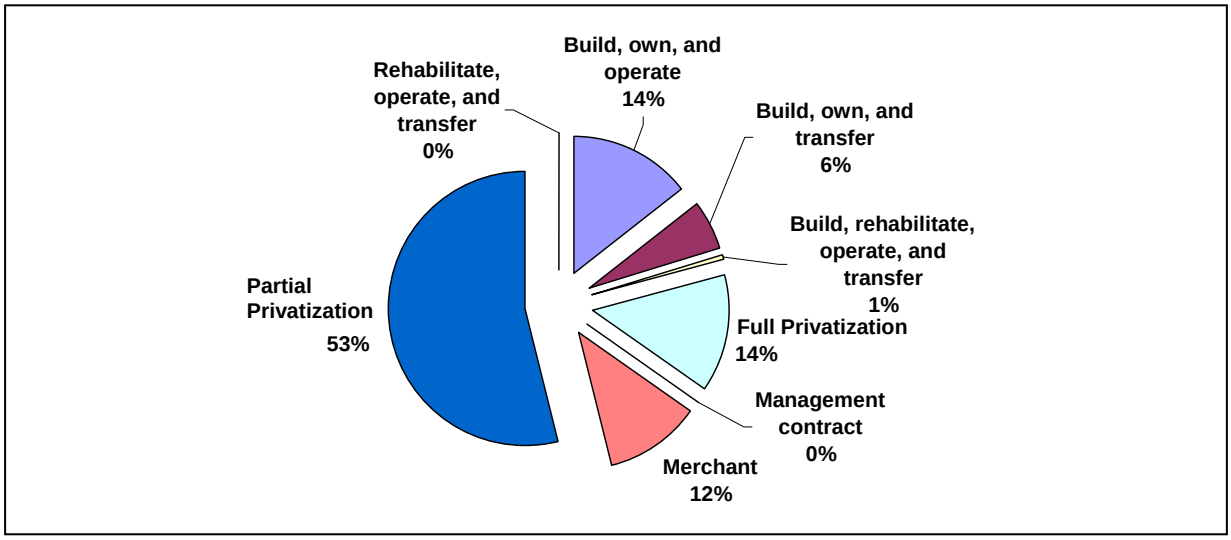
Figure 1.3: Investment in Power Sector by Sub-Types of Public Participation, Latin America and Caribbean, 1990-2002 cumulated



Source: PPI database (2004), own calculations

[15] see PPI glossary (2004)
[16] see Figure 1.4
[17] Izaguirre (1998)

Figure 1.4: Investment in Power Sector by Sub-Types of Public Participation, Latin America and Caribbean, 1990-2002 cumulated



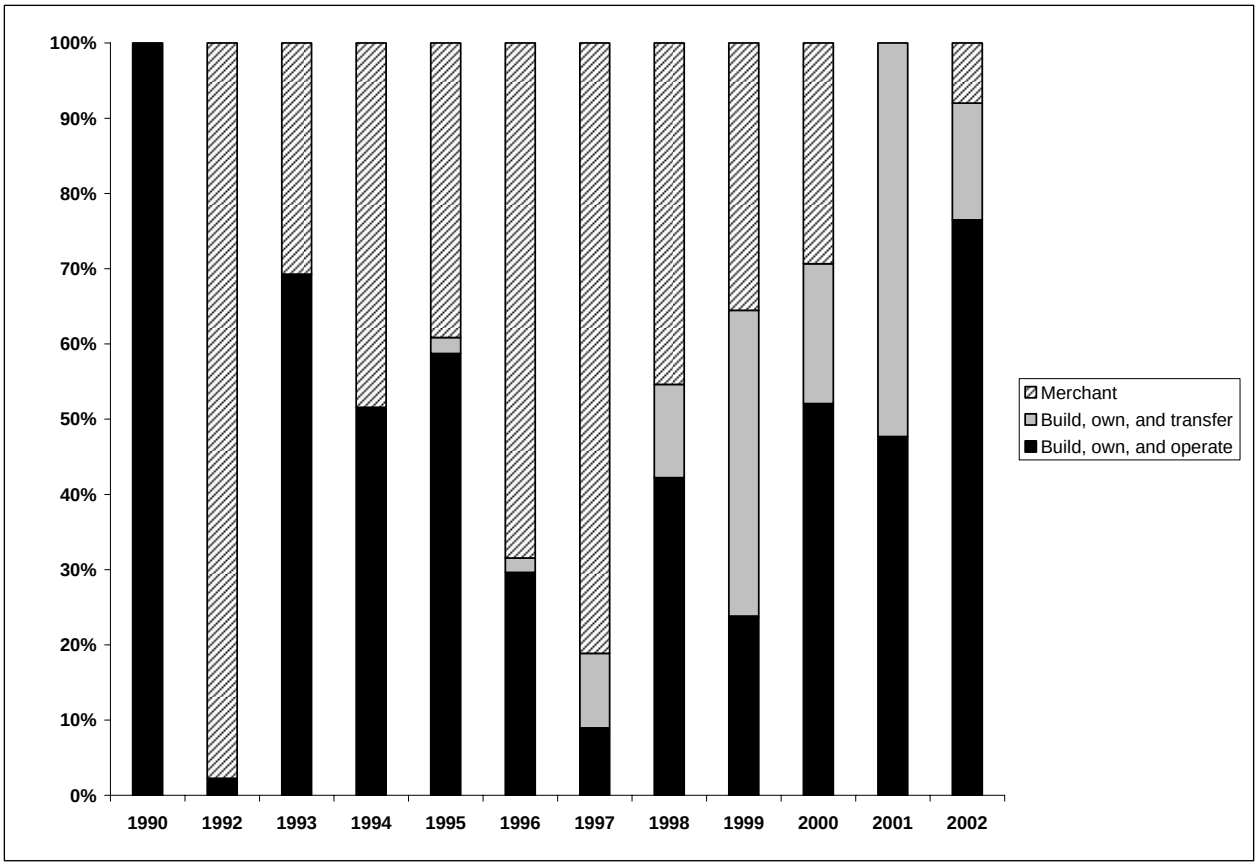
Source: PPI database (2004), own calculations

1.18 Since 1997, mostly as a result of the increasing volatility of market prices for electricity throughout the region, the share of merchant plants[18] is continuously decreasing.[19]

1.19 Another relatively recent development is the trend towards a larger share of "Build, Own, Transfer" schemes, which before 1997 were hardly ever employed. Since 1997, more than $5 billion of total investment was allocated through these contracts, of which more than $4 billion were invested in Brazil alone.

[18] Merchant plant/facility: A private sponsor builds a new facility in a liberalized market in which the government provides no revenue guarantees (see PPI Glossary).
[19] see Figure 1.5

Figure 1.5: Greenfield Projects by Subtypes of Private Participation, 1990-2002



Source: PPI database (2004), own calculations

1.20 The strong preference for divestiture and greenfield projects and the only sporadic use of other forms of private participation is mainly a result of the region's prevalent approach to power sector reform: Following the Chilean model, most Latin American countries have introduced private participation in electricity as part of broader reforms that usually included the establishment of a vertically separated market structure.

1.21 This approach in general entailed the transfer of most generation and distribution assets to the private sector. Therefore, major generation and distribution divestitures have been very frequent across all reforming countries in the region. Most notably, Argentina, Bolivia, Brazil, Chile, Colombia, and Peru have privatized the great majority of their distribution and generation facilities as stand-alone businesses.[20]

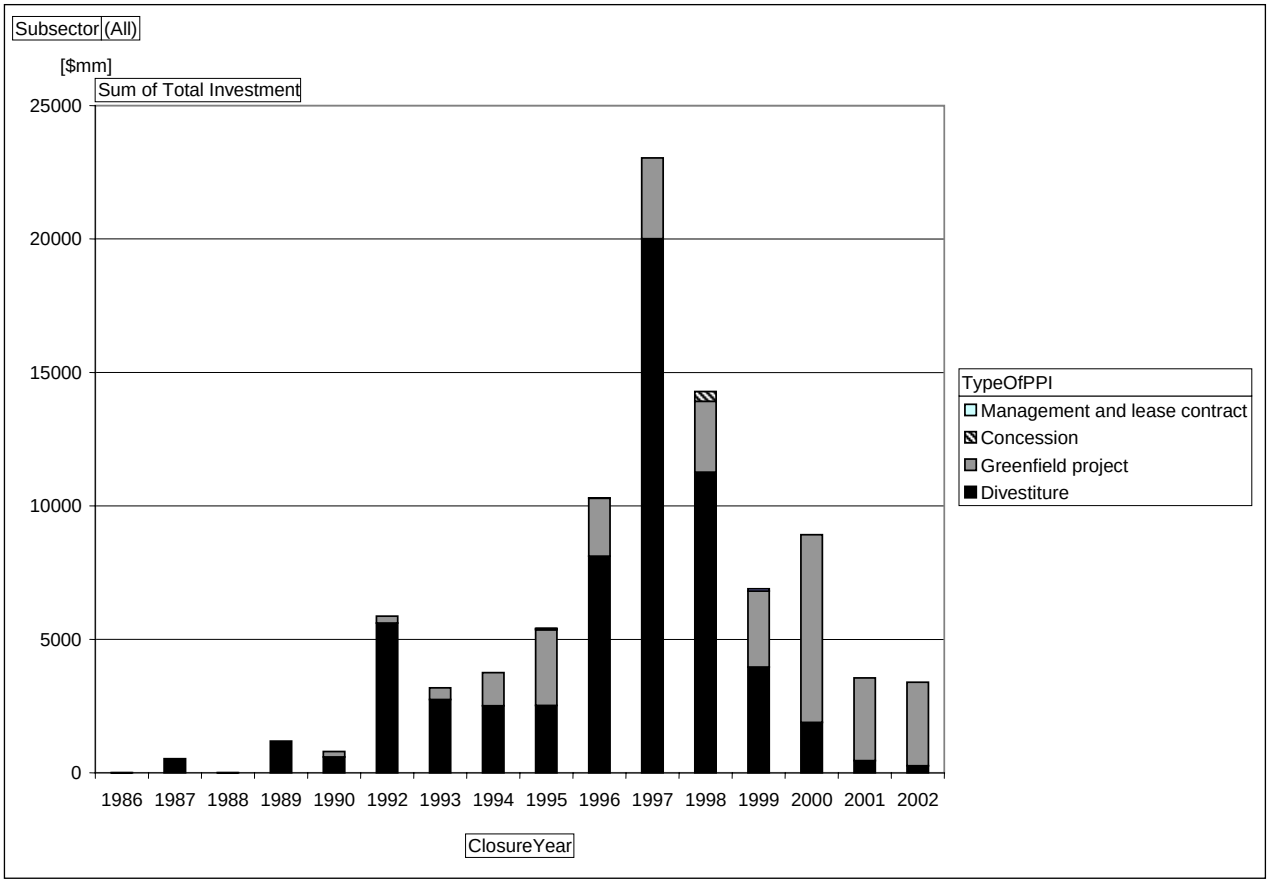
1.22 The above shift from divestiture to greenfield projects also led to a fundamental alteration in the way funds were used after the financial meltdown in 1997. The increased proportion of greenfield projects led to a sharp decrease of funds invested in government

[20] Izaguirre (1998)

assets (such as existing plants and facilities or non tangible assets such as concessions and license fees) while investment into expansion and modernization remained almost unchanged.

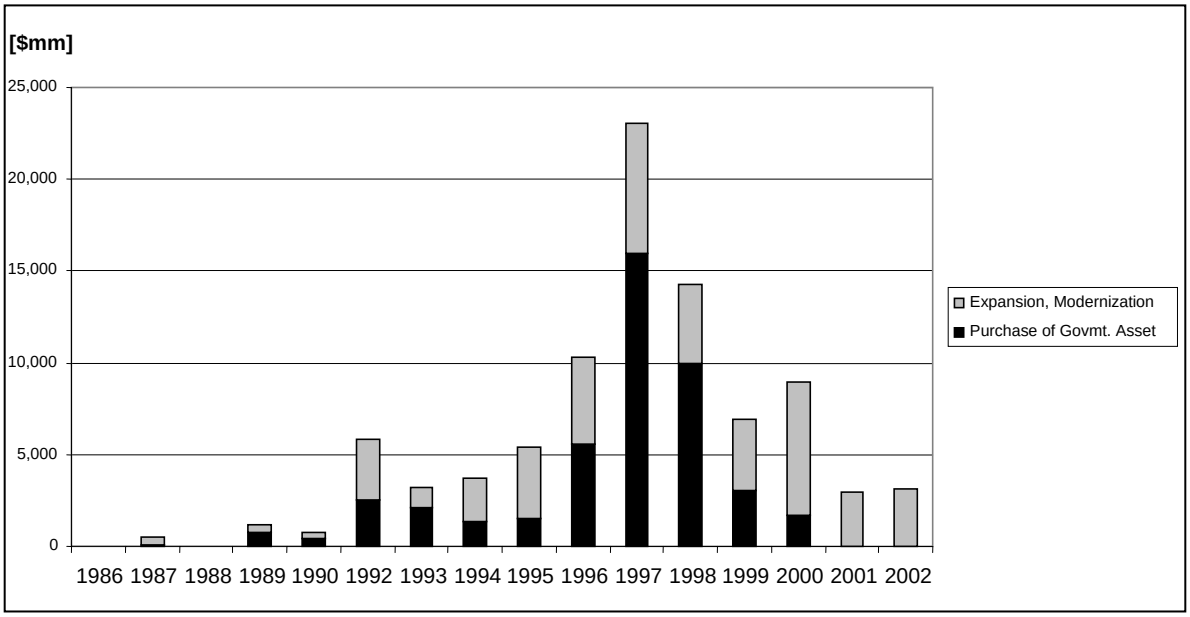
1.23 As a result, Figure 1.7, "Use of Private Funds", shows a very similar pattern to Figure 1.6, "Types of Private Participation", featuring a strong decline of private funds allocated to the purchase of government assets, while expansion and modernization investments remain relatively stable.

Figure 1.6: Types of Private Participation, 1990-2002 by year of financial closure



Source: PPI database (2004)

Figure 1.7: Use of Private Funds by Year of Financial Closing (1990-2002)



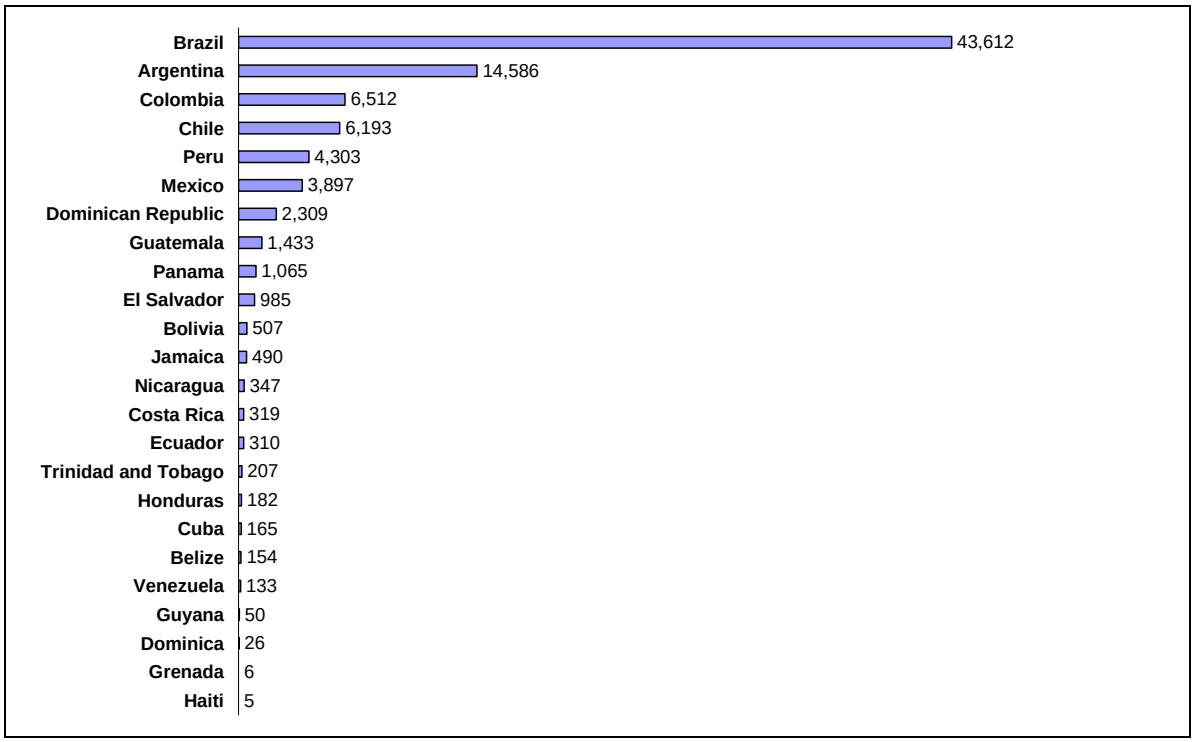
Source: PPI database (2004), own calculations

Comparative Overview of Countries

1.24 From 1990 to 2002, the Latin American and Caribbean region's 25 countries granted a total of 316 projects involving private participation. By the end of 2002, Brazil, Argentina, Colombia and Chile were all among the top ten developing countries in the world in terms of private investments in the electricity sector, with projects worth $44 billion, $15 billion, $6.5 billion and $6.1 billion in that order.[21] Even though Brazil started its reforms of the power sector relatively late in the process compared to Chile and Argentina, by 2002 it attracted more that $43 billion of cumulated investment commitments or almost 50 percent of the private investors in the regions power sector. Argentina followed with 16 percent, and both Columbia and Chile with 7 percent respectively.

[21] PPI-database (2004), see Figure 1.8

Figure 1.8: Investment Commitments by Country[1], 1990-2002 [$mm cumulated]

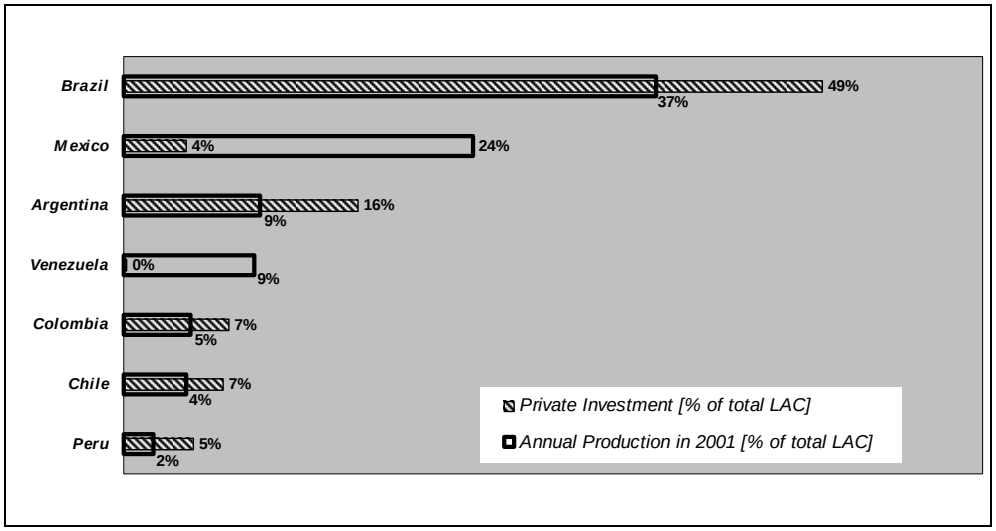


Source: PPI database, own calculations
(1) Excluding bi-national projects

1.25 With the exception of countries that were more reluctant to private participation models in infrastructure (i.e. Mexico, Venezuela, Cuba), that only recently started to open up their power sector to private participation (i.e. Dominican Republic, Ecuador, Nicaragua), or that show a particularly slow reform process (i.e. Costa Rica, Honduras), the magnitude of private investment mostly corresponded with the comparative size of the markets, meaning the largest markets accounted for the greatest share of private investment commitments. Brazil and Argentina for instance jointly accounted for ca. 46 percent of the region's generation capacity, and comprised more than 60 percent of total investments in region's power sector[22].

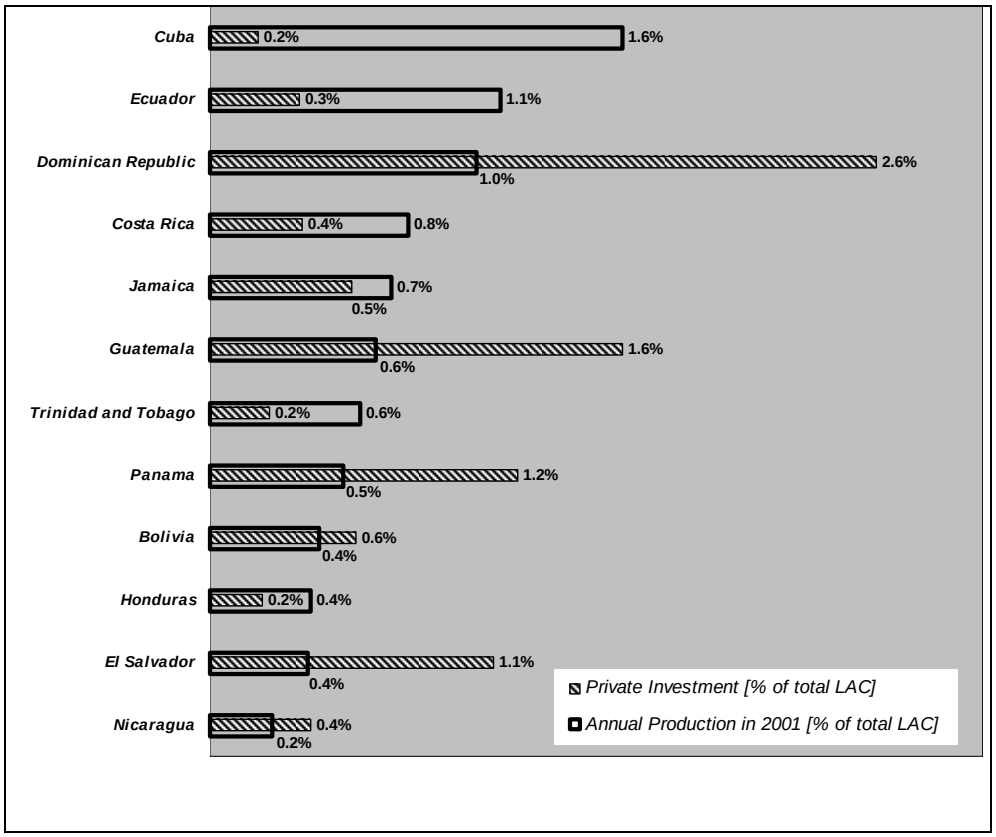
[22] see Figure 1.9

Figure 1.9: Cumulated Private Investment Commitments 1990-2002 vs. Size of Markets (I)



Source: PPI database (2004), ECLAC (2001), own calculations

Figure 1.10: Private Participation 1990-2002 vs. Size of Markets (II)



Source: PPI database (2004), ECLAC (2001), own calculations

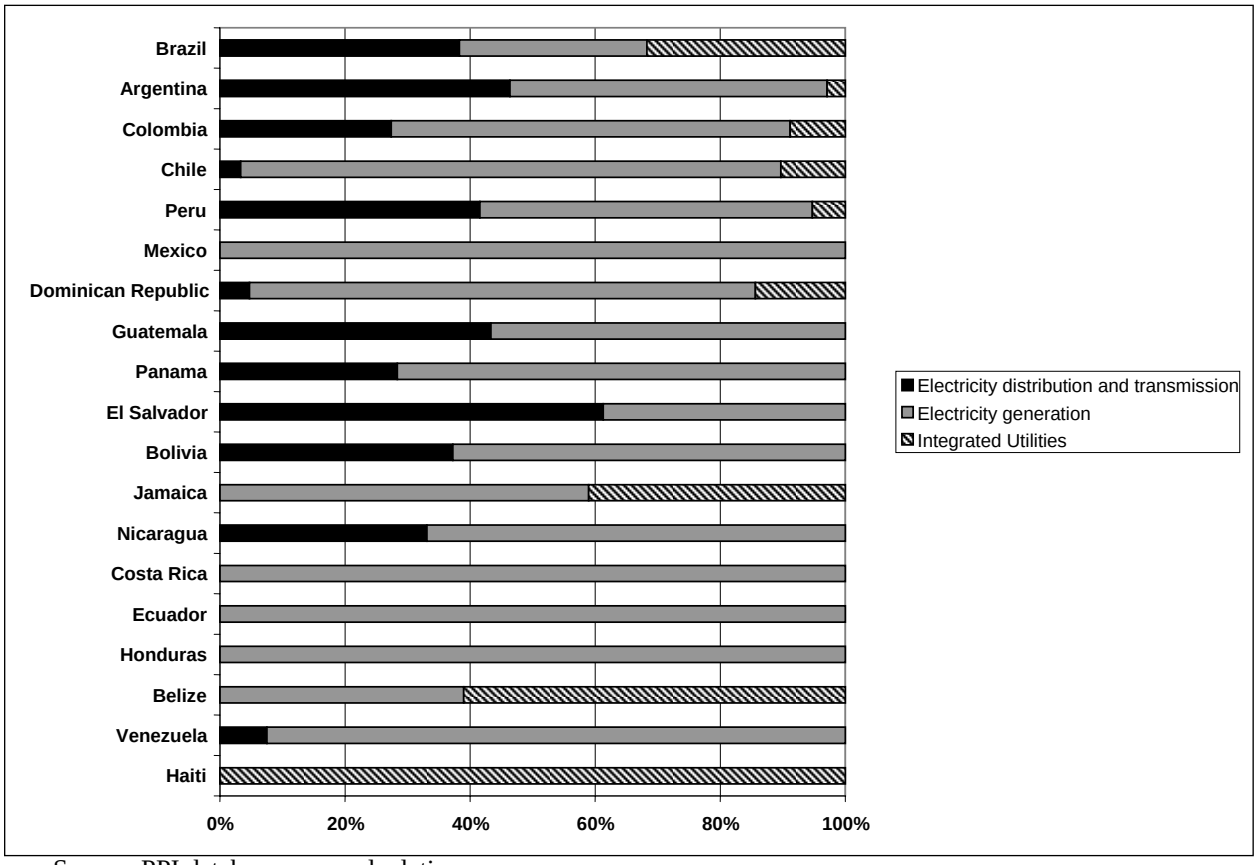
1.26 In the examined decade from 1990 to 2002, the five countries with the largest power sectors in the Latin American and Caribbean region followed a comprehensive, sector-wide approach to reform and unbundling involving the privatization of companies in generation as well as in power distribution and transmission.

1.27 However, about half of the region's second and third tier power markets, such as Mexico, the Dominican Republic, Costa Rica, Ecuador, Honduras and Venezuela limited private participation more or less exclusively to the generation subsector with the exception of a few integrated utilities that typically featured only minor distribution and transport assets. Most of the second tier countries such as Mexico and the Dominican Republic started their sector reforms only relatively recently and during the early phases of reform tend to focus on either greenfield projects or privatizations. The third-tier countries mostly consist of small markets typically too small to fully benefit from the competition-enhancing effects of unbundling and the privatization of distribution and transport utilities, and therefore predominantly show a greater share of greenfield projects aimed at enhancing the generation capacity.[23]

1.28 Chile belongs to neither of the two groups, it only shows a small portion of transactions in the transmission and distribution subsectors due to the fact that both were already entirely privatized in the late 1980s.

[23] see fig. 11

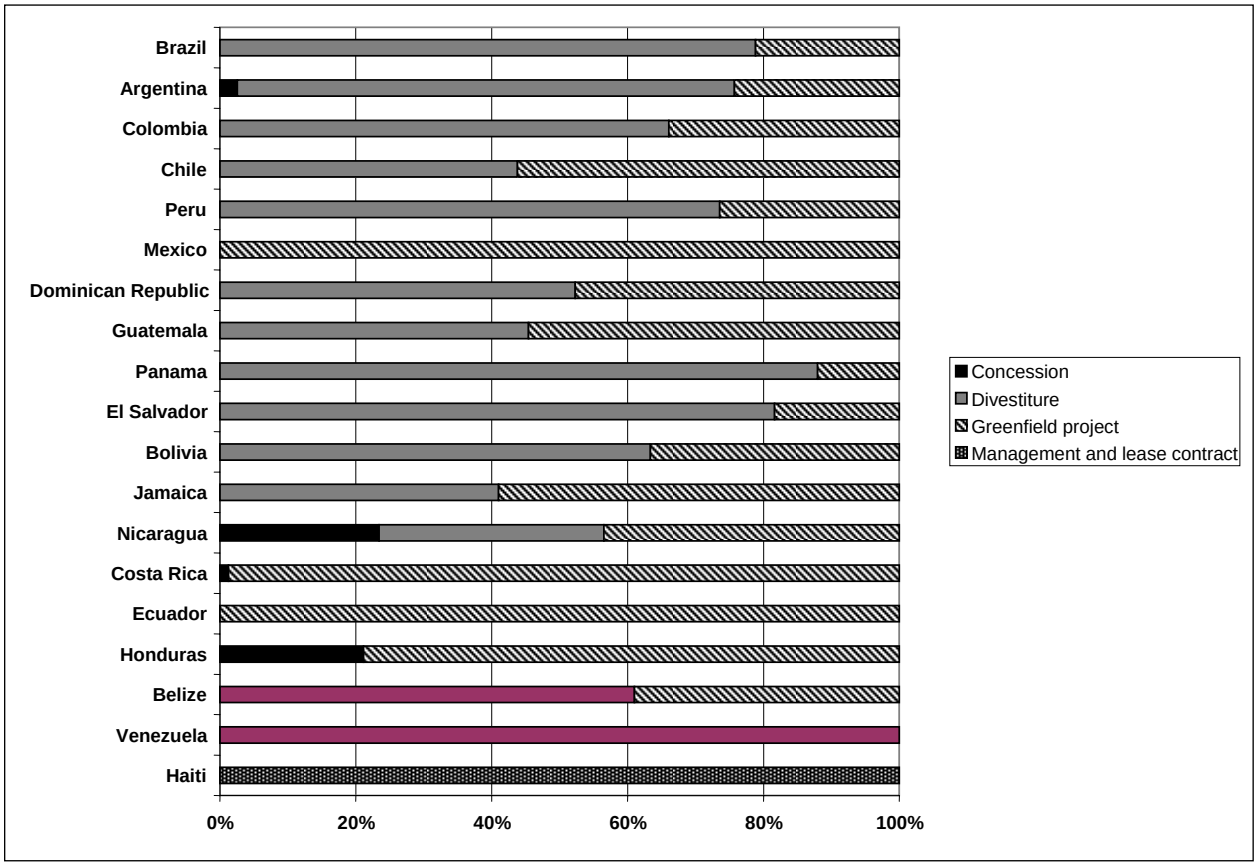
Figure 1.11: Investment Commitments by Sub-Sectors, 1990-2002 cumulated



Source: PPI database, own calculations
(1) Excluding bi-national projects

1.29 Concerning the different types of private participation amongst the countries of the region, a similar pattern compared to the one already observed in the distribution of investments among sub sectors seems to be prevalent. Small countries in general and in particular small countries that started their reform processes late tend to have a limited variety of the different possible types of private participation in their portfolio.

Figure 1.12: Investment Commitments[1] by Types of Private Participation, 1990-2002 cumulated

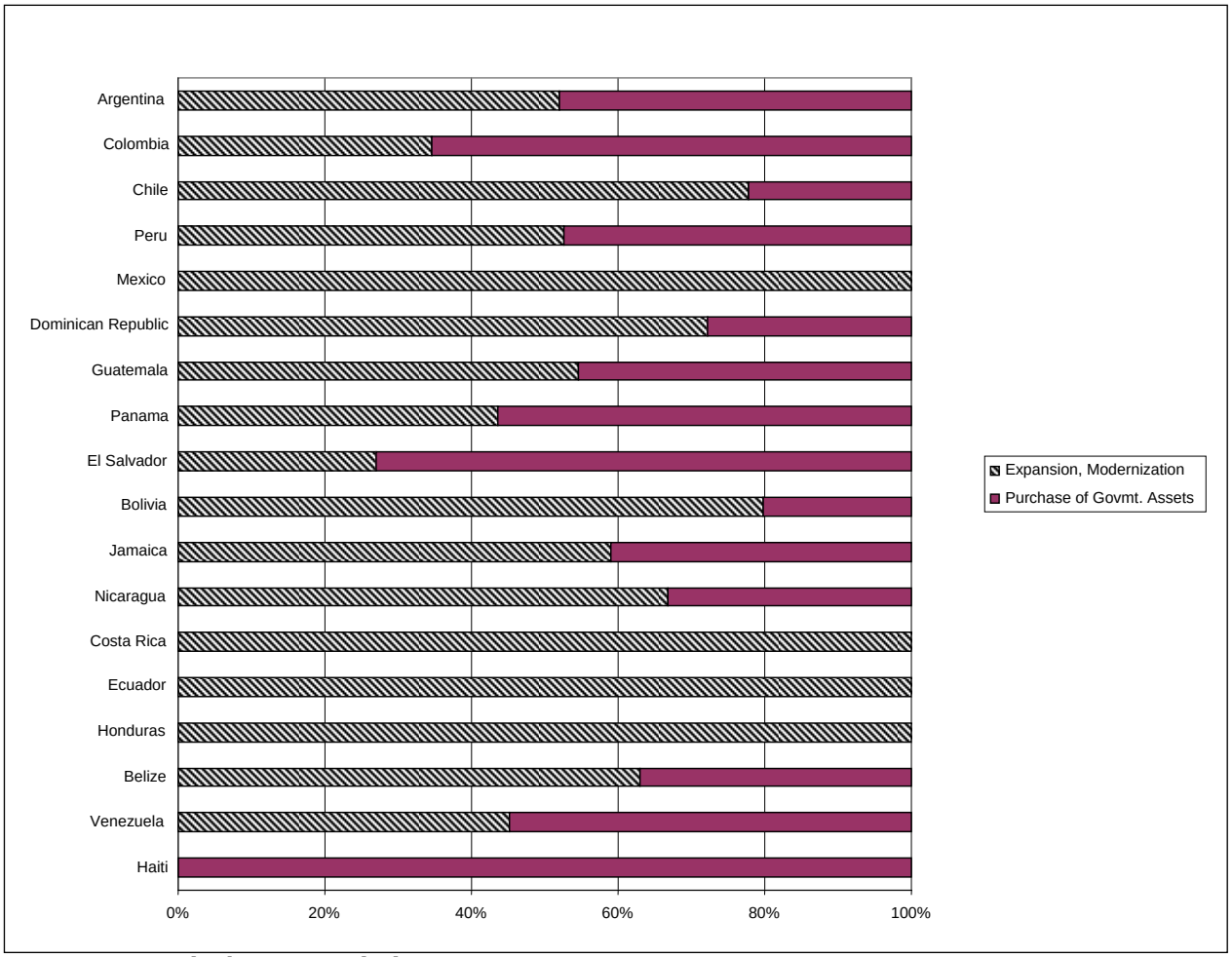


Source: PPI database, own calculations
(1) Excluding bi-national projects

1.30 The majority of countries that were among the late power sector reformers in the region were affected by the shift from divestiture to greenfield projects that was increasingly prevalent during the late 1990s. Costa Rica, Ecuador and Honduras are the countries that were most concerned by this effect with portfolios that do not include a single divestiture.

1.31 Mexico only started its sector reform program relatively early in 1992, but limited competition and private participation to IPP, auto generation and power imports only. Consequently, the expenditure of private funds in these countries is restricted to expansion investments into new facilities and the enlargement of existing capacity alone.

Figure 1.13: Investment Commitments[1] by Use of Funds, 1990-2002 cumulated



Source: PPI database, own calculations
(1) Excluding bi-national projects

Comparative Overview of Companies

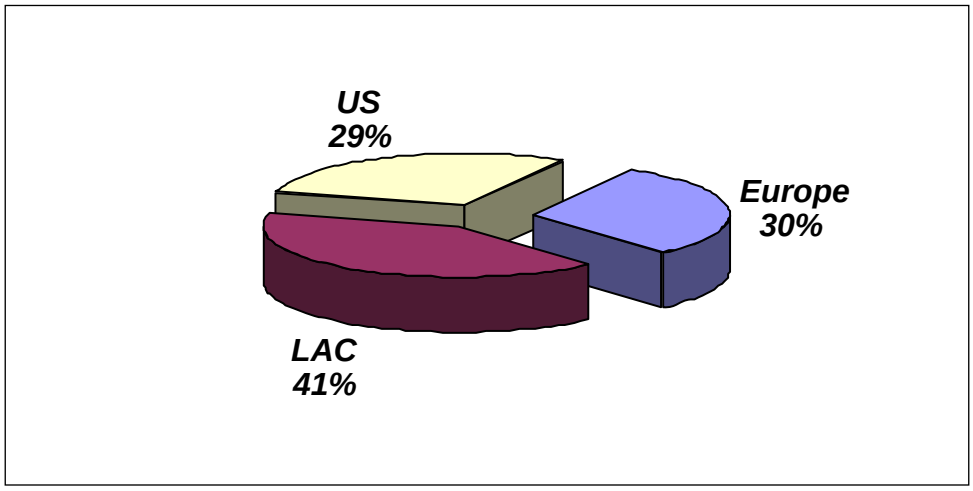
1.32 With the participation of international investors across North America, Europe and the Latin American and Caribbean countries, and all Top 10 investors adding up to less than half of the total investment in the sector, the sources of investment in the region's power sector appear to be well diversified throughout the region.

1.33 However, the great participation of Latin American investors[24] is somehow misleading, given the fact that Spanish Endesa is the majority shareholder of Enersis and Endesa Chile, both by far the largest Latin American investors.

[24] See fig. 14

1.34 Furthermore, in contrast to what the large number of competitors throughout the region might suggest, several large power markets in the region are subject to critical market concentration issues. Especially in Argentina, cross-ownership and the de-facto re-integration of the market resulting from the acquisition of Endesa Chile by Endesa Spain, raised concerns as to whether enough attention has been paid towards the preventing excessive market concentration.[25] The Chilean power market has also shown signs of considerable market concentration, with Endesa owning and operating about 65 percent of the generation capacity in the central system. Other controversial issues have been a de-facto vertical integration and cross ownership issues, resulting from Endesa's dominance of the transmission and upstream markets.

Figure 1.14: Investment Commitments by Origin, 1990-2002 cumulated



Source: PPI database (2004), ECLAC (2001), own calculations

1.35 With the exception of the acquisitions of Edenor and Edesur by Electricité de France and Endesa in 1992, US- and European investors during the early 90s predominantly focused on the strategic acquisition of generation assets. Only towards the second half of the decade, investors started to widen their focus across subsectors and aggressively for bid power distribution and -transport networks as well as for integrated utilities. However, by the end of the 1990s, the region's financial crisis brought most investments in transport and distribution assets to a halt. Since the year 2000, due to political pressure and the absence of potential buyers, Latin American and Caribbean governments and international investors alike have mostly abstained from further privatizations of distribution utilities.

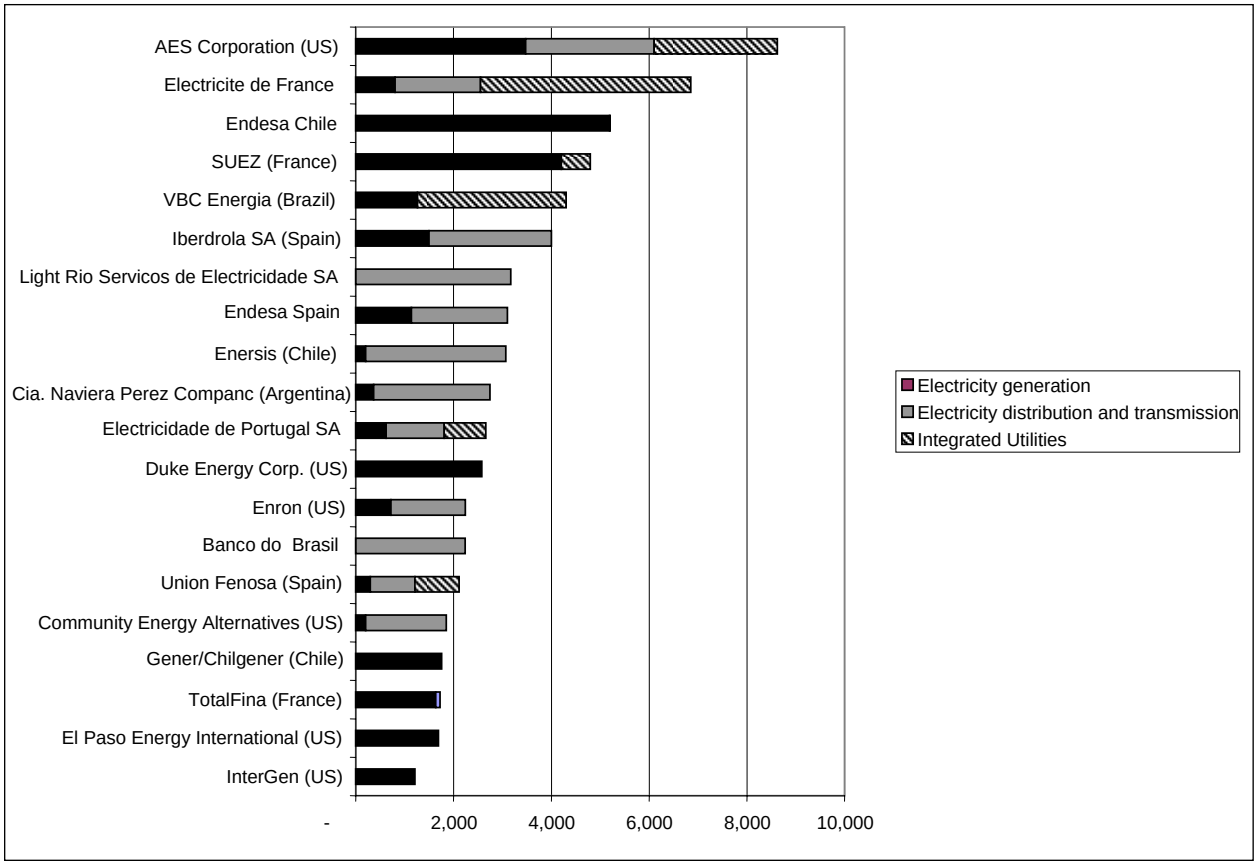
1.36 For the above reason, the majority of investors that show significant participation in power transmission and distribution are part of the first generation of private sponsors that entered the distribution market during the heydays of power market privatization and

[25] See chapter 2, market regulation.

have been active in the market for almost a decade.[26] Despite the current market prices resulting from a surge of market exits[27] and the resulting drop of market prices for distribution utilities, most of the new market players abstained from investments in power transport and distribution.

1.37 Private participation in Latin American and Caribbean power distribution and transport subsectors also appears to be matter of company size since outside the Top 15 investors in the region, private participation in both subsectors is only sporadic.

Figure 1.15: Top 20 Project Sponsors by Subsector, 1990-2002 [$mm cumulated]



Source: PPI database, own calculations

1.38 The analysis of the distribution of the different types of private participation and the use of funds shows a similar picture. Only the top competitors participated in the major divestitures and allocated a significant part of their funds into the purchase of government assets such as distribution facilities or concessions.

1.39 Despite the shift from divestitures to greenfield projects that occurred towards the end of the 90s, all of the top 15 companies still have asset portfolios that are largely

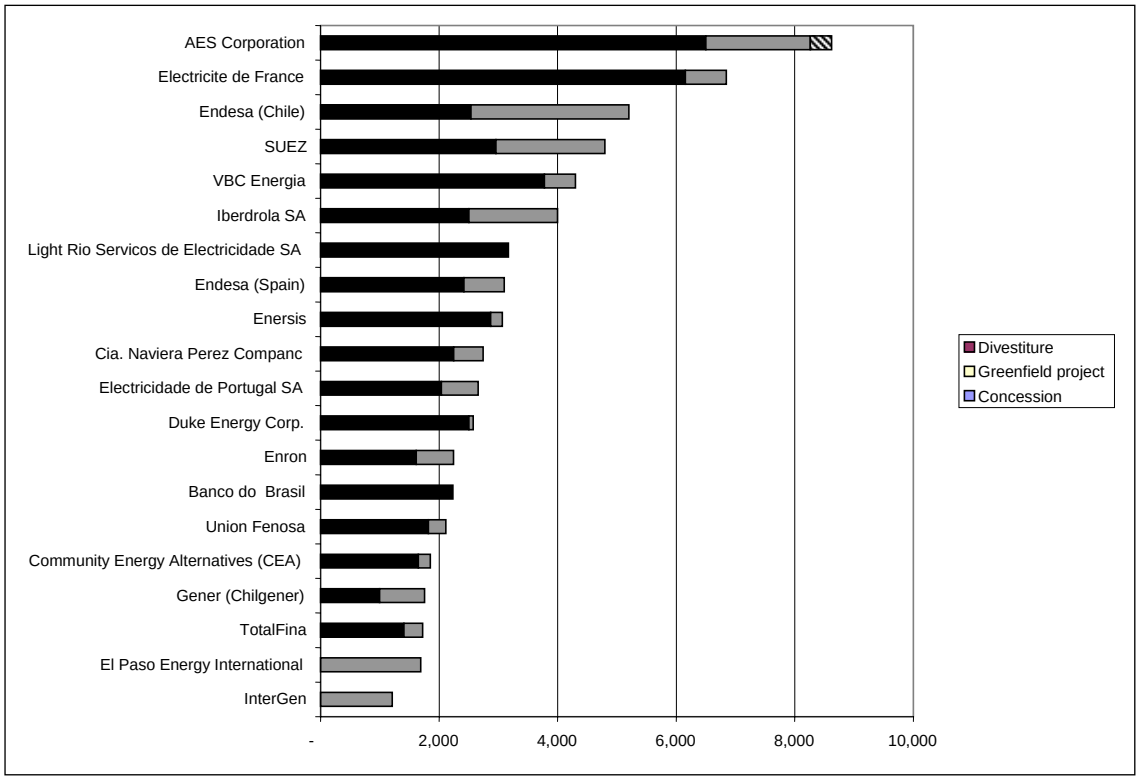
[26] see Figure 1.15
[27] see Table 1.4

dominated by generation and distribution assets acquired during the region's utility privatizations.[28] In the years from 1990 to 2002, 79 percent of the funds employed by the top 15 investors were assigned to divestitures and only 21 percent into greenfield projects (with a remainder of 2 percent corresponding to concession contracts).

1.40 The small investor's portfolio somehow shows the mirror image of the above: None of the bottom 100 investors has more than two projects in their Latin American and Caribbean investment portfolio, and only 26 percent of their total investment is allocated into divestitures whereas the great majority of funds of about 72 percent is invested in greenfield projects and (remainder of 2 percent corresponds to concession contracts).

1.41 A similar distribution seemed to prevalent in the use of funds, with the top 15 investors dedicating only 41 percent of their resources to modernization and expansion investments, whereas the bottom 100 investors used more than 80 percent of their funds for upgrading and capacity enhancement investments.[29]

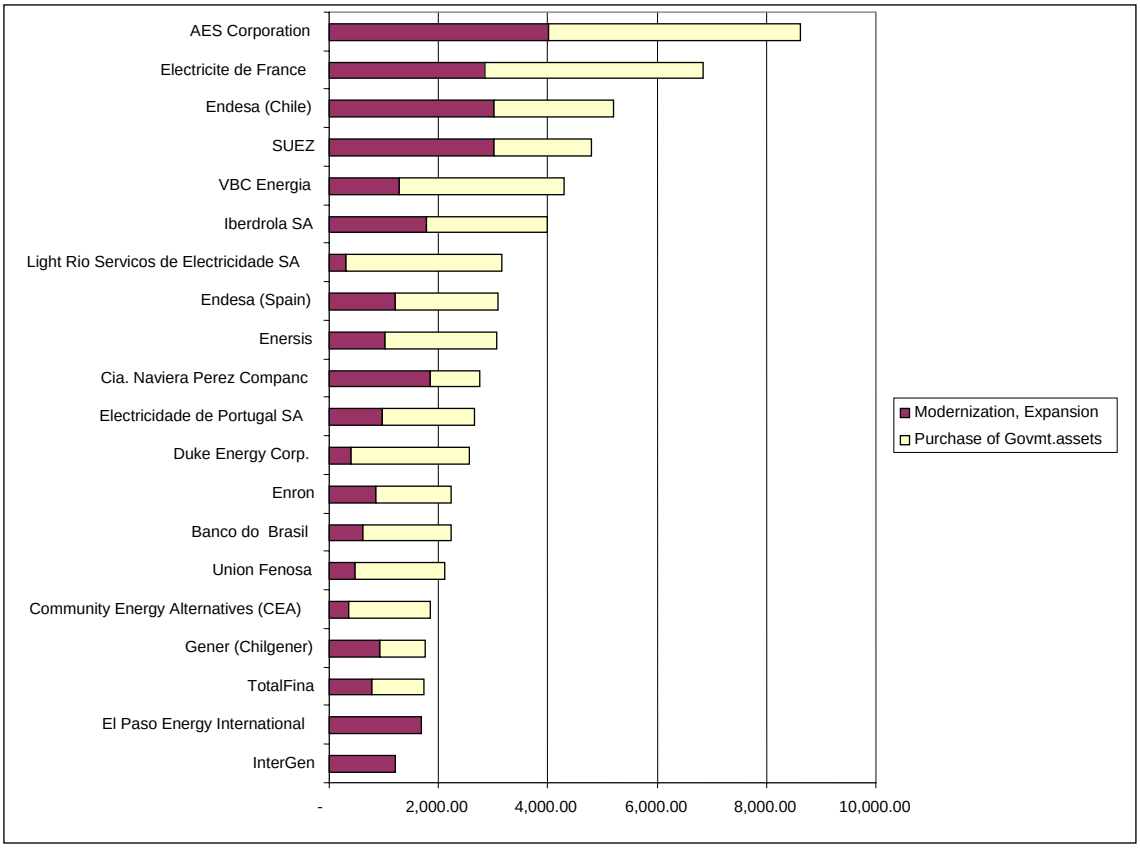
Figure 1.16: Top 20 Project Sponsors by Type of Investment, 1990-2002 [$mm cumulated]



Source: PPI database, own calculations

[28] see Figure 1.16
[29] see Figure 1.17

Figure 1.17: Top 20 Project Sponsors by Use of Funds, 1990-2002 [$mm cumulated]



Source: PPI database, own calculations

Table 1.4: Top 20 Project Sponsors by Total Investment (1990-2002)

Company Name[1]	Country of origin	Electricity Distribution and transmission [%]	Electricity generation [%]	Integrated utilities [%]	Total investmt.[2] [$mm]
AES Corporation	US	37%	22%	41%	16,088
Enersis	Chile	44%	2%	0%	7,408
Endesa (Spain)	Spain	32%	13%	0%	7,311
Electricite de France	France	11%	5%	27%	6,852
Iberdrola SA	Spain	29%	11%	0%	6,444
Endesa (Chile)	Chile	0%	38%	0%	6,154
Banco Bradesco	Brazil	38%	0%	0%	6,076
VBC Energia	Brazil	29%	8%	0%	5,951
Electricidade de Portugal SA	Portugal	24%	4%	5%	5,150
SUEZ	France	0%	26%	4%	4,796
Construcoes e Comercio Camargo Correa	Brazil	19%	3%	0%	3,552
Cia. Naviera Perez Companc	Argentina	18%	2%	0%	3,268
Light Rio Servicos de Electricidade SA	Brazil	20%	0%	0%	3,169
Duke Energy Corp.	US	0%	19%	0%	3,061
Chilectra	Chile	18%	1%	0%	2,999
Mirant	US	0%	1%	16%	2,621
Community Energy Alternatives (CEA)	US	14%	2%	0%	2,603
Enron	US	9%	7%	0%	2,575
CMS Energy Corporation	US	0%	15%	0%	2,464
Banco do Brasil	Brazil	14%	0%	0%	2,234
Total		**22.6%**	**11.3%**	**9.2%**	**100,776**

Source: PPI database (2004), own calculations.
(1) Projects can be associated with more than one sponsor.
(2) Total investment from all sources in projects in which sponsor had an equity participation of 15 percent or more.

Current Strategies of the Main Competitors

AES Corporation, United States

1.42 In 2004, more than half of AES's assets in the power sector were situated in Latin America, with an investment portfolio that includes Argentina, Brazil, Chile, Colombia, Venezuela, the Dominican Republic, El Salvador, Honduras, Mexico, and Panama. In 2002 and 2003, AES has undertaken a comprehensive global restructuring, including the sale of 14 subsidiaries, with the exception of Brasilia Energia, all of which in regions other than Latin America and the Caribbean. In the Latin American region, AES has

increased its stake in many companies, buying shares from other players who are currently exiting the market.[30] In addition, it was effectively forced to take over the shares of several Argentinean joint ventures for a total of $ 376 million, including the transfer of PSEG Global's 30 percent interest in the three Argentine distribution companies EDELAP, EDEN and EDES, a 19 percent share in the 650-MW Central Termica San Nicolas power plant, and a 33 percent interest in the 830-MW Parana power plant, all abandoned by its partner PSEG.[31]

1.43 After defaulting on loans from its subsidiary Eletrobras and its Chilean subsidiary, AES Gener, AES has systematically renegotiated the debt of all its subsidiaries in Brazil and reduced Gener debt by $250 million.[32] In the Dominican Republic, AES sold its interests in the distribution company EdeEste, while maintaining the interests in generation. In Argentina, AES notes that "In 2003, the political and social situation in Argentina showed signs of stabilization, the Argentine peso appreciated to the U.S. dollar, the economy and electricity demand started to recover" and that renegotiation of utilities concessions remains open until the end of 2004.[33]

Empresa Nacional de Electricidad SA (Endesa), Spain

1.44 Endesa has been active in Latin America since the early 1990s. In June 2004, Endesa's management stated that it will stop expanding operations in Latin America as it tries to obtain returns on recent investments that have brought it control of 10 percent of the continent's electricity sector[34]. To justify the risks on Latin American investments and to recoup previous losses, the company is aiming for considerably higher returns on its Latin American assets compared to its European portfolio.

1.45 Although Endesa plans to invest $2.9bn in Latin America over the next few years, the bulk of these funds will mostly be employed to maintain existing assets rather than undertake new investments.[35] Endesa is actively seeking more local partners, so that investment will come from local sources rather than Spain.[36] Endesa's Chilean subsidiary, Enersis, had to carry out a major financial restructuring in 2002, arranging an extra $2.3 billion loans to avoid having to repay existing loans. Despite this, the credit rating of Enersis has been reduced to BBB-.[37] In Brazil however, Endesa decided to reinvest in its distribution companies rather than agree to a refinancing arrangement with Brazilian bank BNDES (as was done by other companies, like for example AES). In Argentina Endesa is involved in negotiations with the government to try and retain its

[30] Hall (2004)
[31] http://www.gasandoil.com/goc/company/cnl13988.htm
[32] http://www.aes.com/aes/index?page=news&reqid=511079
[33] AES Annual report (2003)
[34] Business News Americas-English February 2, 2004 Monday Endesa to halt LatAm expansion
[35] Hall (2004)
[36] Business News Americas-English June 7, 2004 Monday Endesa seeks local partners in Argentina, Brazil
[37] Business News Americas-English July 2, 2004 Friday Fitch affirms Endesa, Enersis BBB- ratings

investments, reclaim its dollarization agreement and increase electricity prices to improve profits.[38]

Electricité de France (EDF), France

1.46 Across the Latin American and Caribbean Region, EDF has invested in operations in electricity generation and distribution in Argentina and Brazil, as well as in generation facilities in Mexico. In 2003, operations in Mexico were mostly lucrative and profitability steadily improved in its operations in Argentina and Brazil, but it lost nearly €1 billion with its Brazilian distributor "Light.". EDF's strategy is now to concentrate on Europe.

1.47 In 2003, EDF brought arbitration cases to the World Bank's International Centre for Settlement of Investment Disputes (ICSID) concerning the Argentinean government's sudden ending of dollarization. EDF has also approached banks to begin restructuring the financial liabilities of its subsidiaries. It has demanded price rises for its distribution companies, but the Argentinean government has not granted any so far. The government has instead decided to impose fines as a penalization for all blackouts that occurred within its concession area since 2001. In July 2004, EDF announced it is selling its stake in the Argentinean distributor Edemsa (Mendoza province) to a local business group.[39]

Iberdrola, Spain

1.48 Iberdrola is a Spanish company with investments in Brazil, Bolivia, Guatemala and Mexico. Its main presence is in a group of distribution companies in the northeast of Brazil. It has recently invested in a 520MW gas-fired generator in the region, all of the output from which will be bought by Iberdrola's distribution companies. According to the 2003 annual report, this investment is fully funded from the surplus of Iberdrola's Brazilian energy operations, not through imported capital.

1.49 Two of Iberdrola's Brazilian distribution companies, Coelba and Cosern, have recently publicized plans to tap local capital markets by issuing bonds worth $143m and $40m respectively.[40]

CMS Energy, United States

1.50 CMS Energy once had broad ambitions in Latin America's gas and power sectors, but decided to slash its overseas presence in order to refocus on its home market (6m customers throughout the state of Michigan). In October 2001, CMS Energy decided to discontinue the operations of its international energy distribution business, but in 2003, it reclassified a large part of its distribution assets as continuing operations due to its inability to sell these assets.

[38] Hall (2004)
[39] Hall (2004)
[40] Hall (2004)

1.51 The company has been marketing its regional assets since late 2001, pursuing an individual asset sale strategy, but is finding weak demand. Since 2003, the company hopes to divest its 15 percent equity interest and associated US$140 million debt in 1,320 MW Argentine hydro generator El Chocon. However, the deal is contingent on the provincial government of Neuquen, where the power station is located, making a planned buyout offer for CMS' stake. Even if that transaction proceeds, CMS will still be left with significant interests in three other Argentine power plants, in Argentine gas pipeline TGN, in Chile's integrated gas and power project GasAtacama, and in Venezuelan state utility SENECA.

1.52 In 2004, CMS announced a loss of $400m on its Argentinean operations.[41] Comparable to EDF, it has taken court action against the government of Argentina's devaluation of the Peso and the forced ending of dollarized end user tariffs.[42]

Mirant Corporation, United States

1.53 Mirant unloaded its money-losing 706 MW Chilean thermal generator Edelnor in early 2002 for US$4.5 million. At year-end 2002, it also completed its exit from South America by selling its 3.6 percent stake in CEMIG--Brazil's largest integrated power generation and distribution company.[43]

CenterPoint, United States

1.54 Houston-based CenterPoint, formerly Reliant Energy, timed most of its Latin America asset sales more fortunately than other investors, managing to sell off its stakes in three Colombian and two Brazilian electric utilities in 2000. It also sold two Argentine businesses in 2003: a 160 MW gas-fired cogenerator was sold for US$23.1 million in February, and its 90 percent stake in Santiago del Estero provincial utility Edese was sold for a reported US$850,000 in April.[44]

Tractebel/Suez, France

1.55 The energy division of Suez Tractebel has major stakes in generating companies in Brazil, Chile, and Peru and Mexico as well as some gas distribution companies in Mexico.

1.56 It has suspended investment in Brazil for the last two years and will not invest further depending on the development of the government's policies for the energy market[45]. Tractebel complains that the current policies put Tractebel "in an unfair position by forcing it to compete with state-controlled generators."[46]

[41] CMS Energy 10-Q filed on 05/07/2004.
[42] Bloomberg News . 07/06/2002
[43] Hall (2004)
[44] Global Power Report, Feb 27, 2003
[45] Global Power Report March 18, 2004
[46] Hall (2004)

Enron, United States

1.57 Under a plan announced recently, a new holding “International Co” would administrate "all or a portion" of Enron's interests in its international electric as well as its natural gas utilities and pipelines. The gas pipeline and distribution assets include the Electridade Servicios SA (Elektro) power distribution company, which has 1.5 million customers in Sao Paulo State, Brazil.[47]

1.58 The power plant assets to be administered (and ultimately sold), comprise a 480-MW gas-fired plant in Cuiaba, Mato Grosso, Brazil; 100 percent of Enron America del Sur, which operates a 70-MW power facility in Argentina; a 51 percent holding in Bahia Las Minas Corp. in Panama, which operates a 280-MW generating facility; 35 percent of Empresa Energetica de Corinto, a 71-MW station in Nicaragua; a 38 percent holding in the 234-MW Puerto Quetal Power plant in Guatemala; an 85 percent holding in Smith/Enron Cogeneration LP, which operates a 185-MW unit in the Dominican Republic.[48]

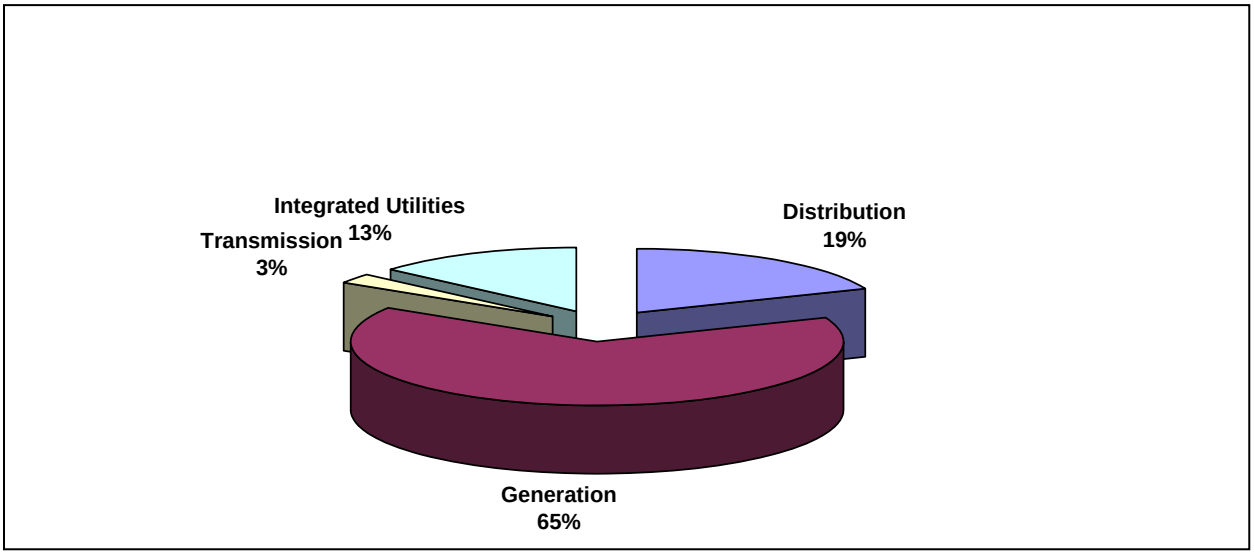
Private Asset Sales and Market Exits

1.59 In the last two years, planned and realized asset sales of private investors in the Latin American and Caribbean Power sector have totaled more than $3.6 billion.[49] Considering the weak demand and plunging prices for power market assets all across the region, many more deals are likely to be in the pipeline but temporarily put on hold until the market shows signs of recovery.

1.60 As to the distribution of private asset sales between the different subsectors, sales of generation assets seem to have occurred in a considerably higher proportion (65 percent) than the share of private participation in generation assets across the Latin American and Caribbean region (48 percent) would suggest.[50] This disconnect is likely to be a result of distribution assets being more difficult to market after the recent occurrences of government interventions like tariff freezes and dis-indexation that affected private investment in distribution very negatively.

[47] Hall (2004)
[48] Power in Latin America, May 23, 2003.
[49] see Table 1.5
[50] see Figure 1.18 and Figure 1.2

Figure 1.18: Private Asset Sales 2002-2004 [percent-share of according to $-value of transaction]



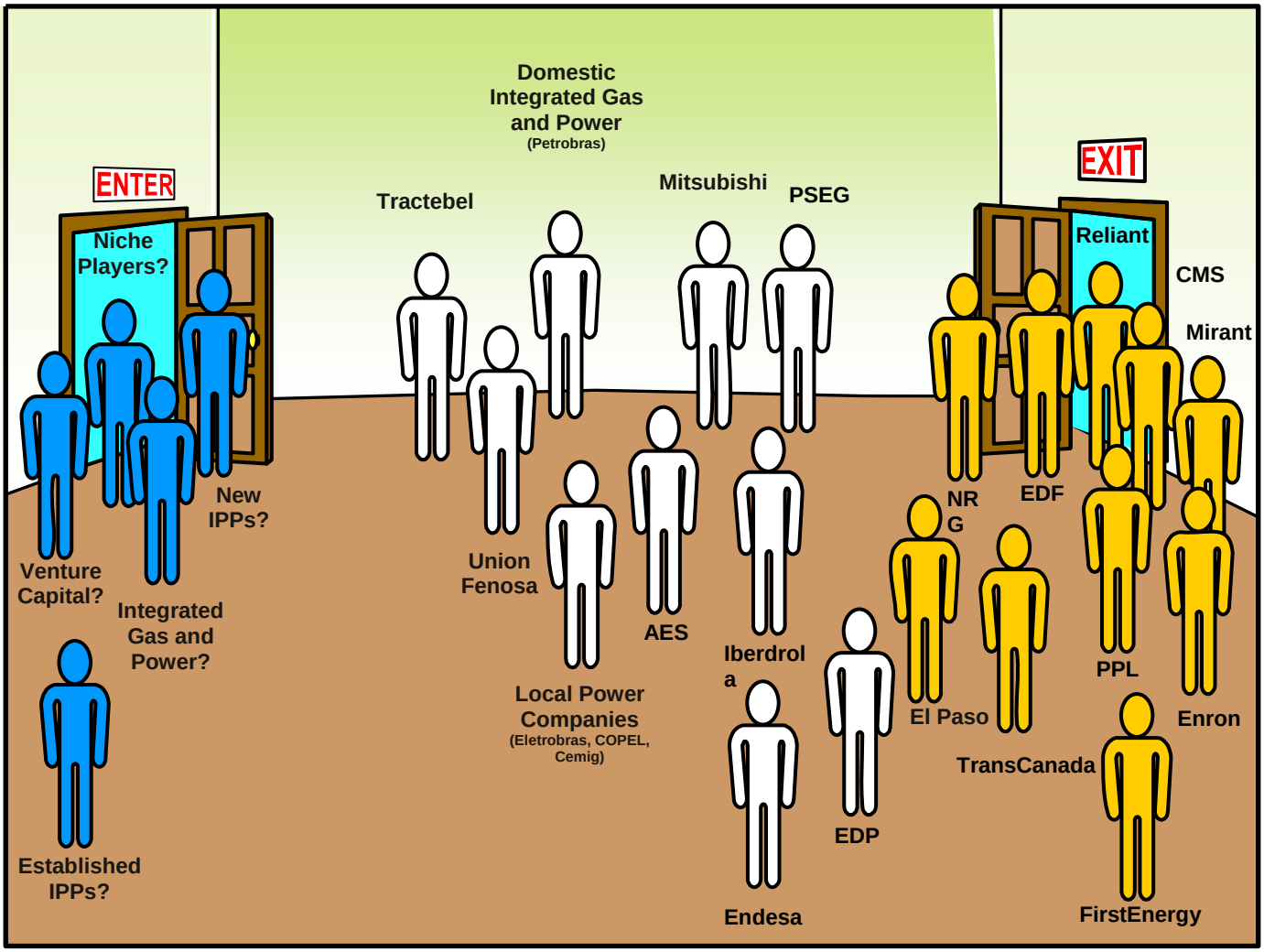
Source: PPI database (2004), Bloomberg (2004), Proquest (2004), Power in Latin America (2004), own calculations.

Table 1.5: Private Asset Sales, 2002-2004

Seller	Project-, Asset name	Subsector	Country	Expected Sale Date	Holdings [%]	Expected Price [$mm]	Realized Price [$mm]
ABB	Termobahia (190 MW)	generation	Brazil	Aug-03	49	256	
AES Corp	AES Gener (,748 MW)	generation	Chile	Mar-04	19	150	
AES	Brasilia Energia	generation	Brazil	Mar-04	53.84		600
Alliant	Cataguazes-Leopoldina group	generation	Brazil	Jul-03	49.2	76	
CenterPoint	Argener, Cogen Plant (160 MW)	generation	Argentina	Feb-03	100		23
CMS Energy	CPEE group	distribution	Brazil	Jun-03	93.9	92	
Constellation, PPL, Covanta	Valle Hermoso (195 MW)	generation	Bolivia	May-03	50	34	
Duke Energy	Corani hydro	generation	Bolivia	May-03	50	405	
Duke Energy	San Marcos thermoelectric project (88 MW)	generation	Bolivia	Dec-02	46	70	
Electricite de France	Empresa Distribuidora de Electricidad de Mendoza	distribution	Argentina	Jan-05	51	280	
Endesa	Cia. Electrica del Rio Maipo	integrated	Chile	Mar-03	100		201
Endesa Chile	Transmission lines	transmission	Chile	Jul-03	110	100	110
Endesa Chile	Cautillar hidroelectric	generation	Chile	Mar-03	100		174
Endesa Chile	Traselec	integrated	Chile	Dec-00	100		1057
Enron	Monterrey (254 MW)	generation	Mexico	Dec-02	80	151	
Enron	Monterrey (254 MW)	generation	Mexico	Jan-03	20	38	
FirstEnergy	Guaracachi generator (200 MW)	generation	Bolivia	Apr-03	50		47
Iberdrola	Ibener (124 MW)	generation	Chile	Aug-04	94.74	123	
Mirant	Empresa Electrica Del Norte	integrated	Chile	Sep-01	82.3	380	
NRG	Compania Boliviana de Energia Electrica (204 MW)	generation	Bolivia	May-03	98	40	
NRG	Bulo Bulo thermo plant (84 MW)	generation	Bolivia	May-03	60	40	
NRG	TermoRio (1,040-MW)	generation	Brazil	Jan-04	15	80	
PSEG, Sempra	Luz del Sur	distribution	Peru	Apr-04	13.6		31
Sempra	Luz del Sur	distribution	Peru	Nov-03	42	90	
Sempra	50% of Chilquinta Energia, electricty distributor	distribution	Chile	Mar-04	50	320	
Southern Cone Power Peru	Edegel (Central Costanera 2,302-MW, San Isidro 370-MW)	generation	Peru	Feb-04	24	135	
Tractebel	Enersur (339-MW)	generation	Peru	Feb-04	21		48
Union Fenosa	Tuxpan, Hermosillo, and Nogales generators	generation	Mexico	Jun-03	50	300	
Xcel Energy	Energia del Sur (76 MW)	generation	Argentina	Mar-03	90	10	

Source: Bloomberg Online, Proquest, Power in Latin America (2004)

Figure 1.19: Latin America and Caribbean Power Market, Recent Development



Source: based on Cano (2003)

Private Participation in Electricity Distribution

1.61 For most of the last decade, the bulk of privatizations in electricity distribution worldwide took place in Latin America, where primarily US and Spanish companies acquired and exchanged the great majority of available distribution assets. In the years from 1990 to 2002 more than $30 billion worth of divestitures were undertaken in the Latin American and Caribbean distribution subsector alone.

1.62 In the 12 years following 1990, Brazil comprised the greatest share in the region's distribution network privatizations totaling more than $20 billion. Argentina followed with a total $5.5 billion, and Colombia and Peru with $1.8 billion and $1.3 respectively. In all four countries, private buyers were mostly North American and European. Regional

investors merely acted as local subsidiaries of American or European investors (i.e. Endesa Chile, Enersis) or only played a minor role.[51]

1.63 The following section tries to outline the most important trends in the two main areas of investment - network extensions and investments in modernization and utility performance - and provide a brief account of the concerns stemming from major strategic acquisitions of the region's key investors.

Private Investment in Network Extensions

1.64 One of the most common failures of the former state owned utilities in the Latin American and Caribbean power sector and therefore a key concern for many reforming governments has been a sustained under-investment in distribution infrastructure. However, even in 2001, after more than a decade of distribution privatizations, almost 60 million people or 12% of the region's population, in particular poor peri-urban and rural population, were still without access to electricity.[52]

1.65 The prevailing logic of market reforms throughout the region suggested that large amounts of private capital would be invested in network extension and the formalization of grid connections, in order to increase the market size and maximize consumer payments.[53]

1.66 Concerning the expansion of privatized distribution networks, there is some evidence to suggest that in some cases the private sector does better than public provision. The private sector's technical and managerial competence, combined with more sustainable pricing policies and better financial discipline, provide more resources for investing in expansion and relax the investment constraints which prevailed under public provision. As a result, in many cases the biggest gains from private provision come through increased investments to meet increasing demand and serve previously unattended consumers.[54] However, it should be noted that network extension has also been significantly subsidized by public funds. The optimality and effectiveness of these interventions, e.g., Guatemala, has recently been questioned.

1.67 A recent example for the successful extension of access to electricity through private participation has been the privatization of electricity distribution in Lima, which has lead to a much larger coverage by the private companies with government support.[55] Coverage of electricity has also increased in Chile since privatization, with the biggest increases being seen for those with lowest income.[56]

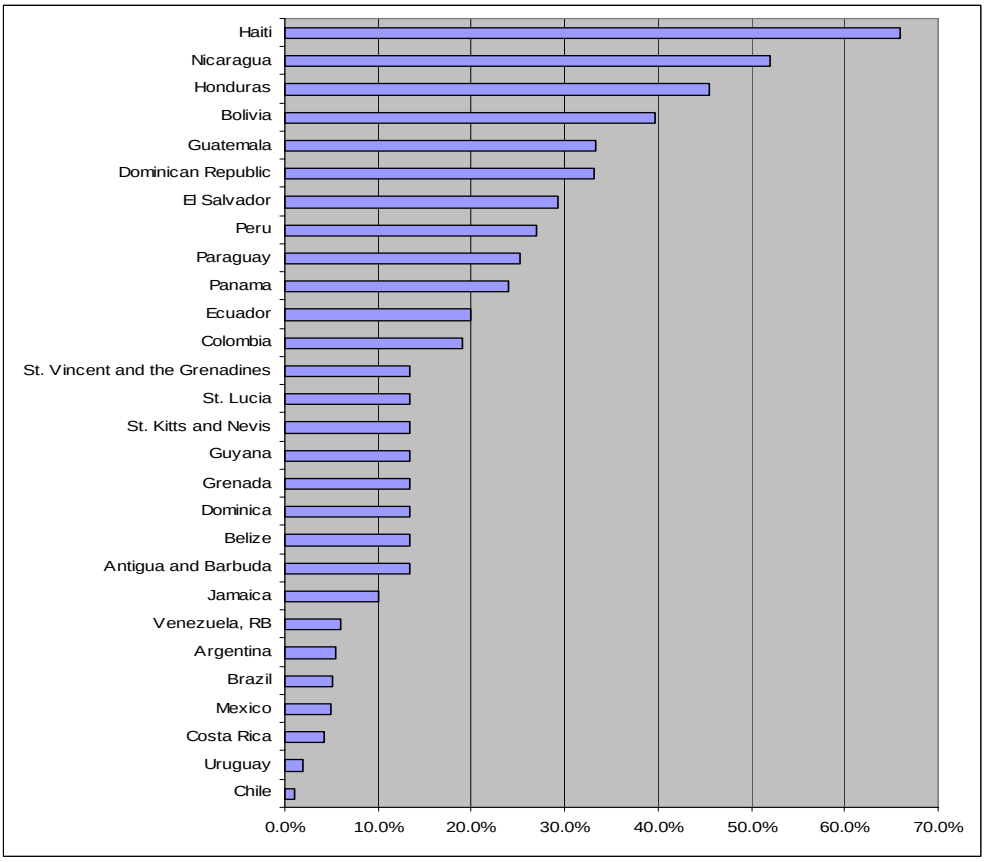
[51] see Tables A1.1 to A1.10
[52] see Figure 1.20
[53] Estache/Foster/Wodon (2002)
[54] Harris (2003)
[55] see Figure 1.21, Torero/Pasco-Font (2001)
[56] Estache, et al. (2000)

1.68 However, contrary to the idea that market liberalization leads to market expansion and thereby investments in new distribution networks, many critics have argued that market reform, if left unregulated, is likely to benefit only established customers and networks. This argument is based on the experience that private utility operators often tend to discriminate amongst consumer groups if there are large differences of perceived likely returns between them. Consequently, low-income areas and consumers are more likely to be perceived as a high risk/low return market. This tendency is particularly prevalent, where regulatory capacity is weaker, and where reform legislation and policies have been rushed through quickly with no particular concern for low income groups and rural access.[57] Monetary incentives to expand the system are vital and can be done through binding obligations and targets to increase access.

1.69 Without specially targeted schemes and interventions, privatized distribution utilities have been likely to move away from the huge investments and financial risks involved in improving and extending the electricity grid of rural, peri-urban and low-income populations. In Argentina, the two privatized distribution companies in Buenos Aires, being confronted with the needs of hundreds of thousands of low-income consumers came up with a "4-year plan" involving significant assistance from the federal and provincial governments.[58]

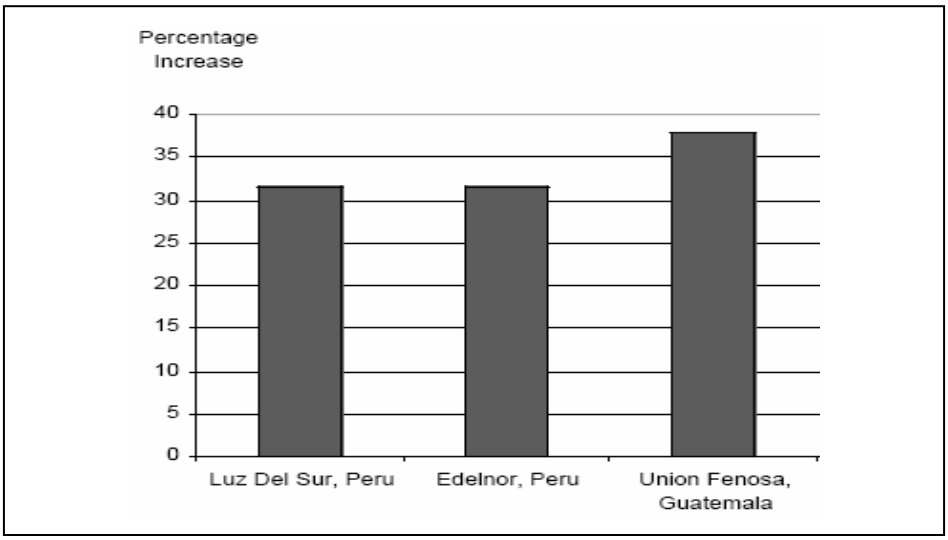
[57] Haselip (2004)
[58] Haselip (2004)

Figure 1.20: Percentages of Population without Access to Electricity



Source: Olade (2003)

Figure 1.21: Increases in Access Following Distribution Privatization



Source: Torero and Pasco-Font (2001), World Bank/PPIAF (2002).

Private Investment in Utility Performance and Modernization

1.70 Before privatization, with governments often lacking the ability to efficiently manage public enterprises or using state owned utilities for non-commercial objectives, distribution companies were frequently over-staffed and badly managed. As a result, taxpayers frequently ended up suffering the cost of those inefficiencies as governments incurred substantial fiscal deficits supporting bungling utilities.[59]

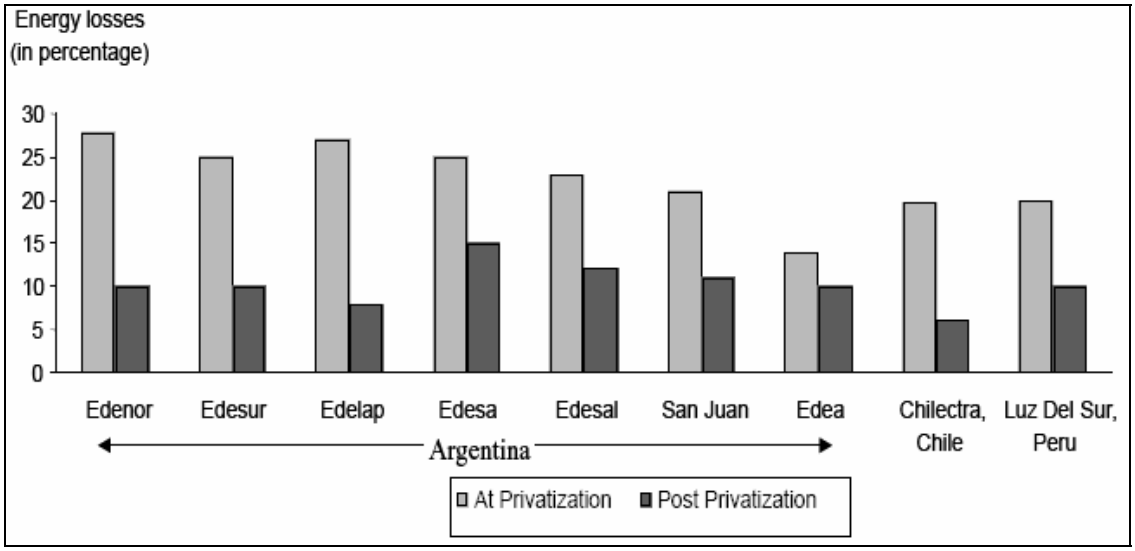
1.71 Consequently, in many cases throughout the region, the almost immediate result of privatizations of distribution utilities was a substantial improvement of labor productivity[60]. For example, Chilectra, Chile's largest distribution utility, more than doubled its annual sales of electricity since privatization, from 3,612 GWh in 1987 to 9,253 GWh in 2001, and its customer base grew from 973,000 to 1,289,000. The number of workers, meanwhile, fell from 2,587 to 722, and the number of clients per worker grew from 376 in 1987 to 1,785 in 2001.[61]

1.72 The Chileans often regarded as pioneers in improving the efficiency and quality of service of privatized companies, later profited from their early expertise as they participated in the privatization of many distribution companies in Argentina, Brazil, Peru and Colombia. A good example of this pattern may be found in CODENSA, the privatized Bogota distribution company that increased customers per employee from 800 to 1,900, and reduced the frequency of service interruptions and mean interruption time by more than 30 percent in only two and a half years.[62]

1.73 A recent study of privatized Brazilian distribution utilities during the period from 1995 to 2000 observed impressive reductions of controllable costs per unit of up to 10% and increases of labor productivity of more than 140%.[63]

[59] Harris(2003)
[60] Some of the productivity improvement implicit in the labor indicators could be attributed to the outsourcing of a number of services that the newly privatized companies have undertaken.
[61] Fischer/Gutierrez/Serra
[62] Milan/Lora/Micco (2001)
[63] Mota (2003)

Figure 1.22: Reductions in Energy Losses Following Distribution Privatization



Source: Feler (1999). Losses include both technical and non-technical losses.

1.74 Non-technical losses and deficient payment discipline is a great challenge in many countries of the Latin American and Caribbean region, with roughly half of the region's countries showing losses above 20% of electricity fed into distribution networks.[64] Accordingly, in countries where deficient meter reading and billing was very prevalent, one of the focal points of private participation was the investment in metering as well as billing and collection mechanisms.[65] Improvements in collections have often been rapid in electricity companies with private participation. For instance in Chile, losses in electricity transport and distribution have more than halved over the levels when the sector was publicly owned.[66]

1.75 However, for many privatized utilities, the need for improvement of collections and non- technical losses meant having to disconnect large quantities of illegally connected end users and customers in default of payment.

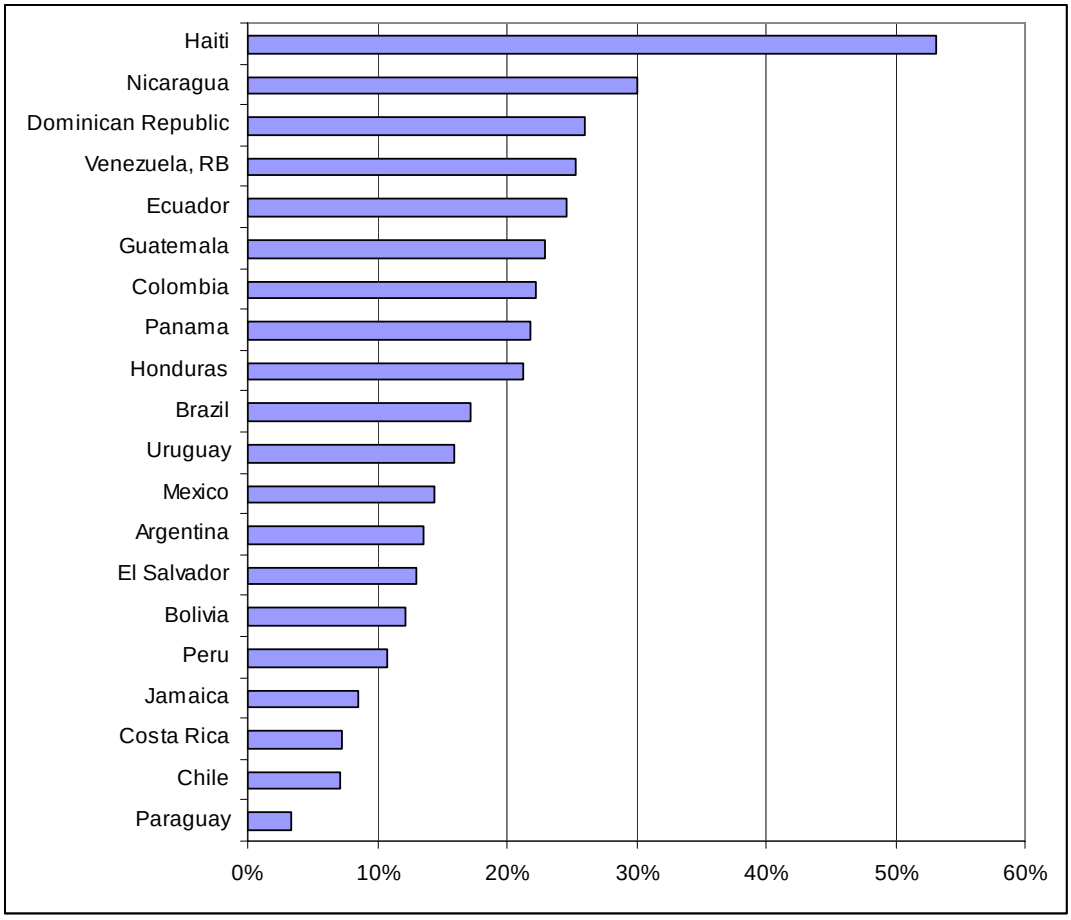
1.76 In Argentina, many of the lowest-income groups were illegally connected to the system, causing substantial leakage.[67] Consequently, the first step taken by the privatized companies was to cut the supply to these poor neighborhoods. Mainly due to open public outrage, a significant portion of illegally connected end-users were incorporated into regular service and their consumption registered and metered by the distribution company. Before Argentina's financial meltdown, municipal authorities throughout the country heavily subsidized the electricity services supplied to these poor areas. Sufficient funds for these payments were generated through municipal charges or taxes applied to

[64] see Figure 1.23
[65] Harris (2003)
[66] Estache/Rodriguez-Pardina (1998)
[67] Chisari/Estache/Romero (1997)

electricity tariffs.[68] However, in the aftermath of Argentina's economic crisis, these funds have dried out and the percentage of non-technical losses is again rapidly increasing, making the economic recovery of many distressed distribution companies even harder.

1.77 After the 1999-restructuring of the power sector in the Dominican Republic, distribution networks were transferred to a consortium consisting of AES (US) and Union Fenosa (Spain). Soon after the privatization, to reduce losses and keep up with customers failing to pay, AES was cutting off some 2000 people a day, although it was reported that more three quarters reconnected illegally.[69]

Figure 1.23: Non Technical Electricity Transmission and Distribution Losses in the Latin American and Caribbean Region



Source: WDI Database (2004)

[68] EIA (2004)
[69] Bayliss (2001)

Private Investment in Strategic Assets and Market Control

1.78 Most of the downward pressure on prices from electricity restructuring traditionally comes from promoting efficiency at the firm level through sector unbundling and wholesale competition.[70] In Argentina, for example, where a strongly competitive market was established in the 1990s, electricity prices demonstrated a consistent downward trend following the market restructuring in the early 1990s, falling about $1.67/MWh annually.[71]

1.79 However, there is growing evidence that in some countries of the Latin American and Caribbean region, effective price competition is increasingly hampered by a creeping monopolization and re-integration of the market. In these countries, a few major investors, through a series of strategic investments and mergers, were able to gain a significant degree of market control through horizontal and/or vertical integration that endangers the functioning of the market and may be difficult to remove.

1.80 In El Salvador, AES effectively gained control of three major distribution companies comprising more than 60% of the market and serving 3.5 million people by incrementally buying out the shares of the two participants (Grupo EDC of Venezuela and Reliant (US)) that originally owned the distribution companies in a 50%/50% joint venture. In addition, shortly after gaining control of the consortium, AES acquired Compania de Luz Electrica de Santa Ana (CLESA) increasing its Salvadorian market share by another 206,000 customers. As a result, AES is now in control of four of the five companies that were subject to the 1998-privatization program.[72]

1.81 Other examples of re-integration issues are Peru, where Endesa's exercises a dominant position in both generation and distribution sectors after it acquired control over the Chilean holding company Enersis and its Peruvian subsidiaries, as well as Argentina, where Endesa and Enersis hold substantial stakes in both of the largest distribution companies.[73]

[70] Newberry (1999); Kessides (2004)
[71] Strategis(2004), http://strategis.ic.gc.ca/epic/internet/inimr-ri.nsf/en/gr-78498e.html
[72] Bayliss (2001), see Table A1.6
[73] Bayliss (2001), see Table A1.9

2

Analysis of Key Barriers to Investments

2.1 As presented and discussed in Chapter 1, the Latin American region has gone through a broad, reform process in the electricity sector. While many countries (Chile, Argentina) went through a full and comprehensive reform process wit many, new private investors entering the market, others (Mexico, Uruguay) have only recently begun attempts at liberalization and deregulation of their electricity markets. In between, there are many examples of different degrees of reform and private investment. In most cases, private participation was part of a broader reform that included some form of vertical separation in the market structure.

2.2 The first section also revealed that private interest was widespread at the beginning of the reform process, initially mainly directed towards divestitures and then mostly to greenfield developments. It also became clear that private interest has been gradually retracting from the electricity sector in the region, with many players leaving the region and others not expanding investments any further.

2.3 From the perspective of the countries and their customers, reform has had some mixed results. In most cases quality standards were raised and coverage increased, at the same time as labor productivity improved substantially. However, reform has also seen cross-ownership and de-facto re-integration in some cases, limiting therefore competition and possible benefits intended at the beginning of the process. In other cases, market liberalization has not led to additional investments in the distribution networks, benefiting more the established residential and industrial customers than expanding service. Nevertheless, the fiscal, financial and service benefits have outweighed the disappointments, thus leading for a continued search for additional private investment in the future, whilst correcting the mistakes and regulatory constraint of the recent past.

2.4 General economic and political aspects, as well as sectoral aspects are the main reasons for the decline of private investment in the energy sector and the market exit by many participants since the mid-1990s. This section provides an analysis of four aspects that have been most common for the reduction in private sector interest in electricity sector in Latin America: (i) macroeconomic barriers, (ii) institutional barriers, (iii) legal/regulatory barriers and, (iv) political barriers. In addition a short summary of a survey of international investors in the power sector will be presented, before concluding with some recommendations.

2.5 The analysis below needs not only to describe reasons for decline in private sector interest, but requires also considering the desired outcome of sector reform, in terms of efficiency and consumer benefits. For example, policies or developments that protect incumbent private sector operators from competition are an important element of the problems facing electricity sector reform in Latin America. Similarly, allowing horizontal re-integration through acquisitions by a single, private participant are not desired outcomes and will inevitably lead to either (i) decline in interest by possible new, private players, or (ii) dissatisfaction by the public in general. The latter is likely to lead to obstacles in a continued reform process.

2.6 Two methodological clarifications are required. In this first part of the proposed study, many of the aspects considered are more anecdotal in nature. More detailed quantifications will be available in the next phase of the analysis, when in-depth country studies will allow also interviews with investors and likely access to some more precise data at companies' level.

2.7 The second aspect to be clarified involves the specific considerations with respect to the distribution sector. While the analysis tries to concentrate on the aspects related to and surrounding distribution companies, inevitably some of the aspects described are either more general in nature (i.e. impact also other sub-sectors) or are originated by institutional or regulatory issues affecting initially the generation sub-sector, but having consequences for the distribution firms.

Macroeconomic Barriers

2.8 The best examples of macroeconomic barriers to private investment are Argentina and Brazil. In both cases, devaluation and macroeconomic instability represented unexpected shocks by private investors. Repercussions have been felt well beyond these two countries. Many private investors (actually in generation and distribution) decided to retract to their base countries avoiding exchange rate risk altogether.

2.9 In the case of Argentina, the collapse of the dollarization and currency board, led in the late 1990's and early 2000's to pesification and desindexation together with devaluation. This in turn, led to economic and financial imbalances for foreign investors and caused major pullouts. A devaluation of 60% in real terms, directly reduced tariff income by that amount.

2.10 In a simplified description of events, the Argentinean electricity sector disaster occurred when private distributors started defaulting on dollar-denominated debt, because the initial introduction and later devaluation of the peso made it difficult or even impossible to honor the contracted obligations[74]. Private investors were betting on a dollarized economy and had correspondingly entered into dollar-denominated debts without any apparent need for hedging arrangements. Since the initial problems

[74] see, Bouille, Dubrovsky, Maurer (2003)

encountered, several foreign distribution companies have taken legal steps against the government because of losses caused by devaluation and conversion of dollar-denominated tariffs.

2.11 The Brazilian case is similar, although somewhat different with respect to the original causes. Private sector investors had to face heavy losses when the currency crashed in the second half of the 1990's. The Brazilian devaluation (around 40%) was not the consequence of the inflexibility of a currency board scheme, but rather the outcome after the authorities were not able to undertake the required macroeconomic reforms, especially introducing the required fiscal reforms. An important flavor of the Brazilian crisis lies with the financing of the privatization of the distribution companies. Local currency financing through BNDES (the local development bank) was not made available for acquisition of companies by foreign investors[75]. Consequently, investors had purchased the companies through dollar-denominated loans. Examples include AES and Iberdrola amongst others.

2.12 Once the tariffs of a devalued "Real" were not sufficient to meet the contracted obligations, many foreign investors were faced with the most typical and structural problem of exchange rate risk. The investors were unable to meet the obligation with respect to the debts contracted to purchase the companies. Since the original crisis, many of these investors have been able to successfully restructure their external debt. However, those efforts have come at high costs and negative results on the income statements.

2.13 In addition to the "exchange rate risk" aspects of the Argentinean and Brazilian cases, other macroeconomic barriers to continued private sector interest have been derived from low sector profitability. This in turn is normally the result from retail tariffs that do not cover costs. Fear by government of the short-term inflationary pressure of tariff hikes, has often (i.e. Bolivia, Colombia, Guatemala) led to either delaying or avoiding the necessary tariff adjustments altogether. Private investors were therefore faced with rates of return well below their initial expectations.

2.14 An overall volatile macro environment or macroeconomic restrictions on debt financing have been also important barriers to renewed private sector interest in investing in the distribution sector in the region. For example, restrictions to local debt financing (i.e. Costa Rica) have resulted in lacking behind with respect to the needed investment targets to reduce losses and increase efficiency in the sector. Instable macroeconomic conditions in some Central American (i.e. Honduras) and even South American countries have limited the investment in required additional generation capacity, which in turn has restricted the expansion of the distribution companies. Finally, an issue at stake in Central America is the small size of countries/economy, which results in the need for supra-national connections. This is a challenging undertaking given the political and economic ramifications.

[75] see Rosenzweig, Voll, Pabon Agudelo (2004)

2.15 The late 1990's also saw a deepened recession in most of the region. This in itself has unlikely reduced private sector interest. Private investors have a long-term view, with possible short-term demand reductions not necessarily affecting the long-term return expectations. However, macroeconomic crises have led in some cases (Colombia, Argentina, Brazil, Mexico amongst others) to either a slower pace in the reform process (passing of crucial legislation was or has been delayed like Mexico and Brazil), or reform processes have been halted or even reversed. It is this type of instability and uncertainty that has and will continue to affect private interest in the distribution sub-sector.

Institutional Barriers

2.16 Power sector reform in Latin America is at different stages for different countries. Some countries are at advanced stages of liberalization (i.e. Chile, Argentina), some are still testing different approaches (i.e. Mexico, Venezuela), while several have only started to carefully undertake some initial steps towards liberalization (i.e. Uruguay and Paraguay). However, even in those countries with more advanced reform processes, substantial institutional barriers continue to prevail, that have led to the reduced interest by private players[76].

2.17 Again, the Argentinean case is representative. Despite the initial success in attracting private investors into the generation and distribution sub-sectors, several factors impeded a broader and more sustained transition towards private sector participation. The cumbersome privatization processes with participation of multiple agencies and legislative bodies made it extremely costly and difficult for new private investors to participate in the bidding process. This was especially the case if regional enterprises were involved[77].

2.18 Another example of similar problems includes Bolivia[78], where while the Ministry of Capitalization was in charge of the privatization of the SOE in distribution, poor inter-agency coordination followed in aspects related to finalizing the divestiture process and more importantly in aspects of sector oversight.

2.19 However, institutional barriers to private investment in Argentina do not stop at the initial divestiture process. Moreover, multiple entities for sector oversight and their limited capabilities make it extremely difficult to understand the ultimate goals and purposes of the authorities. Again, these problems become further exacerbated with a lack of coordination with local authorities when regional markets are involved.

2.20 In addition to those cases where competition has been limited because of incumbent market power or cross-ownership between generator and distributors, private investors have been deterred due to the role and power of large omnipresent state-owned

[76] see Millan (2002) and Benavides (2002)
[77] see, Bouille, Dubrovsky, Maurer (2003)

[78] see O'Sullivan, Gutierrez (2000)

players. This applies to such diverse cases as Mexico (two large integrated SOE's), Costa Rica (one large integrated SOE), or Colombia (one large SOE in generation, and several regionally owned companies in distribution). In some of the countries that have only initiated the reform process, vertical and horizontal integration is the rule, especially of privatization has not yet occurred on a broad basis. Such market structures deter potential private investors, especially if they cannot foresee what the final intention in terms of market structure is.

2.21 A pervasive characteristic that has led to lesser interest by private investors is the continued role of the state in multiple functions[79]. The government often continues to play a role in providing transmission and system operating services, while being the regulator and having political oversight. This paired with a continued role of either nationally or regionally owned enterprises in generation and distribution that are competing with private players, has increased mistrust and led to lost confidence by potential private investors.

2.22 Other institutional barriers and sectoral problems can be extrapolated from the Brazilian example. Here, one ministerial agency has had and continues to have large responsibilities including award of concessions, design of sector policies, and regulation of new bidding processes amongst others[80]. This large amount of several and diverse obligations centralized in one entity have led to a slowdown in planned capacity enlargement, as well as in slow-paced new efforts for enhanced rural electrification. Further private investment in distribution entities might be compromised by the most recent legal changes that require distributors to forecast and contract new generating capacity. This is not an easy task given the lack of data on supply and demand projections. In addition, weak contract enforcement, continued vagueness in tariff-setting provision and the aforementioned "dollar cost/real revenue" mismatch continue to impact private sector interest in a big and growing market.

2.23 In many countries, responsibilities amongst several government entities are not clear, making it difficult for private players to understand the "playing field." In Colombia for example, there are overlapping areas of jurisdictional authority between entities such as the regulatory body, the super-intendancy in charge of supervision and control and that in charge of competition policies. In Colombia, as well as in many other countries also the boundary between regulation and political oversight is not clear, often leading to contradictory decisions and often changes in rules.

2.24 Unclear distribution of roles and responsibilities amongst Government entities is not a minor issue. It leads to reduced confidence and trust by the new or potential private investors. In Central America, examples range from the inexistence of a defined body for

[79] see Lamech, Saeed (2003)
[80] see Mota (2003)

sector coordination and policy (El Salvador) to undefined composition and capabilities of the market administrator (Guatemala)[81].

2.25 Another widespread institutional issue relates to the quality of service. It is certainly the case that often the main reason for seeking private investors is improving the quality in the provision of services. However, when technical and black losses, as well as inefficient and unreliable operating systems are too widespread, private investors tend to shy away from what seem insurmountable challenges.

2.26 In addition, private investors have complained about missing support or vague policies in critical areas. Examples include, little if any support from host governments to collect debts owed to them by customers. This applies even more so, when customers are state-owned entities or public agencies. Even countries with more advanced reform processes like Argentina, Chile, Bolivia or Colombia have never instituted policies or legal frameworks to support collection efforts by newly privatized distribution companies.

2.27 Another issue that has led to a disappointing view by many new investors in the distribution sector relates to the inability of the institutions to respond to the challenges of the ongoing operations under new market structures. Many of the independent or semi-independent dispatch centers have not always been able to accommodate the required technical complexity, or have often not been able to play the clearing house role required for contracts signed between generators and distributors.

2.28 Finally, and critically important, the governmental institutions have often not complied or delayed implementation of contractual commitments. These include, amongst others, on-time payments of subsidies, regulatory or operational commitments acquired in the privatization process, administrative support or shareholder agreements as part of the post-divestiture market structure. In addition, promised Government support to reduce technical losses, to disconnect non-paying customers, to expand service by providing rights of way or environmental licenses has often been lacking. In specific cases in Argentina and Brazil, the government committed to reimburse the privatized utilities for the unpaid balances for “illegal connections” or to support installment of meters or “legal” connections to the network. Many times these commitments were not complied with as political resistance grew or fiscal resources were not available. . Probably the most important complaint by private investors relates to this non-compliance with established commitments[82].

[81] see Ruffin (2002)
[82] see Lamech, Saeed (2003)

Legal/Regulatory Barriers

2.29 The main and repeated issue that can be found with respect to regulatory barriers relates to the inexistence of a truly independent regulator. This is the case in such different countries as Argentina and Chile (with a long and well-developed experience on sector reform) or Costa Rica. In the more advanced countries such as Argentina and Chile, the identified problem has been leniency towards the accumulation of power by certain market players (i.e. incumbent, private investors). In other cases, the missing independence has sometimes favored existent regional or national state-owned enterprises. In Colombia, for example, while the regulator is independent as per the letter of the law, the financial and political dependency on the Central Government has constrained its ability to maintain a truly neutral position[83].

2.30 More than just the "prima-face" independence, private investors want to know how regulators are selected and paid to understand the institutional set-up of the sectoral regulators. Selection of regulators by the executive or legislative branch has different implications for stability and responsiveness. Also, hiring experts from independent technical lists as opposed to political appointees plays a major role. Furthermore, payments of the sectoral budget depending on yearly approvals by Congress or parliament certainly allows for less "continuity" than payments of contributions by the companies themselves. Thus, private investors look not only at the "independence" in terms of the actual relationship to Government ministries but moreover with respect to appointment and payment of regulators and technical support.

2.31 In addition, many of the regulatory bodies face major challenges either because they are new and have to learn the tasks ahead, the appointees and/or technical personnel do not have the required capabilities, or it is faced with multiple tasks within the sector or even across industries. Furthermore, in some countries (i.e. Chile) the regulator does not have the required flexibility to set and enforce rules, given the complicated and stringent legislative process to issue norms and regulations[84].

2.32 A second general aspect found in many countries in the region, including those with more advanced liberalization programs relates to limited competition. Take the example of Chile. Even in this country that had one of the earliest and most successful reform programs, market power of single players (i.e. ENDESA) makes new entry into the market nearly impossible. Cross-ownership and market dominance have resulted in de-facto vertical integration. A similar case is Peru, where horizontal re-integration has been the case due to cross-ownership issues that have led to reduced competitive pressure.

[83] Millan, Lora, Micco (2201)
[84] see Fischer, Gutierrez, Serra (2003)

2.33 The third group of regulatory barriers is linked to the price regulations themselves. The regulations for distribution tariffs in Latin America range from indexed retail tariffs with seasonal prices aimed at protecting final consumers from volatility, through price cap systems with complicated formulas, reference prices set or recommended by regulators to set rates of return for different time periods. Most of these schemes have resulted in insufficient tariffs and are often onerous and difficult to administer. Some of the countries that have started more recently with the reform efforts need a total overhaul of the tariff system[85].

2.34 In addition to the tariff regulations themselves, prevailing subsidy schemes continue to impose challenges that have been difficult to accept by private investors. While many countries have succeeded to reduce subsidies with the correspondent political side effects (see below), regionally diversified and complicated cross-subsidy schemes continue to exist. This together with non-compliance by the government to transfer budgeted subsidies to the distribution companies has added to financial losses and administrative burdens for the newly privatized or to be privatized discos. All of the above has resulted in many distribution companies being under increased financial distress.

2.35 A fourth regulatory/legal challenge to increased private investment lies with the discriminatory application of rules. The most wide spread examples include regional differences in the definition and application of regulations (i.e. Argentina and Brazil) to inconsistent application of rules and penalties for meeting quality standards (i.e. Peru, Brazil). This inconsistent application of rules has led to private investors limit any further expansions or investment, as they do not see the conditions for a fair competitive environment. In addition, the enforcement of quality standards is often weak, leading to an uneven playing field between state-owned distributors and private competitors, who often provide better services[86].

2.36 Discrimination can also be found in how the rules are provided for different size of consumers. In some cases, consumers do not have always access to the same rules and options for price negotiations. This has two effects. It leads to dissatisfaction amongst consumer types and groups, but also limits flexibility for distribution companies to market their services to a broader clientele.

2.37 A fifth regulatory challenge facing many countries is the need to coordinate electricity and gas market reform. Countries such as Brazil and Colombia require development and deepening of gas exploration and production to sustain the required thermo-electric capacity expansions, and be able to meet the increasing consumer demands.

[85] see World Energy Council (2001)
[86] Tenenbaum (1995)

2.38 Finally, rules and regulations should be broad and applicable to all players. Many examples provide though for case-by-case regulations tailored for specific regions (i.e. provinces in Argentina or states in Brazil), specific firms in specific markets (distributors in Lima or Sao Paulo), interference with purely administrative or labor issues, intrusion in concession contracts (Atlantic coast in Colombia), or reversal of policies agreed upon (tariff increase schedules, capacity charges, separate billings for ancilliary services, separate provision of public lighting amongst others). Private investors have seen their base assumptions been challenged by those intrusion and discriminatory applications of formerly foreseen or announced regulations.

Political barriers

2.39 Political barriers to private investment in the electricity sector of the Latin American region take different flavors. Vested political interests can be linked to state-owned incumbents, protecting generous collective bargaining agreements within those SOE's, defending regional interests or bending rules forced by political pressures in the legislature. However, some of the political barriers are also linked to the perception by the public in general that privatization and liberalization has resulted in increased tariffs (often a necessary requirement of the reform process) or dominant market power by individual private players (see above). In addition, accusations of corruption in the divestiture processes themselves, has often hurt the liberalization efforts[87].

2.40 In many countries local governments have been and continue to be reluctant to implement reforms and privatize enterprises (Argentina, Colombia, and Brazil). Often regional government use distribution companies as cash-cows for the regional budget, or use them for job-creation purposes. In Argentina, for example, where competitive markets were supposed to allow electricity supply at the federal and provincial level, 10 of 24 provinces did not follow the divestiture scheme, creating a dual market structure for the country as a whole. In many cases, provincial governments were reluctant to emulate the federal example maintaining local utilities as sources for economic rents and vehicles for political patronage[88]. This also applies in many other countries in the region.

2.41 Sector reform and privatization has often resulted in a sharp drop of sector employment, or the elimination of previous generous collective bargaining agreements. In Argentina, Bolivia, Brazil, Chile, amongst others, this has led to opposition by labor unions. Private investors have been required to either face long labor conflicts or they have had to pay out to be able to reduce employment figures to acceptable levels. Opposition to private investments and employment reduction continues to play an important role in reducing or eliminating private sector interest in the distribution companies[89].

[87] Bouille, Dubrovsky, Maurer (2003) and Estache, Rodriguez (1996)
[88] Bouille, Dubrovsky, Maurer (2003)
[89] see Millan (2001)

2.42 Tariff increases are often a needed element of sector reform. Even without privatization, tariff hikes would have been needed to make distribution companies viable. However, consumer groups and political opposition to sector reform have been able to oppose tariff increases and overhauling of the tariff system, often even against the backdrop of IMF programs. Even in more advanced reform countries such as Chile, political interference into regulatory decisions is a common aspect. Regulatory decisions are seldom isolated from political pressure and interests.

2.43 In some cases (i.e. Brazil, Colombia), the authorities have even allowed for customers to back out from what they saw as too costly contractual arrangements, effectively promoting breaching established obligations. In Venezuela, severe collection problems exist amongst regional utilities and state entities. In addition, electricity prices seem not driven by efficiency considerations, but politically controlled by the Government. Without tariffs that recognize costs and necessary returns, private investment will not be able to flow into the distribution sub-sector in the region.

2.44 Opposition to privatization and liberalization often is based on regional differences. For example, Bolivia was only able to privatize isolated sub-systems as political opposition grew harder in urban as opposes to rural areas[90]. In Brazil, regional politicians have been able to block privatization of regional distribution companies. In Panama, the creation of privatized regional distribution monopolies has responded to regional interest groups, but has limited competition and efficiency gains, leading to increased distribution losses.

2.45 In some countries sectoral reform has been blocked or delayed because of aspects relating to capacity expansion between hydropower and thermo-electric generation. This indirectly affects the distribution companies, either because it increases the costs or, more importantly, because it limits the possibility to meet future demand. In Brazil, for example, social issues and environmental opposition has limited the expansion of hydropower. In Colombia, political intervention in favor of large hydro-electric projects has made it unattractive for private investors to bet on the needed expansion of thermo-electric plants[91].

2.46 Two common trades that directly affect private investors in distribution companies have to do with direct government action or inaction. In many countries government entities are the worst customers when it comes to paying electricity bills. Moreover, the authorities do not help distribution companies to collect the bills, by disallowing disconnecting overdue customers. In other cases (i.e. Colombia) Government bailouts of publicly owned discos, at least cast some doubt over the interest and sustainability of reform to attract private investment.

[90] Barbu and Luzuriaga (1999)
[91] Ayala, Millan (2002)

2.47 Finally, opposition to sector reform is often a political battlefield. Best example is Mexico where lifting a constitutional prohibition is needed to liberalize the sector and attract private investment. However for years now, a political deadlock has effectively stopped any constitutional change. In many countries awarding concessions or allowing private investment require approvals by Parliament, Congress or National Assembly, creating an uncertainty that limits private interest in participating in costly, lengthy and politically charged processes.

Investor Survey

2.48 In 2002 the World Bank undertook a survey of private investors in the power sectors (see "What International Investors Look for When Investing in Developing Countries", Energy and Mining Sector Board Discussion Paper No. 6, May 2003). 67 international investors were surveyed, of which 48 completed a written questionnaire.

2.49 The answers reveal key messages to government when trying to attract and retain investment in the power sector, as well as the main concerns by the investment community. The key messages for governments are that investors are willing to go or stay in markets with good demand growth if (i) adequate cash flows in the sector are ensured, (ii) laws and contracts are stable and enforced, (iii) government interference is minimized, and (iv) responsiveness to the needs of investors are improved. The last point relates mainly to the issues involved in administering and preparing transactions (i.e. concessions or privatizations) in a timely fashion.

2.50 For Latin America, the investors responded to be most dissatisfied with Argentina and Colombia as host countries, while most satisfied with Chile and Mexico. The main concerns of private investors were legal and contractual frameworks that were unstable or difficult to enforce, and issues involving consumer payment discipline and enforcement. Independence of the regulatory entity was another prominent point. Many investors pointed out to the potential benefit of having credit enhancements or guarantees made available (see below for further discussion of this point).

2.51 With respect to the best experiences encountered, investors pointed largely to solid retail tariff schemes and collection discipline, ability to exercise effective management, government meeting established commitments, as well as ability to enforce laws and contracts. The worst experiences expressed by investors related to unresponsiveness to their needs and timeframes in transactions, insufficient retail tariff levels, not sustained commitments acquired through contracts or regulations, and arbitrary regulation processes.

Conclusions

2.52 It is apparent that some basic fundamentals need to be revisited to attract and retain investors in the power sectors in Latin America. Foreign investors have been harmed due to macroeconomic instability and regulatory changes that have affected return expectations. While sectoral liberalization has advanced and sector reform has

gained momentum in most countries, investors will need reinforced security to believe that power markets will work in the region.

2.53 With respect to macroeconomic issues, mainly exchange rate risk, as well as regulatory compliance (meeting the required tariff levels), Government's in Latin America might need to think about some temporary credit enhancement mechanisms. Multilateral backing of exchange rate risk and regulatory commitments might be required to gain the trust back while the fundamental changes in economic structure and regulatory frameworks are sorted out.

2.54 In addition, there is a need to solidify the institutional basis. There is need for sole responsibility for political oversight, while regulation and supervision should be housed with truly independent government bodies. Incentives, both pecuniary and non-pecuniary are required to attract professionals with the needed credentials, experience and capabilities into the regulatory bodies. Also, there is an apparent need to revisit competition policies. The reform process would not be able to be sustained if single private investors are able to acquire unduly market power and vertical and horizontal re-integration takes place.

2.55 The role of state and government remains another major issue. Competing against large, omnipresent state-owned enterprises makes private investment unlikely. Also, the potential for regulatory discrimination deters private interest.

2.56 Price and tariff regulations need to be simple, clear and be maintained over a long time period. Also, retail tariffs need to reflect costs and allow for basic returns. While subsidy schemes are often necessary, especially in a longer transition period to sector reform, it is more likely that direct subsidies by the government (backed possibly by guarantees) provide confidence to investors, than complicated and difficult to administer cross-subsidy schemes.

2.57 Finally, challenges ahead rely with surmounting political opposition to sector reform. This needs a transparent process in the divestiture, as well as communicating the goals of private sector participation to the public in general. If majorities can be won for the process, vocal minorities with vested interests might not be able to stop the reform. The worst outcome, however, is for government's to promote non-compliance with contractual obligations to gain political support. This will inevitably result in private investors leaving the countries they sought of as possible recipients of new investment and enhanced management techniques.

3

Estimates of Investments in the Electricity Sector

3.1 After having presented in chapter 1 the role of private participation in the region, and having discussed the most important barriers to continued private investment in chapter 2, chapter 3 is aimed at projecting required investment needs over the next decade. To achieve that, three different set of figures will be presented. Two estimates based on own calculations as discussed in more detail below, as well as some regional investment projections by the World Energy Investment Outlook.

3.2 The estimates provided by own calculations are based on two different scenarios. One scenarios is based on past growth estimates and extrapolates to project future investments. A second scenario provides for calculations specifically for the distribution sector based on network expansion goals for the rural and urban sector. In addition, numbers for projected investments based on the latest World Energy Investment Outlook are also provided.

3.3 The first calculation as summarized in Table 3.1 is based on growth estimates. The base for the estimates is a 29 year median growth rate for consumption from 1972-2001, which was equivalent to about 6.5% per annum. The cost for new capacity and the capacity utilization rate per country are derived from 2003 estimates. The share distribution corresponds to 60% generation, 30% distribution and 10% transmission as derived from the World Energy Investment Outlook and the study by Fay and Yepes (2003). This scenario can be called “business as usual”, as it is based upon the historical data on electricity consumption and the most recent cost estimates.

Table 3.1: Projected Investments in the Electricity Sector in Latin America 2005-2015 (in m US$)

Country	Generation	Transmission	Distribution	Total
Argentina	8070	1345	4035	13450
Bolivia	420	70	210	700
Brazil	55012	9169	27506	91687
Chile	5941	424	2970	9335
Colombia	4226	704	2113	7043
Costa Rica	6045	1007	3022	10074
Dominican Republic	1532	255	766	2553
Ecuador	1908	318	954	3180
El Salvador	611	102	306	1019
Guatemala	713	119	357	1189
Haití	67	11	33	111
Honduras	816	136	408	1360
Jamaica	1106	184	553	1843
México	27132	4522	13566	45220
Nicaragua	92	15	46	153
Panama	535	89	268	892
Paraguay	1990	332	995	3317
Peru	1732	289	866	2887
Uruguay	578	96	289	963
Venezuela	11342	1890	5671	18903
Total Region	129868	21077	64934	215879

(Own estimates based on past and projected demand growth scenarios)

3.4 Under this scenario, total investment in the region between 2005 and 2015 is estimated at around US 215 billion, of which close to US$65 billion corresponds to the distribution sector. This distribution investment estimate obtained through the top-down approach includes: (a) the necessary investment in augmentation due to the increased demand stemming from income and population growth, (b) the investment required to achieve universal coverage in urban areas and about 70% , and (c) maintenances and rehabilitation of the distributions system. Overall and not surprisingly, countries such as Brazil and Mexico will require investment of the order of US$90 billion for the first and US$45 billion for the second. Financing these investment needs will represent a big challenge. As examples, these figures equate to yearly investments of US$9 billion for Brazil and close to US$5 billion for Mexico.

3.5 To identify the investment required to achieve a significant progress in rural electrification only (i.e., 70% of households coverage) in all of the region's countries by 2015 and urban coverage to 100%, a bottom up approach was utilized. The costs per connection are based on 2003 estimates derived from current costs for both rural and urban electrification. The results of this scenario, which can be called "network extension and increased access", are reported in Table 3.2. Under these estimates total investment is over US$56 billion over the next decade, with US$11 billion related to new investment in rural connections and close to US$45 billion to overall, urban network

expansion. The difference between the first and the second should be interpreted as the distribution investments in maintenance and rehabilitation necessary to meet the increase in electricity demand for existing consumers.

Table 3.2: Projected Investments to Increase Access in Latin America in the Distribution Sector 2005-2015 (in m US$)

Country	Number of Rural Connections	Number of Total Connections	Investment Need Rural Connections	Investment Need Network Connections
Argentina	713	10462	499	3139
Bolivia	489	2716	342	815
Brazil	3310	49755	2317	14927
Chile	250	4434	175	1330
Colombia	1390	12906	973	3872
Costa Rica	226	1172	158	352
Dominican Republic	524	2524	367	757
Ecuador	721	3830	504	1149
El Salvador	407	1951	285	585
Guatemala	1110	3974	777	1192
Haití	803	2532	562	760
Honduras	632	2230	443	669
Jamaica	192	720	134	216
México	3651	29531	2556	8859
Nicaragua	385	1762	269	529
Panama	193	865	135	259
Paraguay	371	1786	259	536
Peru	1001	7862	700	2358
Uruguay	28	894	20	268
Venezuela	437	7644	306	2293
Total Region	**16833**	**149550**	**11781**	**44865**

(Own estimates based on rural and urban network expansion)

3.6 The International Energy Agency foresees close to US$4 trillion in investment in the electricity sector over the next decade[92]. Of this total, around US$220 billion will be destined to the electricity sector in Latin America as per the reference scenario (see table 3.3) provided by decades in the World Energy Investment Outlook[93]. Around one third of that investment, around US$80 billion will be directed to the distribution sector. These figures are three times higher than those for the last three decades. The reasons for this substantial increase relates to the capital intensity if the investments, as well as to the

[92] World Energy Investment Outlook, International Energy Agency (2004)

[93] While the Outlook provides figures for the decades as 2001-2010, 2011-2020, and 2021-2030, approximations as per investment figures for the analyzed time frame of 2005-2015 can be provided based on that reference scenario

likely shift from primary fuels to electricity, with demand increases in the region to be on average around 5%.

Table 3.3: Reference Scenario: Investment in Electricity in Latin America (billion US$)

	2001-2010	2011-2020	2021-2030	2001-2030
Generation	86	111	120	317
Refurbishment	5	5	8	19
Transmission	32	41	55	128
Distribution	69	89	124	281
TOTAL	**191**	**247**	**306**	**744**

World Energy Investment Outlook, International Energy Agency (2004)

3.7 The analysis provided by the World Energy Investment Outlook further suggests that close to 2% of the GDP in Latin America will have to be spent in energy investment over the next two decades and that the share of energy investment in total domestic investment in the region will be close to 8%.

3.8 As can be seen from the used reference scenario, the investment figures from own calculations for the distribution sector (i.e. US$64 billion in the scenario based on demand growth and US$55 billion based on network expansion targets) are in a similar range as those provided based on growth, network expansion and maintenance costs by the IEA. In all cases, it becomes clear that to achieve any of the projected targets, private investment will have to reach levels very similar to those seen in the peak of private investment in the distribution, i.e., close to US$8-10 billion in 1997/1998 period .

3.9 Fiscal constraints in all countries in the region paired with limited debt capacity mean that private investment sources have to account for a substantial portion of this investment. Moreover, public utilities remaining in the public sector face substantial financial challenges, being unable to finance investments of this magnitude on their own. Low revenues, high production costs, and political interference have resulted in substantial liquidity and financial constraints.

3.10 While one potential source could be domestic savings, most of these savings in Latin America are now linked to individual, pension savings accounts. Most of these pension funds have either self-imposed or regulatory restrictions in terms of investing in what are believed to be riskier investments such as infrastructure projects. Projects in the electricity sector are viewed as including such risks as market, construction and operation risks, that together with regulatory, judicial and force majeure risks lead to ratings that are unlikely to meet the requirements of the more conservative domestic pension funds[94].

[94] While outside the scope of this analysis, it is important to mention that there are creative ways of managing and distributing the risks in the electricity sector. The World Bank's guarantee program provides interesting examples for risk guarantees in the distribution sector, with examples from Romania and Slovakia amongst others.

3.11 With domestic savings being an unlikely source to provide most of the needed funding for energy investment in general, and electricity investment in particular, there is clearly a need for external financing. With external debt, however representing close to 50% of GNP in Latin America, there is little room for increased debt financing. Therefore the needs for direct private investment, whether domestic or foreign is crucial. This however will require a perception of risk-return rewards that allows for such private investors to come back to the region.

3.12 There is no doubt that without large flows of private direct investment in the regional electricity sector in general, and in the distribution sector specifically, even the less ambitious targets will not be achieved. This will require substantial efforts to overcome the constraints mentioned in chapter 2 and provide the basis for a return to the levels of private investment seen in the middle of the 1990's as mentioned in chapter 1.

4

Proposed Detailed Country Analysis

4.1 The analysis provided so far requires much more detailed specific country studies that will define and propose an analytical framework for the identification of risks and risk mitigation mechanisms involved in the distribution business. The analysis will analyze the allocation of risks between different stakeholders (i.e. consumers, government, generation and distribution companies, the tax payer in general) and will include such risks as bill collection, service expansion commitments, supply obligations and demand growth, capital and operating cost assumptions, macroeconomic variables (i.e. inflation, foreign exchange risk), regulatory risks and political risks (including subsidy and tariff regime).

4.2 The purpose is to provide for the proposed countries (see below) a risk allocation matrix by analyzing market structures, legislative and regulatory frameworks and different types of concession agreements and/or contractual arrangements for private provision of electricity distribution services. Specific case studies within the proposed countries are aimed at looking at risk mitigation examples and financing mechanisms adopted by private investors. Such case studies will allow to analyze different experiences of public-private partnerships and propose a way forward based on the lessons learned, that will allow to propose mechanisms and structures that make more likely the investment required over the next decade in the regional distribution sector.

4.3 The criteria for proposing and selecting four specific countries for more detailed analysis are based on the following criteria: (i) current status with the electricity sector reform and market structure; (ii) degree of private sector investment; (iii) investment needs and network coverage; and (iv) reform sustainability and extent of some of the identified barriers (i.e. macroeconomic, legal, regulatory, political). The proposed countries below provide a wide range in terms of their abilities ad impediments to attract foreign investments, are diverse in size and investment needs, and have a likely approach to pursue an additional path of reform to revitalize private investment in the distribution sector.

4.4 The four countries proposed for detailed country analysis are as follows: (i) Argentina; (ii) Brazil; (iii) Colombia; and (iv) El Salvador. Argentina provides for an example of substantial private investment in the distribution sector with a widespread problem of trust and negative past experience. The country example provides for a rich

basis of experience and lessons learned from past failures and future requirements. Brazil provides an example with such a substantial need for future investment, that it imposes a challenge given its pure size. It is also an example of regulatory and market reform failures and repeated trial and errors. Colombia is an example that provides a different approach with profound reform and substantial private investment in the generation sector, but very little reform and private investment in the distribution sector. Moreover, it represents a case of repeated failures in attracting private investment to some of its public regional utilities. El Salvador will provide the example of a small country with large investment needs, but certainly more difficulties to attract private investment despite its investment grade rating.

4.5 Together the four proposed countries are representative of a) different stages in the reform process; b) differences in investment needs and size of future requirements; c) past experiences and contractual arrangements; d) extent and pervasiveness of some of the barriers analyzed in chapter 2; but e) are likely to pursue paths that will be looking at attracting and promoting private investment into their distribution sectors.

Annex 1

Private Sector Investment in Latin America

Table A1.1: Divestitures in Electricity Distribution in Argentina, 1990 - 2002

Country	Project Name	Closure Year	Subtype of PPI	% Private	Total Investmt.	Sponsor Country	Sponsor
Argentina	Edesur SA	1992	Full Divestiture	100%	2,246	Argentina, Chile	Cia. Naviera Perez Companc, Enersis
	Edenor SA	1992	Full Divestiture	100%	1,443	France, Spain	Electricite de France, Endesa (Spain)
	Empresa Distribuidora Electrica Atlantica SA	1997	Partial Divestiture	90%	495	Italy	Camuzzi Gazometri SpA
	Empresa Distribuidora Electrica Norte SA	1997	Full Divestiture	100%	420	US	AES Corporation, Community Energy Alternatives (CEA)
	Empresa Distribuidora de Electricidad de Mendoza	1998	Partial Divestiture	51%	281	France, Argentina	Electricite de France, Medinvert
	Empresa de Distribucion Electrica de Tucuman SA	1995	Partial Divestiture	90%	190	Argentina	Jose Cartellone Construcciones Civiles SA, Compania General de Electricidad, Compania Nacional de Fuerza Electrica
	Empresa de Distribucion de Electricidad de Entre Rios SA	1996	Full Divestiture	100%	161	US	PSEG Global Inc.
	Empresa Distribuidora Electrica Sur SA	1997	Full Divestiture	100%	145	US	AES Corporation, Community Energy Alternatives (CEA)
	Empresa de Energia de Rio Negro SA	1996	Full Divestiture	100%	98	Argentina, Italy	Sociedad Austral de Electricidad (Saesa), Camuzzi Gazometri SpA
	Empresa Distribuidora de Electricidad La Rioja	1995	Full Divestiture	100%	14	US	GPU International
	Empresa de Energia de Catamarca	1996	Partial Divestiture	90%	12	Argentina, Germany	IATE SA, Siemens AG
	Empresa Distribuidora de Electricidad de San Luis	1993	Management contract	100%	-	Spain	Union Fenosa
Total					**5,505**		

Source: PPI-Database (2004)

Table A1.2: Divestitures in Electricity Distribution in Bolivia, 1990 - 2002

Country	Project Name	Closure Year	Subtype of PPI	% Private	Total Investmt.	Sponsor Country	Sponsor
Bolivia	Electricidad La Paz SA and Empresa de Luz y Fuerza Electrica de Oruro SA	1995	Full Divestiture	100%	91	Spain	Iberdrola SA, Consortium of investment funds
	Empresa de Luz y Fuerza Electrica Cochabamba SA	1995	Partial Divestiture	50%	50	US	PP&L Global Inc.
	Total				**142**		

Source: PPI-Database (2004)

Table A1.3: Divestitures in Electricity Distribution in Brazil, 1990 - 2002

Country	Project Name	Closure Year	Subtype of PPI	% Private	Total Investmt.	Sponsor Country	Sponsor
Brazil	Light Rio Servicos de Electricidade SA	1996	Partial Divestiture	92%	4,297	US, France	AES Corporation, Electricite de France
	Eletropaulo Metropolitana de Eletricidade SA (Eletropaulo Metropolitana)	1998	Partial Divestiture	66%	3,169	Brazil, US	Light Rio Servicos de Electricidade SA, AES Corporation
	Companhia de Electricidade do Estado da Bahia (COELBA)	1997	Partial Divestiture	61%	2,234	Brazil, Spain	Banco do Brasil, Iberdrola SA
	Companhia NorteNordeste de Distribuicao de Energia Eletrica	1997	Partial Divestiture	90%	1,651	US, Brazil	Community Energy Alternatives (CEA), VBC Energia
	Companhia Centro-Oeste de Distribuicao de Energia Eletrica	1997	Partial Divestiture	90%	1,529	US	AES Corporation
	Elektro Eletricidade e Servicos SA (Elektro)	1998	Partial Divestiture	99%	1,514	US	Enron
	Companhia Energetica do Ceara (Coelce)	1998	Partial Divestiture	59%	1,282	Spain, Chile	Endesa (Spain), Enersis
	Companhia de Electricidade do Estado Rio de Janeiro SA (CERJ)	1996	Partial Divestiture	78%	1,231	Chile, Chile, Portugal	Enersis, Chilectra, Electricidade de Portugal SA
	Empresa Bandeirante de Energia (EBE)	1998	Partial Divestiture	96%	1,186	Portugal, Brazil	Electricidade de Portugal SA, Companhia Paulista de Forca e Luz (CPFL)
	Companhia de Energia Eletrica de Pernambuco (CELPE)	2000	Partial Divestiture	79%	1,139	Spain, Brazil	Iberdrola SA, Previ
	Companhia Energetica do Rio Grande do Norte (Cosern)	1997	Partial Divestiture	86%	754	Spain	Iberdrola SA
	Companhia Energetica do Maranhao (CEMAR)	2000	Partial Divestiture	85%	359	US	PP&L Global Inc.
	Companhia Eletrica de Borborema (CELB)	1999	Partial Divestiture	75%	58	Brazil	Cataguaz Leopoldina
	Companhia Piratininga de Forca e Luz	2001	Full Divestiture	100%	26	Brazil	Companhia Paulista de Forca e Luz (CPFL)
	Total				**20,427**		

Source: PPI-Database (2004)

Table A1.4: Divestitures in Electricity Distribution in Colombia, 1990 - 2002

Country	Project Name	Closure Year	Subtype of PPI	% Private	Total Investmt.	Sponsor Country	Sponsor
Colombia	Comercializadora y Distribuidora de Energia SA	1997	Partial Divestiture	48%	1,226	Chile, Chile, Spain	Enersis, Chilectra, Endesa (Spain)
	Corelca Distribution	1998	Partial Divestiture	65%	558	Spain	Union Fenosa
Total					**1,784**		

Source: PPI-Database (2004)

Table A1.5: Divestitures in Electricity Distribution in the Dominican Republic, 1990 - 2002

Country	Project Name	Closure Year	Subtype of PPI	% Private	Total Investmt.	Sponsor Country	Sponsor
Dominican Republic	Empresa Distribuidora Electrica Este	1999	Partial Divestiture	50%	109	US	AES Corporation

Source: PPI-Database (2004)

Table A1.6: Divestitures in Electricity Distribution in El Salvador, 1990 - 2002

Country	Project Name	Closure Year	Subtype of PPI	% Private	Total Investmt.	Sponsor Country	Sponsor
El Salvador	Compania de Alumbrado Electrico de San Salvador (CAESS)	1998	Partial Divestiture	75%	236	US	AES Corporation
	Distribuidora de Electricidad del Sur (DELSUR)	1998	Partial Divestiture	75%	180	US	PP&L Global Inc.
	Compania de Luz Electrica de Santa Ana (CLESA)	1998	Partial Divestiture	80%	119	US	AES Corporation, Energia Global Inc., De Sola Group
	Empresa Electrica de Oriente (EEO)	1998	Partial Divestiture	89%	61	US	AES Corporation
	Distribuidora Electrica de Usulutan (DEUSEM)	1998	Full Divestiture	100%	8	US, Venezuela	AES Corporation, Corporacion Electricidad de Caracas
Total					**604**		

Source: PPI-Database (2004)

Table A1.7: Divestitures in Electricity Distribution in Guatemala, 1990 - 2002

Country	Project Name	Closure Year	Subtype of PPI	% Private	Total Investmt.	Sponsor Country	Sponsor
Guatemala	Empresa de Distribucion Electrica de Guatemala (EEGSA)	1998	Partial Divestiture	88%	520	Spain, Portugal, US	Iberdrola SA, Electricidade de Portugal SA, TECO Power Services Corp.
	Empresa de Distribucion de Occidente & Empresa de Distribucion de Oriente	1999	Partial Divestiture	80%	101	Spain	Union Fenosa
Total					**621**		

Source: PPI-Database (2004)

Table A1.8: Divestitures in Electricity Distribution in Panama, 1990 - 2002

Country	Project Name	Closure Year	Subtype of PPI	% Private	Total Investmt.	Sponsor Country	Sponsor
Panama	EDE Metro Oeste and Chiriqui	1998	Partial Divestiture	51%	212	Spain	Union Fenosa
	Elektra Noreste, S.A.	1998	Partial Divestiture	51%	90	US, Panama	Constellation Power Inc., Primer Banco de Ahorros, S.A.
Total					**302**		

Source: PPI-Database (2004)

Table A1.9: Divestitures in Electricity Distribution in Peru, 1990 - 2002

Country	Project Name	Closure Year	Subtype of PPI	% Private	Total Investmt.	Sponsor Country	Sponsor
Peru	Luz del Sur SA	1994	Full Divestiture	100%	677	US, US, others	PSEG Global Inc., Sempra Energy International, Latin American Energy and Electricity Fund
	Empresa de Distribucion Electrica Lima Norte SA	1994	Partial Divestiture	64%	412	Chile, Chile, Spain	Enersis, Chilectra, Endesa (Spain)
	Electro Norte Medio	1998	Partial Divestiture	30%	68	Peru	Jose Rodriguez Banda SA
	Empresa Regional de Servicio Publico de Electricidad del Sur Medio SA	1997	Partial Divestiture	90%	51	Argentina, Peru	IATE SA, Tizon Constructora de Caminos
	Electro Noroeste	1998	Partial Divestiture	30%	23	Peru	Jose Rodriguez Banda SA
	Electro Norte	1998	Partial Divestiture	30%	22	Peru	Jose Rodriguez Banda SA
	Empresa de Distribucion de Energia de Chancay SA	1995	Partial Divestiture	60%	10	Chile	Endesa (Chile), Enersis, Chilectra
	Empresa de Distribucion Electrica de Canete SA	1996	Full Divestiture	100%	9	Chile, Canada	Chilquinta, Ontario Hydro International
	Electro Centro	1998	Partial Divestiture	30%	1	Peru	Jose Rodriguez Banda SA
Total					**1,273**		

Source: PPI-Database (2004)

Table A1.10: Divestitures in Electricity Distribution in Venezuela, 1990 - 2002

Country	Project Name	Closure Year	Subtype of PPI	% Private	Total Investmt.	Sponsor Country	Sponsor
Venezuela	Compania Anonima Luz y Fuerza Electricas de Puerto Cabello	1998	Partial Divestiture	94%	10	US	Enron

Source: PPI-Database (2004)

Annex 2

Work Sheets for Calculation of Estimates for Projected Investments

Argentina

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	5,959
Investment Need Power Sector	2005-2015	Estimate	$m	13,450
Investment Need Power Generation	2005-2010	Estimate	$m	3,575
Investment Need Power Generation	2005-2015	Estimate	$m	8,070
Investment Need Power Transport	2005-2010	Estimate	$m	596
Investment Need Power Transport	2005-2015	Estimate	$m	1,345
Investment Need Power Distribution	2005-2010	Estimate	$m	1,788
Investment Need Power Distribution	2005-2015	Estimate	$m	4,035

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	9,819
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	10,462
Total Investment Need Network Extension	2005-2010	Estimate	$m	2,946
Total Investment Need Network Extension	2005-2015	Estimate	$m	3,139
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	439
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	713
Investment Need Rural Network Extension	2005-2010	Estimate	$m	308
Investment Need Rural Network Extension	2005-2015	Estimate	$m	499

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Bolivia

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	306
Investment Need Power Sector	2005-2015	Estimate	$m	699
Investment Need Power Generation	2005-2010	Estimate	$m	184
Investment Need Power Generation	2005-2015	Estimate	$m	420
Investment Need Power Transport	2005-2010	Estimate	$m	31
Investment Need Power Transport	2005-2015	Estimate	$m	70
Investment Need Power Distribution	2005-2010	Estimate	$m	92
Investment Need Power Distribution	2005-2015	Estimate	$m	210

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	2,420
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	2,716
Total Investment Need Network Extension	2005-2010	Estimate	$m	726
Total Investment Need Network Extension	2005-2015	Estimate	$m	815
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	339
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	489
Investment Need Rural Network Extension	2005-2010	Estimate	$m	237
Investment Need Rural Network Extension	2005-2015	Estimate	$m	342

(*) As upfront payment (no discounted cash low considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Brazil

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	38,357
Investment Need Power Sector	2005-2015	Estimate	$m	91,687
Investment Need Power Generation	2005-2010	Estimate	$m	23,014
Investment Need Power Generation	2005-2015	Estimate	$m	55,012
Investment Need Power Transport	2005-2010	Estimate	$m	3,836
Investment Need Power Transport	2005-2015	Estimate	$m	9,169
Investment Need Power Distribution	2005-2010	Estimate	$m	11,507
Investment Need Power Distribution	2005-2015	Estimate	$m	27,506

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	45,931
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	49,755
Total Investment Need Network Extension	2005-2010	Estimate	$m	13,779
Total Investment Need Network Extension	2005-2015	Estimate	$m	14,927
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	2,664
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	3,310
Investment Need Rural Network Extension	2005-2010	Estimate	$m	1,864
Investment Need Rural Network Extension	2005-2015	Estimate	$m	2,317

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Chile

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	4,237
Investment Need Power Sector	2005-2015	Estimate	$m	9,902
Investment Need Power Generation	2005-2010	Estimate	$m	2,542
Investment Need Power Generation	2005-2015	Estimate	$m	5,941
Investment Need Power Transport	2005-2010	Estimate	$m	424
Investment Need Power Transport	2005-2015	Estimate	$m	990
Investment Need Power Distribution	2005-2010	Estimate	$m	1,271
Investment Need Power Distribution	2005-2015	Estimate	$m	2,970

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	4,098
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	4,434
Total Investment Need Network Extension	2005-2010	Estimate	$m	1,229
Total Investment Need Network Extension	2005-2015	Estimate	$m	1,330
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	192
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	250
Investment Need Rural Network Extension	2005-2010	Estimate	$m	134
Investment Need Rural Network Extension	2005-2015	Estimate	$m	175

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Colombia

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	3,085
Investment Need Power Sector	2005-2015	Estimate	$m	7,043
Investment Need Power Generation	2005-2010	Estimate	$m	1,851
Investment Need Power Generation	2005-2015	Estimate	$m	4,226
Investment Need Power Transport	2005-2010	Estimate	$m	308
Investment Need Power Transport	2005-2015	Estimate	$m	704
Investment Need Power Distribution	2005-2010	Estimate	$m	925
Investment Need Power Distribution	2005-2015	Estimate	$m	2,113

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	11,730
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	12,906
Total Investment Need Network Extension	2005-2010	Estimate	$m	3,519
Total Investment Need Network Extension	2005-2015	Estimate	$m	3,872
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	1,020
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	1,390
Investment Need Rural Network Extension	2005-2010	Estimate	$m	714
Investment Need Rural Network Extension	2005-2015	Estimate	$m	973

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Costa Rica

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	4,250
Investment Need Power Sector	2005-2015	Estimate	$m	10,075
Investment Need Power Generation	2005-2010	Estimate	$m	2,550
Investment Need Power Generation	2005-2015	Estimate	$m	6,045
Investment Need Power Transport	2005-2010	Estimate	$m	425
Investment Need Power Transport	2005-2015	Estimate	$m	1,007
Investment Need Power Distribution	2005-2010	Estimate	$m	1,275
Investment Need Power Distribution	2005-2015	Estimate	$m	3,022

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	1,062
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	1,172
Total Investment Need Network Extension	2005-2010	Estimate	$m	318
Total Investment Need Network Extension	2005-2015	Estimate	$m	352
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	159
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	226
Investment Need Rural Network Extension	2005-2010	Estimate	$m	112
Investment Need Rural Network Extension	2005-2015	Estimate	$m	158

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Dominican Republic

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	1,046
Investment Need Power Sector	2005-2015	Estimate	$m	2,553
Investment Need Power Generation	2005-2010	Estimate	$m	627
Investment Need Power Generation	2005-2015	Estimate	$m	1,532
Investment Need Power Transport	2005-2010	Estimate	$m	105
Investment Need Power Transport	2005-2015	Estimate	$m	255
Investment Need Power Distribution	2005-2010	Estimate	$m	314
Investment Need Power Distribution	2005-2015	Estimate	$m	766

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	2,301
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	2,524
Total Investment Need Network Extension	2005-2010	Estimate	$m	690
Total Investment Need Network Extension	2005-2015	Estimate	$m	757
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	365
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	524
Investment Need Rural Network Extension	2005-2010	Estimate	$m	255
Investment Need Rural Network Extension	2005-2015	Estimate	$m	367

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Ecuador

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	1,288
Investment Need Power Sector	2005-2015	Estimate	$m	3,180
Investment Need Power Generation	2005-2010	Estimate	$m	773
Investment Need Power Generation	2005-2015	Estimate	$m	1,908
Investment Need Power Transport	2005-2010	Estimate	$m	129
Investment Need Power Transport	2005-2015	Estimate	$m	318
Investment Need Power Distribution	2005-2010	Estimate	$m	386
Investment Need Power Distribution	2005-2015	Estimate	$m	954

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	3,461
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	3,830
Total Investment Need Network Extension	2005-2010	Estimate	$m	1,038
Total Investment Need Network Extension	2005-2015	Estimate	$m	1,149
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	506
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	721
Investment Need Rural Network Extension	2005-2010	Estimate	$m	354
Investment Need Rural Network Extension	2005-2015	Estimate	$m	504

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

El Salvador

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	432
Investment Need Power Sector	2005-2015	Estimate	$m	1,018
Investment Need Power Generation	2005-2010	Estimate	$m	259
Investment Need Power Generation	2005-2015	Estimate	$m	611
Investment Need Power Transport	2005-2010	Estimate	$m	43
Investment Need Power Transport	2005-2015	Estimate	$m	102
Investment Need Power Distribution	2005-2010	Estimate	$m	130
Investment Need Power Distribution	2005-2015	Estimate	$m	306

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	1,749
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	1,951
Total Investment Need Network Extension	2005-2010	Estimate	$m	525
Total Investment Need Network Extension	2005-2015	Estimate	$m	585
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	278
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	407
Investment Need Rural Network Extension	2005-2010	Estimate	$m	194
Investment Need Rural Network Extension	2005-2015	Estimate	$m	285

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Guatemala

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	502
Investment Need Power Sector	2005-2015	Estimate	$m	1,188
Investment Need Power Generation	2005-2010	Estimate	$m	301
Investment Need Power Generation	2005-2015	Estimate	$m	713
Investment Need Power Transport	2005-2010	Estimate	$m	50
Investment Need Power Transport	2005-2015	Estimate	$m	119
Investment Need Power Distribution	2005-2010	Estimate	$m	151
Investment Need Power Distribution	2005-2015	Estimate	$m	357

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	3,427
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	3,974
Total Investment Need Network Extension	2005-2010	Estimate	$m	1,028
Total Investment Need Network Extension	2005-2015	Estimate	$m	1,192
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	724
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	1,110
Investment Need Rural Network Extension	2005-2010	Estimate	$m	507
Investment Need Rural Network Extension	2005-2015	Estimate	$m	777

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Haiti

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	45
Investment Need Power Sector	2005-2015	Estimate	$m	111
Investment Need Power Generation	2005-2010	Estimate	$m	27
Investment Need Power Generation	2005-2015	Estimate	$m	67
Investment Need Power Transport	2005-2010	Estimate	$m	5
Investment Need Power Transport	2005-2015	Estimate	$m	11
Investment Need Power Distribution	2005-2010	Estimate	$m	14
Investment Need Power Distribution	2005-2015	Estimate	$m	33

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	2,265
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	2,532
Total Investment Need Network Extension	2005-2010	Estimate	$m	680
Total Investment Need Network Extension	2005-2015	Estimate	$m	760
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	550
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	803
Investment Need Rural Network Extension	2005-2010	Estimate	$m	385
Investment Need Rural Network Extension	2005-2015	Estimate	$m	562

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Honduras

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	550
Investment Need Power Sector	2005-2015	Estimate	$m	1,360
Investment Need Power Generation	2005-2010	Estimate	$m	330
Investment Need Power Generation	2005-2015	Estimate	$m	816
Investment Need Power Transport	2005-2010	Estimate	$m	55
Investment Need Power Transport	2005-2015	Estimate	$m	136
Investment Need Power Distribution	2005-2010	Estimate	$m	165
Investment Need Power Distribution	2005-2015	Estimate	$m	408

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	1,932
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	2,230
Total Investment Need Network Extension	2005-2010	Estimate	$m	580
Total Investment Need Network Extension	2005-2015	Estimate	$m	669
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	414
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	632
Investment Need Rural Network Extension	2005-2010	Estimate	$m	290
Investment Need Rural Network Extension	2005-2015	Estimate	$m	443

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Jamaica

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	772
Investment Need Power Sector	2005-2015	Estimate	$m	1,843
Investment Need Power Generation	2005-2010	Estimate	$m	463
Investment Need Power Generation	2005-2015	Estimate	$m	1,106
Investment Need Power Transport	2005-2010	Estimate	$m	77
Investment Need Power Transport	2005-2015	Estimate	$m	184
Investment Need Power Distribution	2005-2010	Estimate	$m	232
Investment Need Power Distribution	2005-2015	Estimate	$m	553

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	676
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	720
Total Investment Need Network Extension	2005-2010	Estimate	$m	203
Total Investment Need Network Extension	2005-2015	Estimate	$m	216
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	132
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	192
Investment Need Rural Network Extension	2005-2010	Estimate	$m	92
Investment Need Rural Network Extension	2005-2015	Estimate	$m	134

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Mexico

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	19,149
Investment Need Power Sector	2005-2015	Estimate	$m	45,221
Investment Need Power Generation	2005-2010	Estimate	$m	11,489
Investment Need Power Generation	2005-2015	Estimate	$m	27,132
Investment Need Power Transport	2005-2010	Estimate	$m	1,915
Investment Need Power Transport	2005-2015	Estimate	$m	4,522
Investment Need Power Distribution	2005-2010	Estimate	$m	5,745
Investment Need Power Distribution	2005-2015	Estimate	$m	13,566

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	26,931
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	29,531
Total Investment Need Network Extension	2005-2010	Estimate	$m	8,079
Total Investment Need Network Extension	2005-2015	Estimate	$m	8,859
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	2,557
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	3,651
Investment Need Rural Network Extension	2005-2010	Estimate	$m	1,790
Investment Need Rural Network Extension	2005-2015	Estimate	$m	2,556

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Nicaragua

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	71
Investment Need Power Sector	2005-2015	Estimate	$m	154
Investment Need Power Generation	2005-2010	Estimate	$m	42
Investment Need Power Generation	2005-2015	Estimate	$m	92
Investment Need Power Transport	2005-2010	Estimate	$m	7
Investment Need Power Transport	2005-2015	Estimate	$m	15
Investment Need Power Distribution	2005-2010	Estimate	$m	21
Investment Need Power Distribution	2005-2015	Estimate	$m	46

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	1,523
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	1,762
Total Investment Need Network Extension	2005-2010	Estimate	$m	457
Total Investment Need Network Extension	2005-2015	Estimate	$m	529
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	254
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	385
Investment Need Rural Network Extension	2005-2010	Estimate	$m	178
Investment Need Rural Network Extension	2005-2015	Estimate	$m	269

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Panama

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	386
Investment Need Power Sector	2005-2015	Estimate	$m	892
Investment Need Power Generation	2005-2010	Estimate	$m	231
Investment Need Power Generation	2005-2015	Estimate	$m	535
Investment Need Power Transport	2005-2010	Estimate	$m	39
Investment Need Power Transport	2005-2015	Estimate	$m	89
Investment Need Power Distribution	2005-2010	Estimate	$m	116
Investment Need Power Distribution	2005-2015	Estimate	$m	268

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	787
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	865
Total Investment Need Network Extension	2005-2010	Estimate	$m	236
Total Investment Need Network Extension	2005-2015	Estimate	$m	259
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	133
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	193
Investment Need Rural Network Extension	2005-2010	Estimate	$m	93
Investment Need Rural Network Extension	2005-2015	Estimate	$m	135

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Paraguay

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	1,226
Investment Need Power Sector	2005-2015	Estimate	$m	3,316
Investment Need Power Generation	2005-2010	Estimate	$m	736
Investment Need Power Generation	2005-2015	Estimate	$m	1,990
Investment Need Power Transport	2005-2010	Estimate	$m	123
Investment Need Power Transport	2005-2015	Estimate	$m	332
Investment Need Power Distribution	2005-2010	Estimate	$m	368
Investment Need Power Distribution	2005-2015	Estimate	$m	995

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	1,555
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	1,786
Total Investment Need Network Extension	2005-2010	Estimate	$m	467
Total Investment Need Network Extension	2005-2015	Estimate	$m	536
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	253
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	371
Investment Need Rural Network Extension	2005-2010	Estimate	$m	177
Investment Need Rural Network Extension	2005-2015	Estimate	$m	259

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Peru

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	1,291
Investment Need Power Sector	2005-2015	Estimate	$m	2,886
Investment Need Power Generation	2005-2010	Estimate	$m	775
Investment Need Power Generation	2005-2015	Estimate	$m	1,732
Investment Need Power Transport	2005-2010	Estimate	$m	129
Investment Need Power Transport	2005-2015	Estimate	$m	289
Investment Need Power Distribution	2005-2010	Estimate	$m	387
Investment Need Power Distribution	2005-2015	Estimate	$m	866

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	7,158
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	7,862
Total Investment Need Network Extension	2005-2010	Estimate	$m	2,148
Total Investment Need Network Extension	2005-2015	Estimate	$m	2,358
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	712
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	1,001
Investment Need Rural Network Extension	2005-2010	Estimate	$m	498
Investment Need Rural Network Extension	2005-2015	Estimate	$m	700

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Uruguay

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	432
Investment Need Power Sector	2005-2015	Estimate	$m	963
Investment Need Power Generation	2005-2010	Estimate	$m	259
Investment Need Power Generation	2005-2015	Estimate	$m	578
Investment Need Power Transport	2005-2010	Estimate	$m	43
Investment Need Power Transport	2005-2015	Estimate	$m	96
Investment Need Power Distribution	2005-2010	Estimate	$m	130
Investment Need Power Distribution	2005-2015	Estimate	$m	289

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	852
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	894
Total Investment Need Network Extension	2005-2010	Estimate	$m	256
Total Investment Need Network Extension	2005-2015	Estimate	$m	268
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	23
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	28
Investment Need Rural Network Extension	2005-2010	Estimate	$m	16
Investment Need Rural Network Extension	2005-2015	Estimate	$m	20

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Venezuela, RB

Consumption Growth Based Estimate ("Business as Usual")*				
Investment Need Power Sector	2005-2010	Estimate	$m	7,948
Investment Need Power Sector	2005-2015	Estimate	$m	18,903
Investment Need Power Generation	2005-2010	Estimate	$m	4,769
Investment Need Power Generation	2005-2015	Estimate	$m	11,342
Investment Need Power Transport	2005-2010	Estimate	$m	795
Investment Need Power Transport	2005-2015	Estimate	$m	1,890
Investment Need Power Distribution	2005-2010	Estimate	$m	2,385
Investment Need Power Distribution	2005-2015	Estimate	$m	5,671

(*) As upfront payment (no discounted cash flow considerations).

Coverage Gap Based Estimate (According to Below Targets for Overall/Rural Access)*				
Total Number of Network Connections Needed	2005-2010	Estimate	1000s	6,848
Total Number of Network Connections Needed	2005-2015	Estimate	1000s	7,644
Total Investment Need Network Extension	2005-2010	Estimate	$m	2,054
Total Investment Need Network Extension	2005-2015	Estimate	$m	2,293
Number of Rural Network Connections Needed	2005-2010	Estimate	1000s	314
Number of Rural Network Connections Needed	2005-2015	Estimate	1000s	437
Investment Need Rural Network Extension	2005-2010	Estimate	$m	220
Investment Need Rural Network Extension	2005-2015	Estimate	$m	306

(*) As upfront payment (no discounted cash flow considerations).

Assumptions				
Base for Growth Rate Estimate	1972-2001	Median	years	29
Per-kWh-Cost of New Capacity	2003	Estimate	$	1,900
Capacity Utilization	2003	Estimate	h.p.a.	7,500
Generation Investment Share	2003	Estimate	%	60%
Transmission Investment Share	2003	Estimate	%	10%
Distribution Investment Share	2003	Estimate	%	30%

Assumptions				
Cost per Connection (overall)	2003	Estimate	$	300
Cost per Rural Connection	2003	Estimate	$	700
Average Size of Household (overall)	2003	Estimate	persons	4.0
Average Size of Household (rural)	2003	Estimate	persons	5.0
Overall Electrification	2010	Target/Estimate	%	98%
Overall Electrification	2015	Target/Estimate	%	100%
Rural Electrification	2010	Target/Estimate	%	50%
Rural Electrification	2015	Target/Estimate	%	70%

Argentina

Annual Electricity Consumption	2001	Latest	GWh	76,195	Annual Electricity Consumption	2010	Estimate	GWh	115,021
Electricity Consumption Growth	1972-2001	Mean	%	4.68%	Annual Electricity Consumption	2015	Estimate	GWh	144,590
Electricity Consumption Growth	1972-2002	Median	%	4.82%					
Electricity Consumption Growth	1972-2003	StandDev	%	4.32%	Annual Private Investment, Energy	2002	Latest	$m	300
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	5.38%	Annual Private Investment, Energy	1992-2002	Mean	$m	2,319
					Annual Private Investment, Energy	1992-2002	Median	$m	2,135
Annual Electricity Production	2001	Latest	GWh	90,181	Annual Private Investment, Energy	1992-2002	StandDev	$m	1,296
Electricity Production Growth	1972-2002	Mean	%	4.63%	Annual Private Investment Growth, Energy	1998-2002	Trend last 5 years	%	-87.13%
Electricity Production Growth	1972-2002	Median	%	4.70%					
Electricity Production Growth	1972-2002	StandDev	%	3.61%	Annual Private Investment, Power	2000	Latest	$m	180
Electricity Production Growth	1997-2001	Trend last 5 years	%	5.33%	Annual Private Investment, Power	1992-2000	Mean	$m	1,621
					Annual Private Investment, Power	1992-2000	Median	$m	1,036
Transmission & Distribution Losses	2001	Latest	%	13.59%	Annual Private Investment, Power	1992-2000	StandDev	$m	1,695
Transmission & Distribution Losses	1971-2001	Mean	%	14.29%	Annual Private Investment Growth, Power	1996-2000	Trend last 5 years	%	-70.50%
Transmission & Distribution Losses	1971-2001	Median	%	13.96%					
Transmission & Distribution Losses	1971-2001	StandDev	%	3.17%	Total Population	2003	Latest	1000s	38,377
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	-5.43%	Annual Population Growth	2003	Latest	%	0.87%
					Share of Rural Population	2003	Latest	%	9.87%
GDP Growth	2001	Latest	%	8.72%	Annual Rural Population Growth	2003	Latest	%	3.01%
GDP Growth	1971-2003	Mean	%	1.60%	Population density, rural	2003	Latest	people per km2	11
GDP Growth	1971-2003	Median	%	2.51%					
GDP Growth	1971-2003	StandDev	%	6.08%	Access to Electricity	2000	Latest	%	94.60%
GDP Growth	1999-2003	Trend last 5 years	%	-2.15%	Rural population w/ access to electricity	2000	Latest	%	15.00%

Bolivia

Annual Electricity Consumption	2001	Latest	GWh	3,469	Annual Electricity Consumption	2010	Estimate	GWh	5,448
Electricity Consumption Growth	1972-2001	Mean	%	5.14%	Annual Electricity Consumption	2015	Estimate	GWh	7,001
Electricity Consumption Growth	1972-2002	Median	%	6.34%					
Electricity Consumption Growth	1972-2003	StandDev	%	6.55%	Annual Private Investment, Energy	2001	Latest	$m	29
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	6.89%	Annual Private Investment, Energy	1992-2002	Mean	$m	544
					Annual Private Investment, Energy	1992-2002	Median	$m	127
Annual Electricity Production	2001	Latest	GWh	3,973	Annual Private Investment, Energy	1992-2002	StandDev	$m	973
Electricity Production Growth	1972-2002	Mean	%	4.73%	Annual Private Investment Growth, Energy	1998-2002	Trend last 5 years	%	- 389.91%
Electricity Production Growth	1972-2002	Median	%	6.26%					
Electricity Production Growth	1972-2002	StandDev	%	4.57%	Annual Private Investment, Power	2000	Latest	$m	131
Electricity Production Growth	1997-2001	Trend last 5 years	%	4.33%	Annual Private Investment, Power	1995-2000	Mean	$m	101
					Annual Private Investment, Power	1995-2000	Median	$m	50
Transmission & Distribution Losses	2001	Latest	%	12.18%	Annual Private Investment, Power	1995-2000	StandDev	$m	111
Transmission & Distribution Losses	1971-2001	Mean	%	14.19%	Annual Private Investment Growth, Power	1996-2000	Trend last 5 years	%	227.12%
Transmission & Distribution Losses	1971-2001	Median	%	12.49%					
Transmission & Distribution Losses	1971-2001	StandDev	%	4.96%	Total Population	2003	Latest	1000s	8,980
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	17.18%	Annual Population Growth	2003	Latest	%	1.92%
					Share of Rural Population	2003	Latest	%	36.62%
GDP Growth	2001	Latest	%	2.45%	Annual Rural Population Growth	2003	Latest	%	0.60%
GDP Growth	1971-2003	Mean	%	2.59%	Population density, rural	2003	Latest	people per km2	112
GDP Growth	1971-2003	Median	%	2.91%					
GDP Growth	1971-2003	StandDev	%	3.01%	Access to Electricity	2000	Latest	%	60.40%
GDP Growth	1999-2003	Trend last 5 years	%	1.88%	Rural population w/ access to electricity	2000	Latest	%	22.30%

Brazil

Annual Electricity Consumption	2001	Latest	GWh	298,010	Annual Electricity Consumption	2010	Estimate	GWh	539,316
Electricity Consumption Growth	1972-2001	Mean	%	6.81%	Annual Electricity Consumption	2015	Estimate	GWh	749,827
Electricity Consumption Growth	1972-2002	Median	%	5.93%					
Electricity Consumption Growth	1972-2003	StandDev	%	4.58%	Annual Private Investment, Energy	2001	Latest	$m	2,612
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	2.20%	Annual Private Investment, Energy	1994-2002	Mean	$m	5,472
					Annual Private Investment, Energy	1994-2002	Median	$m	4,609
Annual Electricity Production	2001	Latest	GWh	327,874	Annual Private Investment, Energy	1994-2002	StandDev	$m	4,643
							Trend last		-
Electricity Production Growth	1972-2002	Mean	%	6.45%	Annual Private Investment Growth, Energy	1998-2002	5 years	%	50.93%
Electricity Production Growth	1972-2002	Median	%	5.73%					
Electricity Production Growth	1972-2002	StandDev	%	4.50%	Annual Private Investment, Power	2000	Latest	$m	1,467
Electricity Production Growth	1997-2001	Trend last 5 years	%	2.49%	Annual Private Investment, Power	1995-2000	Mean	$m	4,361
					Annual Private Investment, Power	1995-2000	Median	$m	3,075
Transmission & Distribution Losses	2001	Latest	%	17.24%	Annual Private Investment, Power	1995-2000	StandDev	$m	4,929
Transmission & Distribution Losses	1971-2001	Mean	%	13.82%			Trend last		-
Transmission & Distribution Losses	1971-2001	Median	%	13.04%	Annual Private Investment Growth, Power	1996-2000	5 years	%	31.01%
Transmission & Distribution Losses	1971-2001	StandDev	%	2.33%					
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	17.46%	Total Population	2003	Latest	1000s	176,596
					Annual Population Growth	2003	Latest	%	1.20%
GDP Growth	2003	Latest	%	-0.20%	Share of Rural Population	2003	Latest	%	16.99%
					Annual Rural Population Growth	2003	Latest	%	-2.35%
GDP Growth	1971-2003	Mean	%	3.98%				people	
GDP Growth	1971-2003	Median	%	3.60%	Population density, rural	2003	Latest	per km2	53
GDP Growth	1971-2003	StandDev	%	4.54%	Access to Electricity	2000	Latest	%	94.90%
GDP Growth	1999-2003	Trend last 5 years	%	1.58%	Rural population w/ access to electricity	2000	Latest	%	72.00%

Chile

Annual Electricity Consumption	2001	Latest	GWh	39,379	Annual Electricity Consumption	2010	Estimate	GWh	66,397
Electricity Consumption Growth	1972-2001	Mean	%	5.98%	Annual Electricity Consumption	2015	Estimate	GWh	88,756
Electricity Consumption Growth	1972-2001	Median	%	5.84%					
Electricity Consumption Growth	1972-2001	StandDev	%	4.36%	Annual Private Investment, Energy	2001	Latest	$m	187,000
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	8.14%	Annual Private Investment, Energy	1992-2001	Mean	$m	792
					Annual Private Investment, Energy	1992-2001	Median	$m	646
Annual Electricity Production	2001	Latest	GWh	43,918	Annual Private Investment, Energy	1992-2001	StandDev	$m	636
Electricity Production Growth	1972-2002	Mean	%	5.68%	Annual Private Investment Growth, Energy	1998-2002	Trend last 5 years	%	-83.59%
Electricity Production Growth	1972-2002	Median	%	6.15%					
Electricity Production Growth	1972-2002	StandDev	%	3.66%	Annual Private Investment, Power	2000	Latest	$m	560
Electricity Production Growth	1997-2001	Trend last 5 years	%	7.36%	Annual Private Investment, Power	1990-2000	Mean	$m	619
					Annual Private Investment, Power	1990-2000	Median	$m	661
Transmission & Distribution Losses	2001	Latest	%	7.13%	Annual Private Investment, Power	1990-2000	StandDev	$m	394
Transmission & Distribution Losses	1971-2001	Mean	%	10.99%	Annual Private Investment Growth, Power	1996-2000	Trend last 5 years	%	-281.20%
Transmission & Distribution Losses	1971-2001	Median	%	11.17%					
Transmission & Distribution Losses	1971-2001	StandDev	%	2.24%	Total Population	2003	Latest	1000s	15,774
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	7.09%	Annual Population Growth	2003	Latest	%	1.18%
					Share of Rural Population	2003	Latest	%	13.02%
GDP Growth	2003	Latest	%	3.30%	Annual Rural Population Growth	2003	Latest	%	-1.39%
GDP Growth	1971-2003	Mean	%	4.37%	Population density, rural	2003	Latest	people per km2	107
GDP Growth	1971-2003	Median	%	5.71%					
GDP Growth	1971-2003	StandDev	%	5.55%	Access to Electricity	2000	Latest	%	99.00%
GDP Growth	1999-2003	Trend last 5 years	%	2.31%	Rural population w/ access to electricity	2000	Latest	%	76.00%

Colombia

Annual Electricity Consumption	2001	Latest	GWh	35,190	Annual Electricity Consumption	2010	Estimate	GWh	55,140
Electricity Consumption Growth	1972-2001	Mean	%	5.12%	Annual Electricity Consumption	2015	Estimate	GWh	70,767
Electricity Consumption Growth	1972-2002	Median	%	4.39%					
Electricity Consumption Growth	1972-2003	StandDev	%	4.82%	Annual Private Investment, Energy	2000	Latest	$m	71
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	-0.46%	Annual Private Investment, Energy	1993-2000	Mean	$m	947
					Annual Private Investment, Energy	1993-2000	Median	$m	422
Annual Electricity Production	2001	Latest	GWh	43,463	Annual Private Investment, Energy	1993-2000	StandDev	$m	1,108
Electricity Production Growth	1972-2002	Mean	%	5.37%	Annual Private Investment Growth, Energy	1996-2000	Trend last 5 years	%	-165.81%
Electricity Production Growth	1972-2002	Median	%	5.16%					
Electricity Production Growth	1972-2002	StandDev	%	6.06%	Annual Private Investment, Power	1999	Latest	$m	175
Electricity Production Growth	1997-2001	Trend last 5 years	%	-0.49%	Annual Private Investment, Power	1993-1999	Mean	$m	1,085
					Annual Private Investment, Power	1993-1999	Median	$m	757
Transmission & Distribution Losses	2001	Latest	%	22.26%	Annual Private Investment, Power	1993-1999	StandDev	$m	1,098
Transmission & Distribution Losses	1971-2001	Mean	%	18.50%	Annual Private Investment Growth, Power	1995-2000	Trend last 5 years	%	36.07%
Transmission & Distribution Losses	1971-2001	Median	%	16.19%					
Transmission & Distribution Losses	1971-2001	StandDev	%	3.73%	Total Population	2003	Latest	1000s	44,402
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	23.04%	Annual Population Growth	2003	Latest	%	1.52%
					Share of Rural Population	2003	Latest	%	23.60%
GDP Growth	2003	Latest	%	3.74%	Annual Rural Population Growth	2003	Latest	%	-0.54%
GDP Growth	1971-2003	Mean	%	3.74%	Population density, rural	2003	Latest	people per km2	421
GDP Growth	1971-2003	Median	%	3.74%					
GDP Growth	1971-2003	StandDev	%	2.43%	Access to Electricity	2000	Latest	%	81.00%
GDP Growth	1999-2003	Trend last 5 years	%	1.09%	Rural population w/ access to electricity	2000	Latest	%	51.00%

Costa Rica

Annual Electricity Consumption	2001	Latest	GWh	35,190	Annual Electricity Consumption	2010	Estimate	GWh	62,058
Electricity Consumption Growth	1972-2001	Mean	%	6.51%	Annual Electricity Consumption	2015	Estimate	GWh	85,049
Electricity Consumption Growth	1972-2002	Median	%	5.63%					
Electricity Consumption Growth	1972-2003	StandDev	%	6.83%	Annual Private Investment, Energy	2000	Latest	$m	0
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	6.51%	Annual Private Investment, Energy	1994-2000	Mean	$m	45
					Annual Private Investment, Energy	1994-2000	Median	$m	58
Annual Electricity Production	2001	Latest	GWh	6,941	Annual Private Investment, Energy	1994-2000	StandDev	$m	39
Electricity Production Growth	1972-2002	Mean	%	6.33%	Annual Private Investment Growth, Energy	1996-2000	Trend last 5 years	%	n/a
Electricity Production Growth	1972-2002	Median	%	6.56%					
Electricity Production Growth	1972-2002	StandDev	%	5.58%	Annual Private Investment, Power	2000	Latest	$m	0
Electricity Production Growth	1997-2001	Trend last 5 years	%	7.92%	Annual Private Investment, Power	1992-2000	Mean	$m	40
					Annual Private Investment, Power	1992-2000	Median	$m	37
Transmission & Distribution Losses	2001	Latest	%	7.20%	Annual Private Investment, Power	1992-2000	StandDev	$m	38
Transmission & Distribution Losses	1989-2001	Mean	%	7.69%	Annual Private Investment Growth, Power	1995-2000	Trend last 5 years	%	-35.06%
Transmission & Distribution Losses	1989-2001	Median	%	7.67%					
Transmission & Distribution Losses	1989-2001	StandDev	%	0.40%	Total Population	2003	Latest	1000s	4,005
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	7.41%	Annual Population Growth	2003	Latest	%	1.59%
					Share of Rural Population	2003	Latest	%	39.38%
GDP Growth	2003	Latest	%	5.60%	Annual Rural Population Growth	2003	Latest	%	0.22%
GDP Growth	1971-2003	Mean	%	4.36%	Population density, rural	2003	Latest	people per km2	696
GDP Growth	1971-2003	Median	%	4.94%					
GDP Growth	1971-2003	StandDev	%	3.50%	Access to Electricity	2000	Latest	%	95.70%
GDP Growth	1999-2003	Trend last 5 years	%	3.95%	Rural population w/ access to electricity	2000	Latest	%	84.80%

Dominican Republic

Annual Electricity Consumption	2001	Latest	GWh	6,976	Annual Electricity Consumption	2010	Estimate	GWh	13,475
Electricity Consumption Growth	1972-2001	Mean	%	7.59%	Annual Electricity Consumption	2015	Estimate	GWh	19,426
Electricity Consumption Growth	1972-2002	Median	%	6.28%					
Electricity Consumption Growth	1972-2003	StandDev	%	16.15%	Annual Private Investment, Energy	2002	Latest	$m	400
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	7.70%	Annual Private Investment, Energy	1994-2000	Mean	$m	330
					Annual Private Investment, Energy	1994-2000	Median	$m	285
Annual Electricity Production	2001	Latest	GWh	10,307	Annual Private Investment, Energy	1994-2000	StandDev	$m	240
Electricity Production Growth	1972-2002	Mean	%	8.86%	Annual Private Investment Growth, Energy	1996-2000	Trend last 5 years	%	n/a
Electricity Production Growth	1972-2002	Median	%	7.04%					
Electricity Production Growth	1972-2002	StandDev	%	15.60%	Annual Private Investment, Power	2000	Latest	$m	400
Electricity Production Growth	1997-2001	Trend last 5 years	%	9.36%	Annual Private Investment, Power	1992-2000	Mean	$m	385
					Annual Private Investment, Power	1992-2000	Median	$m	322
Transmission & Distribution Losses	2001	Latest	%	25.95%	Annual Private Investment, Power	1992-2000	StandDev	$m	391
Transmission & Distribution Losses	1973-2001	Mean	%	24.41%	Annual Private Investment Growth, Power	1995-2000	Trend last 5 years	%	n/a
Transmission & Distribution Losses	1989-2001	Median	%	26.07%					
Transmission & Distribution Losses	1989-2001	StandDev	%	5.31%	Total Population	2003	Latest	1000s	8,739
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	27.10%	Annual Population Growth	2003	Latest	%	1.45%
					Share of Rural Population	2003	Latest	%	40.65%
GDP Growth	2003	Latest	%	-1.25%	Annual Rural Population Growth	2003	Latest	%	0.52%
GDP Growth	1971-2003	Mean	%	4.87%	Population density, rural	2003	Latest	people per km2	321
GDP Growth	1971-2003	Median	%	4.81%					
GDP Growth	1971-2003	StandDev	%	3.75%	Access to Electricity	2000	Latest	%	66.80%
GDP Growth	1999-2003	Trend last 5 years	%	4.16%	Rural population w/ access to electricity	2000	Latest	%	61.00%

Ecuador

Annual Electricity Consumption	2001	Latest	GWh	7,965	Annual Electricity Consumption	2010	Estimate	GWh	15,918
Electricity Consumption Growth	1972-2001	Mean	%	8.00%	Annual Electricity Consumption	2015	Estimate	GWh	23,387
Electricity Consumption Growth	1972-2002	Median	%	8.08%					
Electricity Consumption Growth	1972-2003	StandDev	%	6.49%	Annual Private Investment, Energy	2000	Latest	$m	280
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	2.58%	Annual Private Investment, Energy	1994-2000	Mean	$m	n/a
					Annual Private Investment, Energy	1994-2000	Median	$m	n/a
Annual Electricity Production	2001	Latest	GWh	11,050	Annual Private Investment, Energy	1994-2000	StandDev	$m	n/a
Electricity Production Growth	1972-2002	Mean	%	8.30%	Annual Private Investment Growth, Energy	1996-2000	Trend last 5 years	%	n/a
Electricity Production Growth	1972-2002	Median	%	9.58%					
Electricity Production Growth	1972-2002	StandDev	%	5.64%	Annual Private Investment, Power	2000	Latest	$m	280
Electricity Production Growth	1997-2001	Trend last 5 years	%	3.55%	Annual Private Investment, Power	1992-2000	Mean	$m	n/a
					Annual Private Investment, Power	1992-2000	Median	$m	n/a
Transmission & Distribution Losses	2001	Latest	%	24.60%	Annual Private Investment, Power	1992-2000	StandDev	$m	n/a
Transmission & Distribution Losses	1973-2001	Mean	%	19.57%	Annual Private Investment Growth, Power	1995-2000	Trend last 5 years	%	n/a
Transmission & Distribution Losses	1989-2001	Median	%	20.08%					
Transmission & Distribution Losses	1989-2001	StandDev	%	4.11%	Total Population	2003	Latest	1000s	13,029
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	23.89%	Annual Population Growth	2003	Latest	%	1.63%
					Share of Rural Population	2003	Latest	%	38.21%
GDP Growth	2003	Latest	%	2.57%	Annual Rural Population Growth	2003	Latest	%	0.33%
GDP Growth	1971-2003	Mean	%	3.66%	Population density, rural	2003	Latest	people per km2	305
GDP Growth	1971-2003	Median	%	3.41%					
GDP Growth	1971-2003	StandDev	%	3.92%	Access to Electricity	2000	Latest	%	80.00%
GDP Growth	1999-2003	Trend last 5 years	%	1.52%	Rural population w/ access to electricity	2000	Latest	%	53.60%

El Salvador

Annual Electricity Consumption	2001	Latest	GWh	3,754	Annual Electricity Consumption	2010	Estimate	GWh	6,496
Electricity Consumption Growth	1972-2001	Mean	%	6.28%	Annual Electricity Consumption	2015	Estimate	GWh	8,810
Electricity Consumption Growth	1972-2002	Median	%	6.05%					
Electricity Consumption Growth	1972-2003	StandDev	%	4.94%	Annual Private Investment, Energy	2002	Latest	$m	10
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	5.14%	Annual Private Investment, Energy	1994-2000	Mean	$m	n/a
					Annual Private Investment, Energy	1994-2000	Median	$m	n/a
Annual Electricity Production	2001	Latest	GWh	3,909	Annual Private Investment, Energy	1994-2000	StandDev	$m	n/a
Electricity Production Growth	1972-2002	Mean	%	5.83%	Annual Private Investment Growth, Energy	1996-2000	Trend last 5 years	%	n/a
Electricity Production Growth	1972-2002	Median	%	5.97%					
Electricity Production Growth	1972-2002	StandDev	%	5.44%	Annual Private Investment, Power	2000	Latest	$m	275
Electricity Production Growth	1997-2001	Trend last 5 years	%	2.76%	Annual Private Investment, Power	1992-2000	Mean	$m	n/a
					Annual Private Investment, Power	1992-2000	Median	$m	n/a
Transmission & Distribution Losses	2001	Latest	%	13.05%	Annual Private Investment, Power	1992-2000	StandDev	$m	n/a
Transmission & Distribution Losses	1973-2001	Mean	%	13.63%	Annual Private Investment Growth, Power	1995-2000	Trend last 5 years	%	n/a
Transmission & Distribution Losses	1989-2001	Median	%	13.34%					
Transmission & Distribution Losses	1989-2001	StandDev	%	1.43%	Total Population	2003	Latest	1000s	6,533
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	13.13%	Annual Population Growth	2003	Latest	%	1.79%
					Share of Rural Population	2003	Latest	%	40.56%
GDP Growth	2003	Latest	%	1.98%	Annual Rural Population Growth	2003	Latest	%	0.94%
GDP Growth	1971-2003	Mean	%	2.22%	Population density, rural	2003	Latest	people per km2	394
GDP Growth	1971-2003	Median	%	2.92%					
GDP Growth	1971-2003	StandDev	%	4.53%	Access to Electricity	2000	Latest	%	70.80%
GDP Growth	1999-2003	Trend last 5 years	%	2.27%	Rural population w/ access to electricity	2000	Latest	%	41.10%

Guatemala

Annual Electricity Consumption	2001	Latest	GWh	4,178	Annual Electricity Consumption	2010	Estimate	GWh	7,351
Electricity Consumption Growth	1972-2001	Mean	%	6.48%	Annual Electricity Consumption	2015	Estimate	GWh	10,062
Electricity Consumption Growth	1972-2002	Median	%	6.91%					
Electricity Consumption Growth	1972-2003	StandDev	%	6.64%	Annual Private Investment, Energy	2002	Latest	$m	60
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	6.55%	Annual Private Investment, Energy	1994-2002	Mean	$m	179
					Annual Private Investment, Energy	1994-2002	Median	$m	119
Annual Electricity Production	2001	Latest	GWh	5,856	Annual Private Investment, Energy	1994-2002	StandDev	$m	176
Electricity Production Growth	1972-2002	Mean	%	7.62%	Annual Private Investment Growth, Energy	1998-2002	Trend last 5 years	%	-82.47%
Electricity Production Growth	1972-2002	Median	%	8.25%					
Electricity Production Growth	1972-2002	StandDev	%	6.93%	Annual Private Investment, Power	2002	Latest	$m	60
Electricity Production Growth	1997-2001	Trend last 5 years	%	6.55%	Annual Private Investment, Power	1994-2002	Mean	$m	179
					Annual Private Investment, Power	1994-2002	Median	$m	119
Transmission & Distribution Losses	2001	Latest	%	23.00%	Annual Private Investment, Power	1994-2002	StandDev	$m	170
Transmission & Distribution Losses	1971-2001	Mean	%	12.30%	Annual Private Investment Growth, Power	1995-2002	Trend last 5 years	%	118.73%
Transmission & Distribution Losses	1971-2001	Median	%	12.57%					
Transmission & Distribution Losses	1971-2001	StandDev	%	5.62%	Total Population	2003	Latest	1000s	12,307
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	20.41%	Annual Population Growth	2003	Latest	%	2.59%
					Share of Rural Population	2003	Latest	%	53.65%
GDP Growth	2001	Latest	%	2.12%	Annual Rural Population Growth	2003	Latest	%	1.85%
GDP Growth	1971-2003	Mean	%	3.44%	Population density, rural	2003	Latest	people per km2	468
GDP Growth	1971-2003	Median	%	3.85%					
GDP Growth	1971-2003	StandDev	%	2.64%	Access to Electricity	2000	Latest	%	66.70%
GDP Growth	1999-2003	Trend last 5 years	%	2.83%	Rural population w/ access to electricity	2000	Latest	%	48.70%

Haiti

Annual Electricity Consumption	2001	Latest	GWh	291	Annual Electricity Consumption	2010	Estimate	GWh	572
Electricity Consumption Growth	1972-2001	Mean	%	7.79%	Annual Electricity Consumption	2015	Estimate	GWh	832
Electricity Consumption Growth	1972-2002	Median	%	4.94%					
Electricity Consumption Growth	1972-2003	StandDev	%	22.40%	Annual Private Investment, Energy	1995	Latest	$m	5
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	5.77%	Annual Private Investment, Energy	1994-2002	Mean	$m	n/a
					Annual Private Investment, Energy	1994-2002	Median	$m	n/a
Annual Electricity Production	2001	Latest	GWh	547	Annual Private Investment, Energy	1994-2002	StandDev	$m	n/a
Electricity Production Growth	1972-2002	Mean	%	7.98%	Annual Private Investment Growth, Energy	1998-2002	Trend last 5 years	%	n/a
Electricity Production Growth	1972-2002	Median	%	5.47%					
Electricity Production Growth	1972-2002	StandDev	%	18.78%	Annual Private Investment, Power	2002	Latest	$m	5
Electricity Production Growth	1997-2001	Trend last 5 years	%	-1.35%	Annual Private Investment, Power	1994-2002	Mean	$m	n/a
					Annual Private Investment, Power	1994-2002	Median	$m	n/a
Transmission & Distribution Losses	2001	Latest	%	53.20%	Annual Private Investment, Power	1994-2002	StandDev	$m	n/a
Transmission & Distribution Losses	1971-2001	Mean	%	33.32%	Annual Private Investment Growth, Power	1995-2002	Trend last 5 years	%	n/a
Transmission & Distribution Losses	1971-2001	Median	%	29.15%					
Transmission & Distribution Losses	1971-2001	StandDev	%	11.54%	Total Population	2003	Latest	1000s	8,440
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	49.94%	Annual Population Growth	2003	Latest	%	1.84%
					Share of Rural Population	2003	Latest	%	62.50%
GDP Growth	2001	Latest	%	0.00%	Annual Rural Population Growth	2003	Latest	%	0.84%
GDP Growth	1971-2003	Mean	%	0.81%	Population density, rural	2003	Latest	people per km2	665
GDP Growth	1971-2003	Median	%	0.76%					
GDP Growth	1971-2003	StandDev	%	4.50%	Access to Electricity	2000	Latest	%	34.00%
GDP Growth	1999-2003	Trend last 5 years	%	0.33%	Rural population w/ access to electricity	2000	Latest	%	#VALUE!

Honduras

Annual Electricity Consumption	2001	Latest	GWh	3,368	Annual Electricity Consumption	2010	Estimate	GWh	6,761
Electricity Consumption Growth	1972-2001	Mean	%	8.05%	Annual Electricity Consumption	2015	Estimate	GWh	9,957
Electricity Consumption Growth	1972-2002	Median	%	6.78%					
Electricity Consumption Growth	1972-2003	StandDev	%	7.50%	Annual Private Investment, Energy	1998	Latest	$m	87
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	7.57%	Annual Private Investment, Energy	1994-2002	Mean	$m	n/a
					Annual Private Investment, Energy	1994-2002	Median	$m	n/a
Annual Electricity Production	2001	Latest	GWh	3,992	Annual Private Investment, Energy	1994-2002	StandDev	$m	n/a
Electricity Production Growth	1972-2002	Mean	%	8.21%	Annual Private Investment Growth, Energy	1998-2002	Trend last 5 years	%	n/a
Electricity Production Growth	1972-2002	Median	%	8.62%					
Electricity Production Growth	1972-2002	StandDev	%	5.96%	Annual Private Investment, Power	1995	Latest	$m	112
Electricity Production Growth	1997-2001	Trend last 5 years	%	5.48%	Annual Private Investment, Power	1994-2002	Mean	$m	n/a
					Annual Private Investment, Power	1994-2002	Median	$m	n/a
Transmission & Distribution Losses	2001	Latest	%	21.22%	Annual Private Investment, Power	1994-2002	StandDev	$m	n/a
Transmission & Distribution Losses	1971-2001	Mean	%	17.97%	Annual Private Investment Growth, Power	1995-2002	Trend last 5 years	%	n/a
Transmission & Distribution Losses	1971-2001	Median	%	16.99%					
Transmission & Distribution Losses	1971-2001	StandDev	%	5.03%	Total Population	2003	Latest	1000s	6,969
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	21.87%	Annual Population Growth	2003	Latest	%	2.50%
					Share of Rural Population	2003	Latest	%	54.40%
GDP Growth	2001	Latest	%	3.01%	Annual Rural Population Growth	2003	Latest	%	1.76%
GDP Growth	1971-2003	Mean	%	3.65%	Population density, rural	2003	Latest	people per km2	343
GDP Growth	1971-2003	Median	%	4.00%					
GDP Growth	1971-2003	StandDev	%	3.27%	Access to Electricity	2000	Latest	%	54.50%
GDP Growth	1999-2003	Trend last 5 years	%	2.33%	Rural population w/ access to electricity	2000	Latest	%	32.95%

Jamaica

Annual Electricity Consumption	2001	Latest	GWh	6,081	Annual Electricity Consumption	2010	Estimate	GWh	10,945
Electricity Consumption Growth	1972-2001	Mean	%	6.75%	Annual Electricity Consumption	2015	Estimate	GWh	15,172
Electricity Consumption Growth	1972-2002	Median	%	3.48%					
Electricity Consumption Growth	1972-2003	StandDev	%	23.33%	Annual Private Investment, Energy	1995	Latest	$m	201
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	2.53%	Annual Private Investment, Energy	1994-2002	Mean	$m	n/a
					Annual Private Investment, Energy	1994-2002	Median	$m	n/a
Annual Electricity Production	2001	Latest	GWh	6,656	Annual Private Investment, Energy	1994-2002	StandDev	$m	n/a
							Trend last		
Electricity Production Growth	1972-2002	Mean	%	6.19%	Annual Private Investment Growth, Energy	1998-2002	5 years	%	n/a
Electricity Production Growth	1972-2002	Median	%	2.61%					
Electricity Production Growth	1972-2002	StandDev	%	19.87%	Annual Private Investment, Power	1995	Latest	$m	201
Electricity Production Growth	1997-2001	Trend last 5 years	%	1.98%	Annual Private Investment, Power	1994-2002	Mean	$m	n/a
					Annual Private Investment, Power	1994-2002	Median	$m	n/a
Transmission & Distribution Losses	2001	Latest	%	8.47%	Annual Private Investment, Power	1994-2002	StandDev	$m	n/a
Transmission & Distribution Losses	1971-2001	Mean	%	12.83%	Annual Private Investment Growth, Power	1995-2002	Trend last 5 years	%	n/a
Transmission & Distribution Losses	1971-2001	Median	%	11.21%					
Transmission & Distribution Losses	1971-2001	StandDev	%	3.89%	Total Population	2003	Latest	1000s	2,640
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	9.68%	Annual Population Growth	2003	Latest	%	0.88%
					Share of Rural Population	2003	Latest	%	47.85%
GDP Growth	2001	Latest	%	2.10%	Annual Rural Population Growth	2003	Latest	%	0.82%
								people	
GDP Growth	1971-2003	Mean	%	0.97%	Population density, rural	2003	Latest	per km2	715
GDP Growth	1971-2003	Median	%	1.00%					
GDP Growth	1971-2003	StandDev	%	4.32%	Access to Electricity	2000	Latest	%	90.00%
GDP Growth	1999-2003	Trend last 5 years	%	1.29%	Rural population w/ access to electricity	2000	Latest	%	#VALUE!

Mexico

Annual Electricity Consumption	2001	Latest	GWh	163,320	Annual Electricity Consumption	2010	Estimate	GWh	284,646
Electricity Consumption Growth	1972-2001	Mean	%	6.37%	Annual Electricity Consumption	2015	Estimate	GWh	387,561
Electricity Consumption Growth	1972-2002	Median	%	6.94%					
Electricity Consumption Growth	1972-2003	StandDev	%	2.94%	Annual Private Investment, Energy	2002	Latest	$m	1,184
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	5.00%	Annual Private Investment, Energy	1994-2002	Mean	$m	720
					Annual Private Investment, Energy	1994-2002	Median	$m	496
Annual Electricity Production	2001	Latest	GWh	209,618	Annual Private Investment, Energy	1994-2002	StandDev	$m	692
							Trend last		-
Electricity Production Growth	1972-2002	Mean	%	6.60%	Annual Private Investment Growth, Energy	1998-2002	5 years	%	80.58%
Electricity Production Growth	1972-2002	Median	%	7.02%					
Electricity Production Growth	1972-2002	StandDev	%	2.46%	Annual Private Investment, Power	2002	Latest	$m	1,184
Electricity Production Growth	1997-2001	Trend last 5 years	%	5.24%	Annual Private Investment, Power	1998-2002	Mean	$m	779
					Annual Private Investment, Power	1994-2002	Median	$m	260
Transmission & Distribution Losses	2001	Latest	%	14.45%	Annual Private Investment, Power	1994-2002	StandDev	$m	821
							Trend last		
Transmission & Distribution Losses	1971-2001	Mean	%	12.57%	Annual Private Investment Growth, Power	1995-2002	5 years	%	n/a
Transmission & Distribution Losses	1971-2001	Median	%	12.54%					
Transmission & Distribution Losses	1971-2001	StandDev	%	1.33%	Total Population	2003	Latest	1000s	102,291
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	14.32%	Annual Population Growth	2003	Latest	%	1.45%
					Share of Rural Population	2003	Latest	%	24.51%
GDP Growth	2001	Latest	%	1.30%	Annual Rural Population Growth	2003	Latest	%	0.40%
								people	
GDP Growth	1971-2003	Mean	%	3.72%	Population density, rural	2003	Latest	per km2	100
GDP Growth	1971-2003	Median	%	4.20%					
GDP Growth	1971-2003	StandDev	%	3.82%	Access to Electricity	2000	Latest	%	95.00%
GDP Growth	1999-2003	Trend last 5 years	%	2.44%	Rural population w/ access to electricity	2000	Latest	%	82.90%

Nicaragua

Annual Electricity Consumption	2001	Latest	GWh	1,394	Annual Electricity Consumption	2010	Estimate	GWh	1,865
Electricity Consumption Growth	1972-2001	Mean	%	3.29%	Annual Electricity Consumption	2015	Estimate	GWh	2,193
Electricity Consumption Growth	1972-2002	Median	%	3.24%					
Electricity Consumption Growth	1972-2003	StandDev	%	7.42%	Annual Private Investment, Energy	2000	Latest	$m	115
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	3.71%	Annual Private Investment, Energy	1994-2002	Mean	$m	n/a
					Annual Private Investment, Energy	1994-2002	Median	$m	n/a
Annual Electricity Production	2001	Latest	GWh	2,473	Annual Private Investment, Energy	1994-2002	StandDev	$m	n/a
Electricity Production Growth	1972-2002	Mean	%	4.87%	Annual Private Investment Growth, Energy	1998-2002	Trend last 5 years	%	n/a
Electricity Production Growth	1972-2002	Median	%	6.49%					
Electricity Production Growth	1972-2002	StandDev	%	8.58%	Annual Private Investment, Power	2002	Latest	$m	115
Electricity Production Growth	1997-2001	Trend last 5 years	%	5.32%	Annual Private Investment, Power	1998-2002	Mean	$m	n/a
					Annual Private Investment, Power	1994-2002	Median	$m	n/a
Transmission & Distribution Losses	2001	Latest	%	30.13%	Annual Private Investment, Power	1994-2002	StandDev	$m	n/a
Transmission & Distribution Losses	1971-2001	Mean	%	18.39%	Annual Private Investment Growth, Power	1995-2002	Trend last 5 years	%	n/a
Transmission & Distribution Losses	1971-2001	Median	%	15.62%					
Transmission & Distribution Losses	1971-2001	StandDev	%	6.51%	Total Population	2003	Latest	1000s	5,480
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	28.01%	Annual Population Growth	2003	Latest	%	2.55%
					Share of Rural Population	2003	Latest	%	42.68%
GDP Growth	2001	Latest	%	2.30%	Annual Rural Population Growth	2003	Latest	%	1.63%
GDP Growth	1971-2003	Mean	%	1.37%	Population density, rural	2003	Latest	people per km2	117
GDP Growth	1971-2003	Median	%	2.30%					
GDP Growth	1971-2003	StandDev	%	7.15%	Access to Electricity	2000	Latest	%	48.00%
GDP Growth	1999-2003	Trend last 5 years	%	0.05%	Rural population w/ access to electricity	2000	Latest	%	#VALUE!

Panama

Annual Electricity Consumption	2001	Latest	GWh	3,883	Annual Electricity Consumption	2010	Estimate	GWh	6,355
Electricity Consumption Growth	1972-2001	Mean	%	5.63%	Annual Electricity Consumption	2015	Estimate	GWh	8,356
Electricity Consumption Growth	1972-2002	Median	%	6.19%					
Electricity Consumption Growth	1972-2003	StandDev	%	5.04%	Annual Private Investment, Energy	2000	Latest	$m	396
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	5.45%	Annual Private Investment, Energy	1994-2002	Mean	$m	n/a
					Annual Private Investment, Energy	1994-2002	Median	$m	n/a
Annual Electricity Production	2001	Latest	GWh	5,124	Annual Private Investment, Energy	1994-2002	StandDev	$m	n/a
Electricity Production Growth	1972-2002	Mean	%	6.08%	Annual Private Investment Growth, Energy	1998-2002	Trend last 5 years	%	n/a
Electricity Production Growth	1972-2002	Median	%	5.23%					
Electricity Production Growth	1972-2002	StandDev	%	4.85%	Annual Private Investment, Power	2002	Latest	$m	607
Electricity Production Growth	1997-2001	Trend last 5 years	%	6.05%	Annual Private Investment, Power	1998-2002	Mean	$m	n/a
					Annual Private Investment, Power	1994-2002	Median	$m	n/a
Transmission & Distribution Losses	2001	Latest	%	21.78%	Annual Private Investment, Power	1994-2002	StandDev	$m	n/a
Transmission & Distribution Losses	1971-2001	Mean	%	18.61%	Annual Private Investment Growth, Power	1995-2002	Trend last 5 years	%	n/a
Transmission & Distribution Losses	1971-2001	Median	%	19.59%					
Transmission & Distribution Losses	1971-2001	StandDev	%	4.62%	Total Population	2003	Latest	1000s	2,984
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	22.06%	Annual Population Growth	2003	Latest	%	1.49%
					Share of Rural Population	2003	Latest	%	42.85%
GDP Growth	2001	Latest	%	3.90%	Annual Rural Population Growth	2003	Latest	%	0.77%
GDP Growth	1971-2003	Mean	%	3.45%	Population density, rural	2003	Latest	people per km2	230
GDP Growth	1971-2003	Median	%	3.57%					
GDP Growth	1971-2003	StandDev	%	4.52%	Access to Electricity	2000	Latest	%	76.10%
GDP Growth	1999-2003	Trend last 5 years	%	2.50%	Rural population w/ access to electricity	2000	Latest	%	40.00%

Paraguay

Annual Electricity Consumption	2001	Latest	GWh	4,489	Annual Electricity Consumption	2010	Estimate	GWh	11,716
Electricity Consumption Growth	1972-2001	Mean	%	11.25%	Annual Electricity Consumption	2015	Estimate	GWh	19,965
Electricity Consumption Growth	1972-2002	Median	%	11.14%					
Electricity Consumption Growth	1972-2003	StandDev	%	8.64%	Annual Private Investment, Energy	2000	Latest	$m	n/a
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	0.20%	Annual Private Investment, Energy	1994-2002	Mean	$m	n/a
					Annual Private Investment, Energy	1994-2002	Median	$m	n/a
Annual Electricity Production	2001	Latest	GWh	45,358	Annual Private Investment, Energy	1994-2002	StandDev	$m	n/a
Electricity Production Growth	1972-2002	Mean	%	26.60%	Annual Private Investment Growth, Energy	1998-2002	Trend last 5 years	%	n/a
Electricity Production Growth	1972-2002	Median	%	11.21%					
Electricity Production Growth	1972-2002	StandDev	%	59.31%	Annual Private Investment, Power	2002	Latest	$m	n/a
Electricity Production Growth	1997-2001	Trend last 5 years	%	-0.87%	Annual Private Investment, Power	1998-2002	Mean	$m	n/a
					Annual Private Investment, Power	1994-2002	Median	$m	n/a
Transmission & Distribution Losses	2001	Latest	%	3.33%	Annual Private Investment, Power	1994-2002	StandDev	$m	n/a
Transmission & Distribution Losses	1971-2001	Mean	%	6.39%	Annual Private Investment Growth, Power	1995-2002	Trend last 5 years	%	n/a
Transmission & Distribution Losses	1971-2001	Median	%	4.57%					
Transmission & Distribution Losses	1971-2001	StandDev	%	5.56%	Total Population	2003	Latest	1000s	5,643
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	2.60%	Annual Population Growth	2003	Latest	%	2.39%
					Share of Rural Population	2003	Latest	%	42.78%
GDP Growth	2001	Latest	%	2.10%	Annual Rural Population Growth	2003	Latest	%	0.93%
GDP Growth	1971-2003	Mean	%	4.24%	Population density, rural	2003	Latest	people per km2	79
GDP Growth	1971-2003	Median	%	3.98%					
GDP Growth	1971-2003	StandDev	%	4.30%	Access to Electricity	2000	Latest	%	74.70%
GDP Growth	1999-2003	Trend last 5 years	%	0.53%	Rural population w/ access to electricity	2000	Latest	%	#VALUE!

Peru

Annual Electricity Consumption	2001	Latest	GWh	18,245	Annual Electricity Consumption	2010	Estimate	GWh	26,708
Electricity Consumption Growth	1972-2001	Mean	%	4.33%	Annual Electricity Consumption	2015	Estimate	GWh	33,006
Electricity Consumption Growth	1972-2002	Median	%	5.27%					
Electricity Consumption Growth	1972-2003	StandDev	%	5.85%	Annual Private Investment, Energy	2002	Latest	$m	278
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	5.37%	Annual Private Investment, Energy	1994-2002	Mean	$m	478
					Annual Private Investment, Energy	1994-2002	Median	$m	451
Annual Electricity Production	2001	Latest	GWh	20,778	Annual Private Investment, Energy	1994-2002	StandDev	$m	219
Electricity Production Growth	1972-2002	Mean	%	4.36%	Annual Private Investment Growth, Energy	1998-2002	Trend last 5 years	%	-18.38%
Electricity Production Growth	1972-2002	Median	%	5.19%					
Electricity Production Growth	1972-2002	StandDev	%	4.61%	Annual Private Investment, Power	2002	Latest	$m	278
Electricity Production Growth	1997-2001	Trend last 5 years	%	5.37%	Annual Private Investment, Power	1998-2002	Mean	$m	538
					Annual Private Investment, Power	1994-2002	Median	$m	477
Transmission & Distribution Losses	2001	Latest	%	10.76%	Annual Private Investment, Power	1994-2002	StandDev	$m	356
Transmission & Distribution Losses	1971-2001	Mean	%	12.71%	Annual Private Investment Growth, Power	1995-2002	Trend last 5 years	%	21.88%
Transmission & Distribution Losses	1971-2001	Median	%	12.03%					
Transmission & Distribution Losses	1971-2001	StandDev	%	3.04%	Total Population	2003	Latest	1000s	27,148
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	12.65%	Annual Population Growth	2003	Latest	%	1.48%
					Share of Rural Population	2003	Latest	%	26.13%
GDP Growth	2001	Latest	%	3.97%	Annual Rural Population Growth	2003	Latest	%	0.07%
GDP Growth	1971-2003	Mean	%	2.46%	Population density, rural	2003	Latest	people per km2	191
GDP Growth	1971-2003	Median	%	2.87%					
GDP Growth	1971-2003	StandDev	%	5.58%	Access to Electricity	2000	Latest	%	73.00%
GDP Growth	1999-2003	Trend last 5 years	%	2.56%	Rural population w/ access to electricity	2000	Latest	%	30.00%

Uruguay

Annual Electricity Consumption	2001	Latest	GWh	6,411	Annual Electricity Consumption	2010	Estimate	GWh	9,254
Electricity Consumption Growth	1972-2001	Mean	%	4.16%	Annual Electricity Consumption	2015	Estimate	GWh	11,347
Electricity Consumption Growth	1972-2002	Median	%	4.63%					
Electricity Consumption Growth	1972-2003	StandDev	%	3.63%	Annual Private Investment, Energy	2002	Latest	$m	330
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	4.29%	Annual Private Investment, Energy	1994-2002	Mean	$m	n/a
					Annual Private Investment, Energy	1994-2002	Median	$m	n/a
Annual Electricity Production	2001	Latest	GWh	9,252	Annual Private Investment, Energy	1994-2002	StandDev	$m	n/a
Electricity Production Growth	1972-2002	Mean	%	5.87%	Annual Private Investment Growth, Energy	1998-2002	Trend last 5 years	%	n/a
Electricity Production Growth	1972-2002	Median	%	5.37%					
Electricity Production Growth	1972-2002	StandDev	%	16.85%	Annual Private Investment, Power	2002	Latest	$m	n/a
Electricity Production Growth	1997-2001	Trend last 5 years	%	8.73%	Annual Private Investment, Power	1998-2002	Mean	$m	n/a
					Annual Private Investment, Power	1994-2002	Median	$m	n/a
Transmission & Distribution Losses	2001	Latest	%	15.97%	Annual Private Investment, Power	1994-2002	StandDev	$m	n/a
Transmission & Distribution Losses	1971-2001	Mean	%	15.15%	Annual Private Investment Growth, Power	1995-2002	Trend last 5 years	%	n/a
Transmission & Distribution Losses	1971-2001	Median	%	15.28%					
Transmission & Distribution Losses	1971-2001	StandDev	%	3.52%	Total Population	2003	Latest	1000s	3,380
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	17.45%	Annual Population Growth	2003	Latest	%	0.56%
					Share of Rural Population	2003	Latest	%	7.46%
GDP Growth	2001	Latest	%	2.50%	Annual Rural Population Growth	2003	Latest	%	-2.19%
GDP Growth	1971-2003	Mean	%	1.54%	Population density, rural	2003	Latest	people per km2	20
GDP Growth	1971-2003	Median	%	1.56%					
GDP Growth	1971-2003	StandDev	%	5.01%	Access to Electricity	2000	Latest	%	98.00%
GDP Growth	1999-2003	Trend last 5 years	%	-3.24%	Rural population w/ access to electricity	2000	Latest	%	74.04%

Venezuela, RB

Annual Electricity Consumption	2001	Latest	GWh	64,178	Annual Electricity Consumption	2010	Estimate	GWh	114,330
Electricity Consumption Growth	1972-2001	Mean	%	6.63%	Annual Electricity Consumption	2015	Estimate	GWh	157,572
Electricity Consumption Growth	1972-2002	Median	%	6.60%					
Electricity Consumption Growth	1972-2003	StandDev	%	5.80%	Annual Private Investment, Energy	2000	Latest	$m	30
Electricity Consumption Growth	1997-2001	Trend last 5 years	%	2.67%	Annual Private Investment, Energy	1994-2002	Mean	$m	n/a
					Annual Private Investment, Energy	1994-2002	Median	$m	n/a
Annual Electricity Production	2001	Latest	GWh	89,973	Annual Private Investment, Energy	1994-2002	StandDev	$m	n/a
Electricity Production Growth	1972-2002	Mean	%	6.60%	Annual Private Investment Growth, Energy	1998-2002	Trend last 5 years	%	n/a
Electricity Production Growth	1972-2002	Median	%	6.01%					
Electricity Production Growth	1972-2002	StandDev	%	4.65%	Annual Private Investment, Power	1998	Latest	$m	133
Electricity Production Growth	1997-2001	Trend last 5 years	%	3.57%	Annual Private Investment, Power	1998-2002	Mean	$m	n/a
					Annual Private Investment, Power	1994-2002	Median	$m	n/a
Transmission & Distribution Losses	2001	Latest	%	25.28%	Annual Private Investment, Power	1994-2002	StandDev	$m	n/a
Transmission & Distribution Losses	1971-2001	Mean	%	16.52%	Annual Private Investment Growth, Power	1995-2002	Trend last 5 years	%	n/a
Transmission & Distribution Losses	1971-2001	Median	%	16.09%					
Transmission & Distribution Losses	1971-2001	StandDev	%	4.28%	Total Population	2003	Latest	1000s	25,549
Transmission & Distribution Losses	1997-2001	Trend last 5 years	%	23.19%	Annual Population Growth	2003	Latest	%	1.81%
					Share of Rural Population	2003	Latest	%	12.36%
GDP Growth	2001	Latest	%	-9.22%	Annual Rural Population Growth	2003	Latest	%	-0.11%
GDP Growth	1971-2003	Mean	%	1.29%	Population density, rural	2003	Latest	people per km2	0
GDP Growth	1971-2003	Median	%	1.48%					
GDP Growth	1971-2003	StandDev	%	4.92%	Access to Electricity	2000	Latest	%	94.00%
GDP Growth	1999-2003	Trend last 5 years	%	-3.64%	Rural population w/ access to electricity	2000	Latest	%	73.00%

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Chile	Desafíos de la Electrificación Rural	10/05	082/05
Ecuador	Programa de Entrenamiento a Representantes de Nacionalidades Amazónicas en Temas Hidrocarburíferos	08/02	025/02
Guatemala	Evaluation of Improved Stove Programs: Final Report of Project Case Studies	12/04	060/04
Mexico	Energy Policies and the Mexican Economy	01/04	047/04
Nicaragua	Aid-Memoir from the Rural Electrification Workshop (Spanish only)	03/03	030/04
	Sustainable Charcoal Production in the Chinandega Region	04/05	071/05
Regional	Regional Electricity Markets Interconnections — Phase I Identification of Issues for the Development of Regional Power Markets in South America	12/01	016/01
	Regional Electricity Markets Interconnections — Phase II Proposals to Facilitate Increased Energy Exchanges in South America	04/02	016/01
	Population, Energy and Environment Program (PEA) Comparative Analysis on the Distribution of Oil Rents (English and Spanish)	02/02	020/02
	Estudio Comparativo sobre la Distribución de la Renta Petrolera Estudio de Casos: Bolivia, Colombia, Ecuador y Perú	03/02	023/02
	Latin American and Caribbean Refinery Sector Development Report – Volumes I and II	08/02	026/02
	The Population, Energy and Environmental Program (EAP) (English and Spanish)	08/02	027/02
	Bank Experience in Non-energy Projects with Rural Electrification Components: A Review of Integration Issues in LCR	02/04	052/04
	Supporting Gender and Sustainable Energy Initiatives in Central America	12/04	061/04

Region/Country	*Activity/Report Title*	*Date*	*Number*
	Energy from Landfill Gas for the LCR Region: Best Practice and Social Issues (CD Only)	01/05	065/05
	Study on Investment and Private Sector Participation in Power Distribution in Latin America and the Caribbean Region	12/05	089/05
	GLOBAL		
	Impact of Power Sector Reform on the Poor: A Review of Issues and the Literature	07/00	002/00
	Best Practices for Sustainable Development of Micro Hydro Power in Developing Countries	08/00	006/00
	Mini-Grid Design Manual	09/00	007/00
	Photovoltaic Applications in Rural Areas of the Developing World	11/00	009/00
	Subsidies and Sustainable Rural Energy Services: Can we Create Incentives Without Distorting Markets?	12/00	010/00
	Sustainable Woodfuel Supplies from the Dry Tropical Woodlands	06/01	013/01
	Key Factors for Private Sector Investment in Power Distribution	08/01	014/01
	Cross-Border Oil and Gas Pipelines: Problems and Prospects	06/03	035/03
	Monitoring and Evaluation in Rural Electrification Projects: A Demand-Oriented Approach	07/03	037/03
	Household Energy Use in Developing Countries: A Multicountry Study	10/03	042/03
	Knowledge Exchange: Online Consultation and Project Profile from South Asia Practitioners Workshop. Colombo, Sri Lanka, June 2-4, 2003	12/03	043/03
	Energy & Environmental Health: A Literature Review and Recommendations	03/04	050/04
	Petroleum Revenue Management Workshop	03/04	051/04
	Operating Utility DSM Programs in a Restructuring Electricity Sector	12/05	058/04
	Evaluation of ESMAP Regional Power Trade Portfolio (TAG Report)	12/04	059/04
	Gender in Sustainable Energy Regional Workshop Series: Mesoamerican Network on Gender in Sustainable Energy (GENES) Winrock and ESMAP	12/04	062/04
	Women in Mining Voices for a Change Conference (CD Only)	12/04	063/04
	Renewable Energy Potential in Selected Countries: Volume I: North Africa, Central Europe, and the Former Soviet Union, Volume II: Latin America	04/05	070/05
	Renewable Energy Toolkit Needs Assessment	08/05	077/05
	Portable Solar Photovoltaic Lanterns: Performance and Certification Specification and Type Approval	08/05	078/05
	Crude Oil Prices Differentials and Differences in Oil Qualities: A Statistical Analysis	10/05	081/05
	Operating Utility DSM Programs in a Restructuring Electricity Sector	12/05	086/05

Last report added to this list: ESMAP Technical Paper 089/05.