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Assessment of Energy Reforms in Latin America and the Caribbean

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ENERGY ACCESS

Assessment of Energy Reforms: Case Studies in Latin America and the Caribbean

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EXECUTIVE SUMMARY

Access to comfortable, clean and efficient energy sources on the part of the poor has been defined as one of the highest political priorities in various world forums and analyses of this issue (RISØ-UNEP, 2002; WEC, 2000; FB, 2001). In this context, the GNESD Network Access project has focused its research, as a first priority in this phase, on the analysis of the impact of electricity sector reforms on energy access for the poor.

The differences in average energy consumption levels per individual between developed and developing countries have to do with the growth of the horizontal component of the demand (access of new users to energy sources) as well as with the growth of the vertical component, that is, growth depending on higher levels of household equipment ownership that characterises modern life styles. In LA&C, the average electricity consumption level per individual lies below the world average. This reflects both problems: the lack of access by a large segment of the population, especially in rural areas, and the low consumption level of poor households who, in many cases, cannot afford the cost of electricity service in urban as well as rural areas. In spite of important reforms carried out in several countries of the region, such a trend has been impossible to revert so far.

The analysis of reform impacts has been approached using a set of basic indicators suggested for the purpose in the *Final Common Approach Paper* preceding the project. These refer to the *access* and *affordability* as expressed by: national electrification levels, national electrification rates, electricity consumption per capita, electricity tariffs, and household electricity expenditure as a percentage of total household income. The Argentine, Peruvian and Salvadoran cases are analysed after discussing the limitations of these indicators from the viewpoints of data availability and their interpretation in terms of causal relations.

In approaching the analysis, the indirect impacts of reform have also been identified, that is, those emerging from the linkages between energy and macro-economic policies. This has been useful to understand what happened with reforms aimed at bringing domestic energy prices close to international values by means of sudden monetary appreciation, since this practice has disrupted and de-structured the productive system to such an extent that it can be considered the main cause of worsening structural poverty conditions in the region.

In each of the three cases studied, the indicators of system coverage and growth rate of new connections were not entirely adequate to measure the impacts of reforms in the region. This was because, on the one hand, the dynamics of such indicators depends on the relative development level of the system prior to the reforms, as well as on the characteristics, pace and modality of the urbanization process. On the other hand, data distinguishing between poor and non-poor users is not available, which prevents the drawing of more definite and direct conclusions against the objective of the analysis.

In spite of these shortcomings, available data on system coverage and growth rate of new connections shows a marked decline in system expansion after the reforms, irrespective of the causes. Where this was accompanied by a significant decline in technical losses due to illegal connections, the access already existed before the reforms. The three cases show a noticeable decrease in the amount of losses as a result of the regularization of such connections after the privatisation. However, if overall macro-economic reforms fail to solve the problem of poverty but, in fact, make it worse — as in Argentina and El Salvador —, then this improvement may be threatened by a setback in real tariff collection, since users do not have enough income to afford the true cost of the service.

Average per capita electricity consumption levels in households shows a decline in Peru, stagnation in El Salvador and an increase in Argentina. In Argentina, the increase has to do with the existence of a low price for richer consumers and a general distortion of relative prices of all goods and services due to a highly overvalued currency, which has been the basic component of profitability as planned for in the privatisation process and the rest of the reforms. Indicators related to prices and their impact on family budgets clearly show the deeply regressive nature of the reforms from the point of view of distribution. Therefore, a decade after the reforms, the discussion is again on the role of the

State and subsidies for service expansion to areas which do not have access (rural areas) and the continuation of sustainable conditions for poor users in urban areas.

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LIST OF ACRONYMS AND ABBREVIATIONS

AyEE	Agua y Energía Eléctrica (*state-owned company regulating water and electricity supply*)
BCRA	Banco Central de la República Argentina (*Argentine Central Bank*)
BOOT	Building-Own-Operate-Transfer
CAESS	Compañía de Alumbrado Eléctrico de El Salvador (*Salvadoran electric lighting company*)
CAMMESA	Compañía Administradora del Mercado Mayorista Eléctrico Sociedad Anónima (*Corporation in charge of administering the wholesale electricity market*)
CEL	Comisión Ejecutiva Hidroeléctrica del Río Lempa (*Hydroelectric Executive Committee of the River Lempa*)
ECLAC	United Nations Economic Commission for Latin America and the Caribbean
COPED	Cooperative Program on Energy and Development
COPRI	Comisión Promotora de la Inversión Privada (*Private Investment Promotion Commission*)
CTE	Comisión de tarifas Eléctricas (*Commission for Electricity Tariffs*)
EDENOR	Empresa Distribuidora y Comercializadora Norte (*Northern Distribution and Commercialisation Company*)
EMS	Sistema de Administración de Energía (*Energy Administration System*)
ENRE	Ente Nacional de Regulación Eléctrica de Argentina (*National Electricity Regulation Body*)
EPH/INDEC	Encuesta Permanente de Hogares/Instituto Nacional de Estadísticas y Censos (*Permanent Home Survey/National Institute of Statistics and Censuses*)
ETESAL	Empresa de Transmisión Salvadoreña (Salvadoran Transmission Company)
FB	Fundación Bariloche (*Bariloche Foundation*)
FB-CME	Fundación Bariloche – Consejo Mundial de la Energía (*Bariloche Foundation – World Energy Council*)
FINET	Fondo de Inversión Nacional de Electricidad y Telefonía (*National Investment Fund of Electricity and Telephone Service*)
GBA	Gran Buenos Aires (*Greater Buenos Aires*)
GDP	Gross Domestic Product
GNESD	Global Network on Energy for Sustainable Development
GTZ	Deutsche Gessellschaft für Technische Zusammenarbeit
IDB	Inter-American Development Bank
IDEE/FB	Instituto de Economía Energética/Fundación Bariloche (*Institute of Energy Economy / Bariloche Foundation*)
IMF	International Monetary Fund
INDEC	Instituto Nacional de Estadísticas y Censos (*National Institute of Statistics and Censuses*)
INEI	Instituto Nacional de Estadísticas e Información (*National Institute of Statistics and Data*)
LA&C	Latin America and the Caribbean
MEM	Mercado Eléctrico Mayorista (*Wholesale Electricity Market*)
MEMSP	Mercado Eléctrico Mayorista Sistema Patagónico (*Wholesale Electricity Market - Patagonian System*)
MRS	Mercado Regulador del Sistema (*System Regulating Market*)
NPV	Net Present Value
OLADE	Organización Latinoamericana de Energía (*Latin American Energy Organisation*)
PVD	Países en vías de Desarrollo (*Developing countries*)
RISØ-UNEP	UNEP Collaborating Centre on Energy and Environment RISØ National Laboratory-Denmark
SIEE	Sistema de Información Energética y Económica (*Energy and Economy Information System*)-OLADE/CE
SICN	Sistema Interconactado del Norte (*Northern Interconnected System*)
SIGET	Superintendencia General de Energía Eléctrica y Telecomunicaciones (*General Superintendent of Electric Energy and Telecommunications*)
SINAC	Sistema Interconectado Nacional (*Interconnected National System*)
SISUR	Sistema Interconactado del Sur (*Southern Interconnected System*)
UNEP	United Nations Environment Program
UT	Unidad de Transacciones (*Transaction Uni*t)
WB	World Bank
WDI-online	World Development Indicators online – World Bank
WEC	World Energy Council
YPF	Yacimientos Petrolíferos Fiscales (*formerly, state-owned oilfield, now a private company*)

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1. BACKGROUND

The poor's access to appropriate, clean and efficient energy sources has been identified as one of the highest political priorities in various world forums and analyses of the issue[1]. The intent is to ensure that some two billon of the 2.8 billion people in developing countries who live on less than two dollars a days should be able to access modern energy services to improve their living conditions and livelihood opportunities. Such access should be extended under economic and environmental conditions that are feasible and desirable.

In 2000, the estimated number of people below the poverty line in Latin America and the Caribbean (LA&C) was 211.4 million (43.8 % of the total population), of which 89.4 million people (18.5% of the total population) was destitute. Many poor people find it difficult to access energy sources, and if they do, they have difficulty maintaining a continuous and regular energy service supply due to inadequate incomes, lack of stable and well-remunerated employment and inappropriate subsidy and promotion policies. This is particularly true and relevant in the case of the electric sector, and it has to do with the impact of reforms on poverty and on the poor's access to electricity.

The proportion and number of poor people in urban areas in relation to the total showed a significant and steady increase in the 1990s over the 1980s. The number of poor people in urban areas in 1980 was 14 per cent lower than that of the rural poor people in rural areas. In 1999, the number of urban poor was 74 per cent higher than the rural poor. In 1980, the urban poor accounted for 46 per cent of the total poor in the region while, in 1999, that proportion rose to 63.5 per cent.

In spite of these trends, the question of energy and poverty in LA&C has more often than not been focused on the energy problems of the rural poor than on access to energy services on by the urban poor. This has partly been due to the fact that, at least in the case of electricity, the issue of 'non-technical losses' or 'energy thefts' was neglected when the service was provided by State-run companies. Only recently has it been dealt with more overtly, in many cases alongside reforms in the sector that implied privatisation or demands that energy sales should cover the real costs of the service rendered.

The insufficient attention paid to the energy problems of the urban poor may also be due to the fact that the magnitude of the challenges implied in the fight against urban poverty has become noticeable only more recently. This phenomenon is complex and difficult to solve, as it appears hand in hand with urbanisation and modernisation processes, which were supposed to put an end to poverty (Kozulj, 2001), and this is almost always defined as synonymous with the typical way of life of the rural population.

Unlike rural poverty — which is set within a traditional way of life and lacks the equipment that contributes to the comforts of modern life —, poverty in urban areas is characterised by a more restricted range of options to meet those most basic needs for which access to energy is essential. In other words, faced with the lack of an adequate and stable monetary income, the urban poor may suffer a greater shortage of things than the rural ones, or such shortage may be of a different nature in keeping up with the urban consumption standards of previous stages of the modernisation process (FB-CACME, 2003). This implies a real destabilising

[1] Risø-UNEP, 2002; WEC, 2000; FB, 2001.

element of the positive achievements of modernisation itself, and it calls into question the universal nature of such a process.

On the other hand, radical energy sector reforms have been implemented in some LA&C countries. Such reforms have constituted a substantial part of the macro-economic structural reforms attempted in these countries. They have, therefore, had direct and indirect impacts on the poor and on poverty levels. These need to be analysed so that the analysis of the consequences of such reforms is not reduced only to the incidence of a few direct indicators, whose connections to their explanatory variables may be weak, doubtful and difficult to prove. It is in this context that the cases of three countries considered representative of the varied realities within the region — Argentina, Peru and Salvador — are analyzed in the following parts of this report.

2. RELEVANCE OF CASE STUDY TOPIC AND CRITERIA FOR SELECTION OF CASE STUDY COUNTRIES

2.1 Key questions

The differences in average energy consumption levels between developed and developing countries have to do with the growth of the horizontal component of the demand — access by new users to energy sources — as well as the growth of the vertical component, that is, higher levels of household equipment that characterizes modern life style. In LA&C, the average electricity consumption level per individual lies below the world average. This reflects both problems: the lack of access by a large segment of the population, especially in rural areas, and the low consumption level of poor households, many of which cannot afford the cost of the electricity service. In spite of important reforms carried out in several countries of the region, such a trend has been impossible to reverse. On the contrary, in some cases (e.g., in Argentina), achievements like increase in average electricity consumption per individual have been offset by negative impacts on poverty levels and the numbers of new poor. The case studies in the sub-region can, therefore, cast some light on the complexity of the relationship between energy reforms, energy access, poverty and impacts on the poor.

Indeed, the 1990s were characterised in LA&C by economic and structural reforms which were quite radical in some countries. While reforms in the energy sector were significant in themselves, they also played a role in articulating macro-economic policies concerning the ownership of public sector companies, prices, access to financing sources, resource transfer mechanisms, exchange rates, and so on.

The impact of energy policies on the poor — and on poverty as a social phenomenon — may, therefore, be analysed from several points of view. From an immediate perspective, the focus is on questions such as the following:

- Do the energy sector reforms contain elements that facilitate or have facilitated access to energy services by the poor segments of the population?
- Has the quality of the service rendered improved?
- Have the poor's energy consumption patterns diversified in terms of using different combinations of energy resources?

- What has been the direct impact of the reforms on the price of energy for the poor?

Energy sector reforms have, however, depended on certain global perceptions of important macro-economic parameters which have played an active role in new and growing poverty levels. These parameters include the exchange rate, the real level of opening up of economies, and definitions in the fields of industrial and financial policies. Given this, questions of a different type need to be answered, for instance:

- Would the energy sector reforms have been feasible without the macro-economic policies that accompanied them?
- If not, then is it possible to measure the net impact of the reforms on the poor by simply adding up negative and positive impacts?
- What has been the impact, direct and indirect, of the reforms on employment in privatized enterprises and on global employment, and how does this relate to the poorest or to the generation of new structural poverty?
- How can one consider the long-term de-structuring effects that certain policies are strong enough to introduce in the form of structural poverty along several generations, in almost irreversible terms?

The analysis of the situation of several countries in the region suggests that the second set of questions is as important, if not more so, as the first from the viewpoint of developing countries. It calls for the development of new approaches, concepts and indicators. While some indicators can answer questions concerning the impact of energy sector reforms, they cannot address the second group of questions. The latter includes: the reach of energy services and products, the real availability of energy services, the relative concentration of resources in poor households, the capacity to afford basic energy consumption levels, the cost of different energy sources, and the relative prices of different energy sources, including the cost of equipment.

In spite of the numerous problems posed by lack of sufficient information and the rigour needed to establish comparisons among indicators of the most immediate types of impact (Foster, 2001), the kind of analysis required to account for the relations between energy reforms, macro-economic policies, and their impact on the poor and poverty is much more complex and elusive. However, such an analysis is similar in nature to the one widely used to criticize generalized subsidies based on unbalanced public budgets, on the basis of the argument that inflation affects the poor more severely.

The Argentine, Peruvian and Salvadoran cases cover a substantial part of the regional diversity on the topics posed here. On the one hand, these countries present diverse economic, social, energy, institutional and climatic situations. On the other, the extent, depth and impact of the reforms in each of them have been different in spite of their apparent similarity in classification.

Argentina, in the Southern Cone, represents the typical medium developed country within Latin America and the rest of the developing world. Until the 1980s and the beginning of the 1990s, it had one of the lowest levels of poverty and deprivation; a considerable degree of urban, cultural, technological and industrial development; and a more pronounced climatic diversity than most other countries in the region. At the same time, the Argentine case is the most radical in terms of the speed and depth of energy and macro-economic reforms

implemented in the last decade. No other country privatized all of its public services, and the privatisation that did take place was not so dependent on key macro-economic policies, such as the overvalued, guaranteed-by-law fixed exchange rate, which was a key to ensure high profitability at a minimum risk.

Although similar to the Argentine case regarding the type of reforms implemented, the Peruvian case has turned out to be different, and it is set within a different economic, social, cultural and climatic situation. A country with a population level slightly lower than that of Argentina, in a diverse but much smaller territory, Peru presents very low consumption levels of energy products, electricity among them. The average equipment in the households is surprisingly limited. Poverty levels are very high and technological development levels are lower.

The Salvadoran case, on the other hand, represents a different reality, typical of most Central American countries. Urbanization levels in the country are lower and the development of its cities smaller. Energy consumption levels are much lower. Poverty in rural and urban areas is a much deeper phenomenon than in the other two cases, reflecting a lower development level and a lesser diversification of production. Reforms in Salvador implied a policy of generalized subsidies to household users of electricity in urban areas, which had a very high impact on public finances and, yet, left the problem of electricity access by most of the poor unresolved.

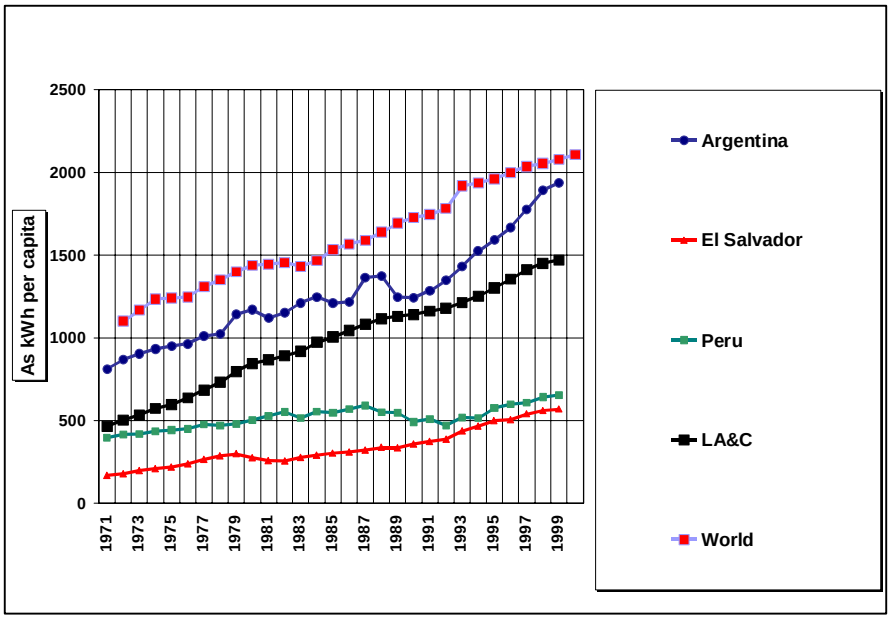
The analysis of these three cases will, therefore, make it possible to assess the complexity and diversity of the real world. These are often neglected by universal recipes proposed to developing countries or to a region as if they shared a totally homogeneous situation.

2.2 Distinguishing features of LA&C region

Two indicators — the evolution of per capita electricity consumption and the evolution of transmission and distribution loss rates —may help in understanding the special characteristics of the LA&C situation and that of the case study countries with respect to the rest of the world. It is common knowledge that electricity system losses include technical and non-technical losses (or energy theft). The latter is partly related to the poverty problem in as much as poor urban users get themselves illegally connected to the grid, although they are not the only ones to resort to such practices in the region. If it is assumed that in developed countries these losses do not exceed 8 per cent, and that technical losses may reach 10 per cent at most in LA&C, then the difference between these ‘acceptable’ levels and those estimated might well be attributed to ‘energy theft’.

The average electricity consumption level per individual in LA&C has been rising over the past two decades (Figure 1). However, it remains 30 per cent below the world average. Of the three countries studied, only Argentina lies above the regional average, but still below the world average in spite of the increase in consumption recorded during the last decade (which was fostered by very low electricity charges relative to domestic purchasing power). On the other hand, average electricity consumption levels in Peru and El Salvador remain below the regional average, and even lower in relation to the interior of the region and the world average. These consumption levels, however, do not refer only to household users, and say very little of what has happened with poor users.

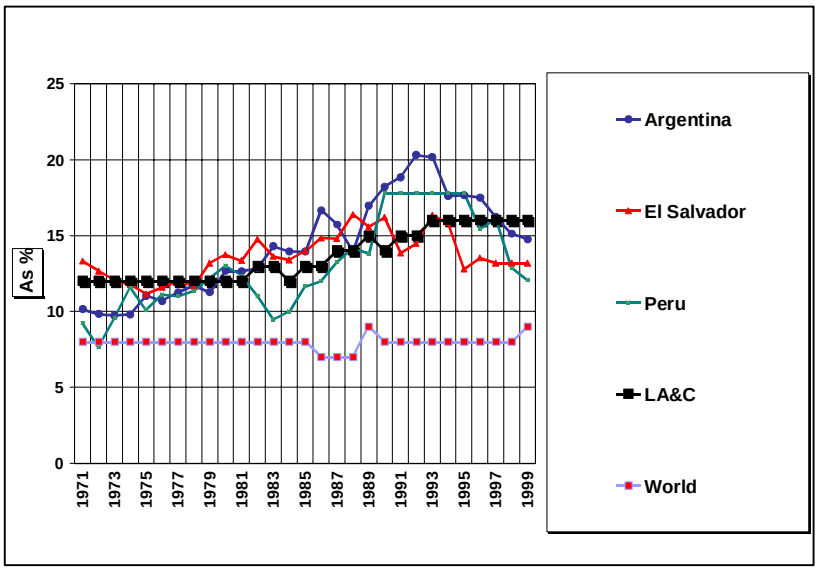
Figure 1
Per Capita Electricity Consumption Trends



Source: Authors' estimates using World Bank data, WDI Online.

As shown in Figure 2, the increase in the extent of electricity losses in the region has been very significant during the 1980s and even in the 1990s, with dissimilar behaviour and different processes among the three countries. These are explained later when considering each case in detail.

Figure 2
Transmission and Distribution Loss Trends
(% of total)



Source: Authors' estimates using World Bank data, WDI Online.

It should be noted, however, that in the three countries under consideration, the percentage of losses decreased during the second half of the 1990s, but it remained stable on a regional

scale at the same time. This phenomenon is no doubt related, first, to the manner, timing and speed of urbanisation in the region and, second, to the reforms in the energy — especially electricity — sector. As stated earlier, the problem of illegal users and the regularization of this situation is linked to the privatisation of the service and to the demand that users should pay for the service they get. The previous situation signified an implicit subsidy for illegal consumption.

Since these reforms have not had the same characteristics in all the countries, it is worth describing in brief their scope, the date when they were put into practice and their subsequent evolution:

1. In Argentina, the reform implied the unbundling of the three segments of the national electricity industry and the privatisation of all the assets belonging to the national companies (Segba, Agua y Energía and Hidronor). This process was implemented very rapidly between 1992 and 1993.
2. In Peru, the process began with the creation of the Private Investment Promotion Commission (COPRI) in 1991, and it had as its goal the vertical unbundling of the electricity industry and the privatisation of national company assets (Electroperú, Electrolima and Etevensa – Ventanilla Thermoelectric Company of Thermal Generation). The process was, however, slower than in Argentina. Distribution was privatised in Lima in 1994, and continued through the year 2000.
3. In El Salvador, the privatisation process began in 1991, but it did not affect the electricity sector till 1995-1996 when the Salvadoran Electric Lighting Company (CAESS) was divided into two companies and a new company was created. The electricity service had been run by the State since 1986, when private companies were compelled to return 50 year-old concessions to the Government.

These processes are described at length in Sections 4 to 6. It should be noted though that in all three case study countries the reforms meant vertical unbundling, the promotion of competition in electricity generation, the encouragement of investment in thermal energy, and the creation of legal frameworks and charge regulating bodies. The reforms were also linked to macro-economic aspects, which are important to analyse. However, before addressing this issue it is useful to summarise the data on the number of poor people in rural and urban areas, and the population data in the countries to be analysed in the context of the LA&C region (see Table 1).

Table 1
Total Population by Area of Residence and Degree of Poverty

	Total Population			Population Below the Poverty Line			Population Below the Indigent Line		
	Total ('000)	Urban (%)	Rural (%)	Total (%)	Urban (%)	Rural (%)	Total (%)	Urban (%)	Rural (%)
Argentina	37,032	90	10	27	27	30	7	7	8
El Salvador	6,276	55	45	50	38	64	22	13	33
Perú	25,939	72	28	49	38	76	22	12	50
LA&C	488,547	76	24	42	37	59	17	12	34

Data Sources: Authors' estimates using ECLAC data, LA&C Statistical Yearbook 2001, Figure 123, and *Panorama Social de América Latina 2001-2002*, Figure 14, Annex 2002PDF.

3. METHODOLOGY

The study methodology corresponds to the guidelines established by the project co-ordinator[2] and results from what was agreed upon after the meeting of the Working Group for the Energy Access project of GNSED, held in Paris at the end of February 2003. A uniform approach has been adopted while analysing the impact of different reform alternatives implemented on access to energy by the poor, and on the direct economic impact that such reforms had in terms of their effect on poor family budgets. The data sources, calculation methods and the nature of the reforms considered are explained in each case study.

The indicators suggested for the analysis of the impact of the reforms refer to *access* and *affordability*, and comprise the following:

Access

i) National electrification levels
ii) National electrification rates
iii) Electricity consumption per capita

Affordability

i) Electricity tariffs[3]
ii) Household electricity expenditure as a percentage of total household income

The methodology proposed aims to facilitate comparability among the different cases analyzed, and requires that the indicators be expressed for two different categories — the poor and the non-poor. The proposed indicators have both advantages and drawbacks in terms of: (a) their ability to behave as suitable referents to explanatory variables linked to the reforms, and their impact on the poor; and (b) the difficulties of obtaining necessary data, their relevance and the appropriateness of proxies used when such data are not available, especially to distinguish between the poor and non-poor irrespective of the definition applied (poverty line, people with incomes below one or two dollars a day). Some of these issues are discussed here.

Some generic literature on the impact of reforms on the poor (e.g., Foster, 2001), and also literature of a more specific kind (e.g., Alexander, 2001), assume that it is possible to analyze reforms and their impact on the poor in causal terms, expressed through the behavior of certain indicators, such as those suggested here or other similar ones. The assumption is that having a series of homogeneous indicators for different countries will make it possible to approach a comparative analysis and to learn from it lessons of universal validity. This line of thought may be an oversimplification of the problem of developing countries, as it is underlaid by a general belief that the same types of recipe will yield more or less similar results wherever they are applied or, worse, that the causal links between reforms and results may be reduced to indicators. Such indicators (and their values), in turn, may be the result of several causes, completely unrelated to the reforms. As such, while the search for a set of indicators that will suitably represent the impact of reforms in different countries is legitimate and desirable, a mere extrapolation from the usual indicators is not, especially if those indicators do not explain the numerous causal factors that may have been in play. The

[2] S. Karekezi, *Final Common Approach Paper*, 3/19/03.
[3] *Tariff* refers here to electricity charges, the cost of electricity (translator's note).

following review of each of the indicators suggested for the study explains the nature of the issue.

National electrification levels

This indicator measures the proportion of households that have access to electricity. In general, it is possible to obtain information for urban and rural areas. However, when trying to classify households into poor and non-poor, the necessary data is not available. To overcome this limitation, it has been suggested that the proportion of users consuming up to 50 kWh/month or up to 100 kWh/month be used as a *proxy* for poor users, and the rest be treated as non-poor users.

The use of this indicator as representative of the reforms poses a number of limitations that should be considered in order to avoid a misinterpretation of the results. In the first place, for each case that is analyzed, it is necessary to take into account whether the system was developed or not at the moment of implementing the reforms. If it was, the reforms should not have major effects. On the other hand, electrification levels has always depended a lot on the development and speed of urbanisation processes; if reforms occur at the same time when such processes develop or move forward, the development of electrification might be wrongly attributed to the reforms. Likewise, if before the reforms the users were illegal consumers, the indicator will not reveal real processes but processes of statistical inclusion. These are some of the reasons why the explanation of the data gathered and the interpretation of their possible meaning should be done very thoroughly.

National electrification rates

This indicator measures the growth rate of new electricity connections. Though related to the previous indicator, it refers to electricity market expansion rather than to the coverage of the system. Yet, as with the previous indicator, the values *per se* before and after the reforms are not very revealing unless they are accompanied by *ad hoc* explanations. Thus, in developed systems the rates will be necessarily lower than in the past. If market expansion (its range) presents a logistic function, and the reforms were implemented after the turning point, then the indicator will simply reveal a natural decline process without any intervening causal relation. The same can be said about the opposite, when the reform is implemented in an expanding market. For this reason, the indicator must be interpreted carefully, for those in favour or against the reforms may use the results in an ambiguous way in order to win support to their political and ideological views.

Electricity consumption per capita

This indicator assesses the impact of the reforms in quantitative terms at a national level and at the level of poor and non-poor users, provided they could be so differentiated. If data disaggregated by poor and non-poor users is not available, an approximation according to consumption levels will only show if the average has moved upwards or downwards, but it will not reveal much useful information to measure the impact on the poor. It will, however, show the impact on average consumption which, in turn, may be due to fluctuations in prices, incomes, appliance ownership levels and so on. It is very difficult to evaluate the nature of the reforms in a direct way by means of this indicator. Yet, it is possible to show the complexity of real behaviour by means of hypotheses that also relate indirect impacts.

Electricity tariffs

This refers to the cost of electricity before and after the reforms. Cost may be sub-divided into average cost by consumption category or band, that is, the cost of connections and addition or removal of subsidised charges for bands of poor consumers. In general, it is a clear, feasible indicator, likely to be interpreted in direct terms. However, the addition of indirect impacts may be justified when prices have depended on sharp fluctuations of external and internal relative prices, since such variations almost always affect the poor and increase their number. It is however, important to note that on its own, the electricity tariffs indicator is not sufficient to depict impact on the poor. Its impact to the poor is relative to their income/expenditure as particularly discussed by the following indicator.

Household electricity expenditure as a percentage of total household income

This indicator measures the impact of electricity expenditure on the family budget before and after the reforms. These data are generally obtained via the permanent home surveys and reveal the positive and negative impacts satisfactorily. It is probably one of the more unambiguous direct indicators, though it may also be subject to interpretations similar to those for the previous indicator because of the question of external and internal relative prices.

The case studies presented in the following parts of the report attempt to utilize the various indicators agreed upon for the study. However, the analysis of indirect impacts are added as necessary to show the complexities of the links between reforms and impacts on the poor and poverty levels.

4. ARGENTINE CASE STUDY

4.1 Background and description of the reform

4.1.1 Key characteristics of the electricity sector

The Argentine case represents the change from a vertically integrated, state-owned industry (existing as from the post-war period to 1992) to a vertically unbundled model and complete privatisation (1992-1993), together with the setting up of authorities to regulate monopolized activities, such as distribution and transportation. After the reforms, and as of now, the electricity system is divided into two broad jurisdictions, national (or federal) and provincial. The federal jurisdiction follows the guidelines established by the Energy Department, which enunciates energy policies and regulations, and authorizes the intervention of new actors. The regulating authority is the National Electricity Regulation Body (*ENRE*), in charge of setting retail energy prices, controlling and supervising the quality of transportation and distribution services, and settling conflicts between parties to the system and those affecting users. In the provincial jurisdiction, these actions are carried out by Provincial Energy Bodies and Provincial Regulating Bodies. The electricity sector is grouped around the Wholesale Market, which is coordinated by the Administrative Corporation for the Electricity Wholesale Market (CAMMESA), whose functions are to administer the market and dispatch loads, and to be the highest technical authority. The Wholesale Market is, in turn, made up of the following actors:

- generators, self-producers and co-generators;

- federal, provincial and co-operative distributing agents;
- local and international transportation agents; and
- large users.

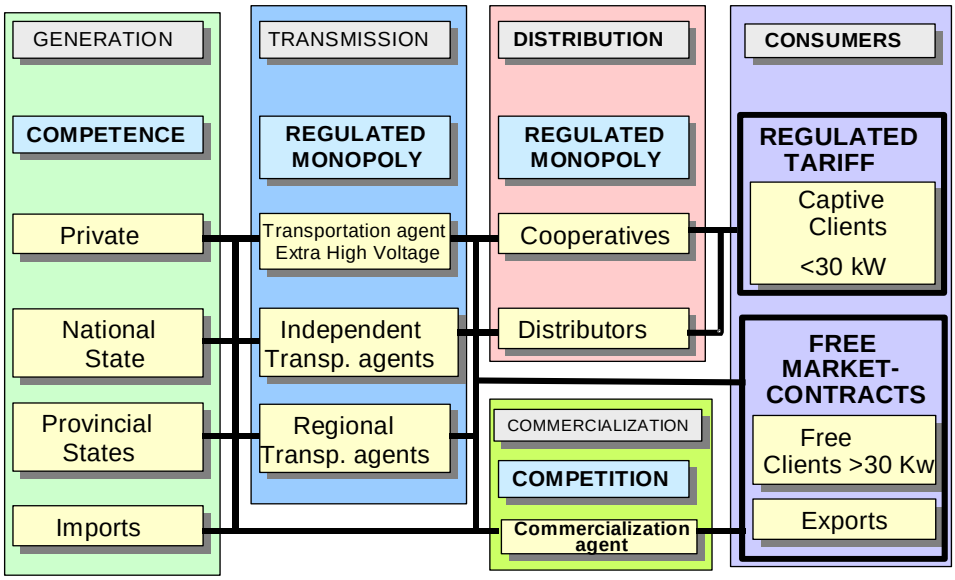
The numbers and types of participating agents are summarized in Table 2. This structure is the result of unbundling the national electricity company assets, the entry of new actors in generation and provincial electricity reforms. Figures 3 and 4 show the current regulations for the operation of the electricity market.

Table 2
Number of Agents in Wholesale Market

Agents	MEM	MEMSP	Total
Generators	40	4	44
Self-Producers	12	-	12
Co-Generators	3	-	3
Transportation Agents	29	1	30
Distribution Agents	28	3	31
Major Large Users (*GUMAs*)	373	19	392
Minor Large Users (*GUMEs*)	1497	5	1502
Total	1982	32	2014

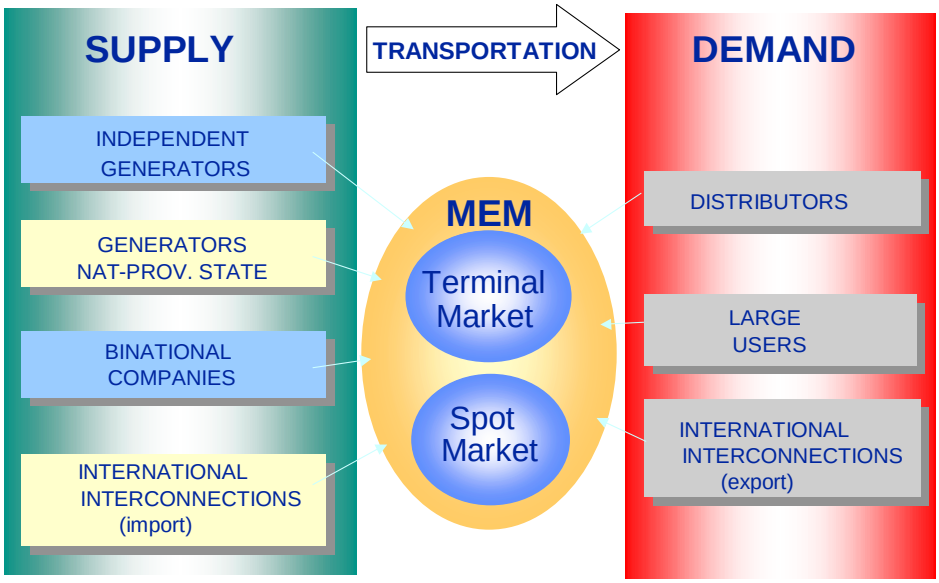
Data Source: Pistonesi, 1999.

Figure 3
Market Organisation: Market Operation Scheme



Source: CAMMESA, 1999.

Figure 4
Basic Rules of Market Operation



Source: CAMMESA, 1998.

Table 4 shows the evolution of the number of actors within the Argentine electricity system from the start of the reform. It is important to note that, prior to the reform, electricity generation was in the hands of six public actors: Agua y Energía, HIDRONOR, SEGBA, the National Atomic Energy Commission (CNEA), bi-national hydroelectric dams and provincial companies. The first three companies were sub-divided on the basis of the number of electric

power plants they had, and were privatized. As a consequence of this process, the number of actors in this segment of the electricity sector grew from 5 to 22.

Table 3
Number of Actors in Wholesale Electricity Market (MEM)

(as of 31 December)

Actors	1993	1994	1995	1996	1997	1998	1999	2000	2001
Generators	22	27	33	38	40	40	40	39	39
Self-Generators	2	5	9	9	11	12	12	13	11
Co-Generators	-	-	-	-	2	3	3	3	3
Commercialisation agents	-	-	-	-	-	1	2	3	4
Distribution agents	21	21	23	25	28	28	47	54	58
Major large users	9	69	189	246	331	373	390	379	364
Minor large users	-	-	207	458	793	1497	1541	1430	1828
Private large users	-	-	-	-	-	-	26	58	51

Source: CAMMESA, 2001.

The evolution of installed capacity in public service electric power plants before and after the reform and the respective owners of the plants is displayed in Table 4. Of the total of 14,696 MW of installed capacity in 1991, 10,623 MW was privatized. The reform law and its subsequent amendments enabled electricity co-operatives (initially considered major large users) to gradually become distribution agents, which explains the increase in the number of actors. Finally, private large users (those requiring capacities between 100 and 50 kW) increased from 1999, but their growth rate has stabilized and the trend is expected to continue.

Table 4
Installed Capacity in Public Service Electric Power Plants Before and After Reform (MW)

	1991	2001
Agua y Energía	4,703	
HIDRONOR	2,660	
SEGBA	2,601	
CNEA	985	985
Bi-national ownership	1,220	2,655
Provincial bodies	2,366	1,851
Others	162	
Private Actors		17,340
TOTAL	**14,696**	**22,831**

Source: IDEE on the basis of CAMMESA data.

4.1.2 Description of past reforms

4.1.2.1 Situation prior to the reform

When the reform took place, mainly during the period 1992-1993, the Argentine electricity system was characterized by the existence of public companies of federal (national and bi-national) or provincial jurisdiction almost exclusively. Federal jurisdiction companies ran the large power plants, most of the high voltage transmission, and distribution within Greater

Buenos Aires and to large users in all the national territory. There were public companies of provincial jurisdiction in most of the provinces and they, together with the co-operatives, acted almost exclusively as distribution agents.

Global socio-economic trends during the 1980s seriously undermined the operation of public companies, especially federal ones. Delayed increases in electricity charges and unfair contracts with the private sector brought about a rapid rise in indebtedness levels and severe financial imbalances, which had to be covered by the national treasury. Towards the end of that decade, the Argentine electricity system was virtually insolvent, a situation that coincided with critical shortages in the service caused by a period of drought and the deterioration of thermal supply due to poor maintenance. However, while this situation contributed to the justification of a major change, the restructuring of the electricity system was mainly a result of the global reform at the general economic and energy levels, and it was implemented along the lines of such reform.

4.1.2.2 The new institutional organisation resulting from the reform

The electricity reform was prompted by reform within the federal jurisdiction and soon reached all activities under its control. The purpose of such restructuring was to improve productive efficiency through the introduction of competition wherever possible, promote private capital participation and protect users' interests by regulating markets that were behaving as natural monopolies. As with all other energy industries, this reform implied a drastic modification in productive and institutional organization, and a deep change in the role of the State in the electricity system.

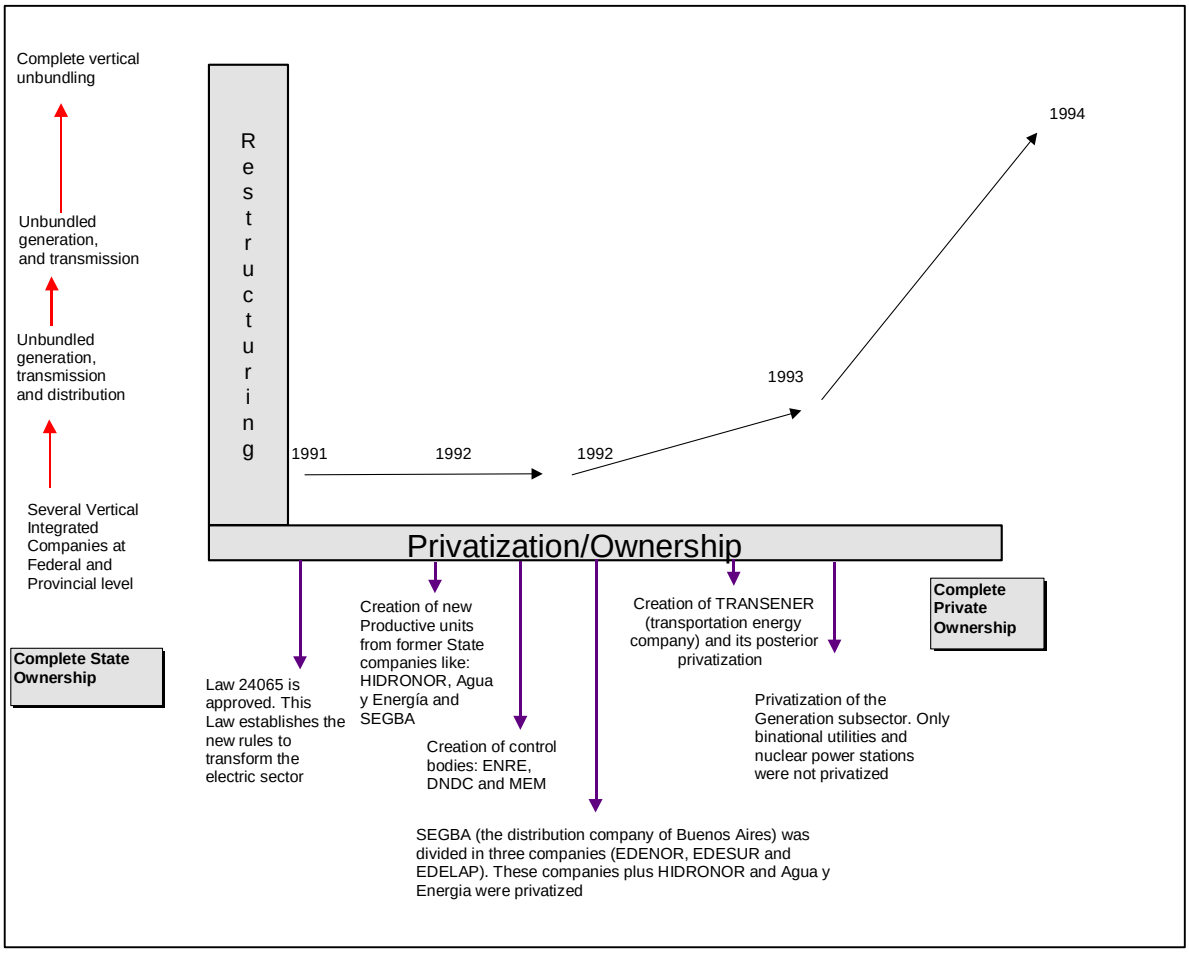
As mentioned earlier, the main stages of the process were completed between 1992 and 1993. This involved the vertical unbundling and horizontal separation of the system activities — especially those connected with generation and distribution —, transferring emerging companies to the private sector and setting up the principle of role incompatibility and free access of third parties to transmission and distribution networks. Ensuing from this, legally independent productive units were created out of the large power plants belonging to the former national companies, HIDRONOR, Agua y Energía and SEGBA, which were then privatised separately. The scope of electricity distribution in the metropolitan area, until then the responsibility of SEGBA, was divided into three areas with three companies created to provide the service (EDENOR, EDESUR S.A. and EDELAP S.A.). These were put out to tender and handed over to private consortiums.

Although the legislation then in force aimed at the vertical unbundling of the companies and the clear separation of the electricity market into the different actors — generators, transportation agents, commercialization agents, distribution agents and large users —, in practice it meant a process of certain vertical re-integration through binding and dominant commercial corporations. Similarly, such re-integration was strengthened among the different energy chains, especially those connecting petroleum and gas with electricity generators which, in turn, take part in transmission and distribution.

While most of the provinces adhere to the principles of the national electricity law, the provincial governments have autonomy in defining the terms under which they lease the electricity service in their territory (by means of their own regulations), except for questions concerning inter-provincial trade in electricity which must be carried out according to national regulations. For this reason, and because national companies were in charge of

expanding the electricity service throughout the national territory after the Second World War, the national authorities retain control over almost the whole of electricity generation. Figure 5 presents a schematic summary of the reform process.

Figure 5
Schematic Representation of Argentine Electricity Sector Reforms



Source: FB, on the basis of Karekezi (2003).

4.1.3 The electricity-macro-economic reform nexus and indirect impacts on the poor

The energy sector reforms in Argentina cannot be satisfactorily explained by considering only the specific problems of the sector as they were the consequence of the deeper crisis that the Argentine economy went through from the mid-1970s and whose main characteristic was a recurrent structural imbalance. Indeed, towards the mid-1970s, the growth model based on urbanisation and substitute industrialization of imports had reached a stagnation level. The characteristic of the 1980s was inflation and difficulty in meeting external debt services.

Although the Argentine economy was used to a highly inflationary context, the hyper-inflation of 1989, which threatened to repeat itself towards the end of 1990 and the beginning of 1991, considerably reduced the resistance to macro-economic adjustment and public sector restructuring policies. The transition period consolidated this context with a markedly

overvalued currency on which the Convertibility Plan was launched in 1991. The Plan was based on the following factors:

a) with a considerably overvalued currency as a starting point[4], fixing of the exchange parity by law at 1 Peso = 1 US dollar, thus virtually 'dollarising' the national economy and relinquishing any possibility of an active monetary policy;

b) re-negotiation of the debt with foreign creditors within the context of the Brady Plan, facilitated by the support of multilateral financing institutions by means of strict commitments to carry out structural reforms;

c) rapid commercial opening and total liberalization of the capital market;

d) privatisation of public companies through the sale of assets or the concession of services, and total withdrawal of the State from productive activities;

e) deregulation and liberalization of the goods and service markets; and

f) tax increase accompanied by a reduction of public expenditure in order to meet the required surplus for the payment of external debt services.

According to these basic guidelines of the economic policy, the rapid privatisation of public companies was a key element in obtaining the financial resources needed to consolidate the feasibility of the Plan and to help settle the conflicts between domestic economic groups and foreign creditors. In the context of the energy sector, the implementation of the Plan aimed at putting an end to state monopoly and setting in motion a system with greater market competition in order to make it more efficient and to provide more and better services to the users. A distinction was established between potentially competitive markets, for instance, the hydrocarbon and electricity generation markets, and those that constituted a natural monopoly, such as electricity, gas and water distribution through the grid.

The privatisation process, therefore, meant the sale and unbundling of public company assets in the energy sector, and the definition of legal and institutional frameworks for the regulation of public services. Under the government's privatisation strategy, energy sector privatisation was the most important. Of the 297 public companies that were sold, the four major electric companies privatized (YPF, State-run Gas Company, AyEE and SEGBA[5]) had the most diverse range of activities, yielding approximately USD 8 billion million in cash and USD 10 billion in nominal external public debt reduction — 84.5 per cent of the cash and 33 per cent of the bonds. The rest was attributed mainly to telecommunication and air transport service companies.

The most important link between the Convertibility Plan and energy reform policies had to do, however, with the relative prices of energy products and with the relative prices of goods and services at large in the economy. In general, the cost of energy products that lay below

[4] In 1991, the appreciation level was near 100% with respect to the average exchange rate during the 1980s and more than 60% with respect to the average exchange rate between 1956 and 1989, which includes the 1978-1980 period with sudden overvaluation.

[5] Government of Argentina, 1994. Privatisation did not imply a decrease in foreign indebtedness, which in that period grew from USD 61 billion to USD 68 billion. A considerable proportion of the debt was absorbed by 'residual' State companies. Cf. Works and Public Services Ministry, Trade and Investment Department, Investment Sub-Department, *Report on Privatizations to 5-31-1994.* Privatizations did not imply a decrease in foreign indebtedness, which in that period grew from 61,000 to 68,000 million dollars. A considerable proportion of the debt was absorbed by state "residual" companies.

international price levels was brought up to a level compatible with those prices, yet without affecting prices and charges in relation to domestic purchasing power (Kozulj, 2001 & 2002).

However, electricity and gas charges for final users in the lower consumption bands did undergo sharp increases — even expressed in the constant local currency, at domestic purchasing power parity — as compared to prior levels. Since it can be reasonably assumed that there is correlation between low consumption levels and population with the lowest incomes, this implies that the reforms had a negative impact on the poor. This was true even in a general context which encouraged equipment ownership in poor households (through more affordable relative prices of household appliances and better financing conditions) and resulted in higher overall energy consumption levels over the previous situation.

The most important impacts of the reform on the poor and on poverty levels have, thus, been negative. But they resulted from indirect rather than direct causes — gradually, cumulatively and in a fashion that was difficult to reverse in the short or medium term. This can be attributed to strong empirical evidence that shows that:

a) without monetary appreciation, energy reforms would not have been feasible for the private sector (profitability levels would have been a lot lower, markets would have contracted, and the relation between current incomes and capital would have been weaker); and

b) there was a close relationship between de-industrialization levels caused by monetary appreciation (substitution of local production with imports), increase in unemployment rates, growing levels of poverty and foreign indebtedness per inhabitant.

In addition, the non-converging nature of the Convertibility Plan in terms of employment and foreign indebtedness makes it responsible for the sudden increase in poverty levels after it was abandoned, as a consequence of price increases in basic consumption products brought about by devaluation. In any realistic hypothesis, this latter development must be seen as the inevitable consequence of a non-sustainable plan, conceived for a ten-year period and riddled with warnings of a possible default declaration and the dependence on “international goodwill” in order to sustain it (Frenkel, 2003;Damill, 2000; Kozulj 2002; Rubinstein, 1997; Krueger, 1984). Seeing it under any other light would be impossible, since monetary appreciation is an objective fact, measurable in terms of price indicators and available data, and mentioned in the literature (Little, 1995) as a cause of serious structural problems in countries where such plans have been in force for a long time. The latent implications of a policy cannot then be ignored in explaining the dynamic behavior of the variables.

4.2 Direct impacts of the reform on the poor

The three indicators of *access* do not seem to capture the impacts of the reform on the poor in Argentina. This is due to the wide reach of the service prior to the reform. Because of the high urbanisation level in the country (87% in 1990), the potential to enhance access as a consequence of increase in the numbers of rural users has been low (in 2000, the urban population was 88%, almost the same as in 1990). In addition, data to quantify the indicators according to poor and non-poor users is not available. However, it is interesting to analyse the impact of the reform in terms of changes in non-technical losses and the evolution of the index of payments in arrears. On the other hand, the data necessary to estimate the behaviour of the *affordability* indicators selected is available, and it can be applied to interpret the impact of the reform on the poor. These are elaborated below.

4.2.1 Electrification levels

The electrification level in Argentina grew from 91 per cent in 1991 to 95 per cent in 1997 (Table 5). At present, the coverage of the system is 98 per cent in urban areas and about 70 per cent in rural areas. It should be noted that electricity co-operatives have historically played a major role in promoting access to electricity in small urban centers and rural areas. These co-operatives are mainly in the Humid Pampas (Buenos Aires, Cordoba, Santa Fe and La Pampa), where more than 63 per cent of the population lives. Currently, there are 527 electricity co-operatives throughout the country.

Table 5
Estimated Electrification Levels in Argentina

Indicator	Pre-reform, Year 1991 (%)	Post-reform, Year 1997 (%)
Total electrification levels	91	95
Electrification levels of the poor	n.a.	n.a.
Electrification levels of the non-poor	n.a.	n.a.

Source: Authors' estimates based on data from OLADE, Energy Economic Information System, SIEE-OLADE database.

This indicator, however, says very little about the impact of the reforms on the poor segments of society. It should be noted that when the reforms started, an "Outline Agreement" was entered into with the concerned parties (Town Councils, Distribution Agents). The objective of the agreement was to set up a set of general rules and guidelines that would regulate and co-ordinate the technical and economic support that the parties would contribute in relation to electric energy supply, and to the maintenance of the system in "Deprived Neighbourhoods" within each of the concession areas. Four neighbourhood categories were established:

- Type A Settlement: Groups of dwellings without inner streets, where it is not possible to regularise plots of land (shanty towns).
- Type B1 Settlement: Groups of dwellings where it is possible to open up streets and to regularise plots of land.
- Type B2 Settlement: Groups of dwellings with streets and in the process of regularising plots of land.
- Type C Settlement — Deprived Neighborhoods: Groups of dwellings with streets, partially regularised and with identified users in each plot of land.

According to the agreement, the economic support to be contributed by the National Government, the Province of Buenos Aires and the Town Councils that entered into the agreement[6] was to be restricted to users who had been normalised as of 1 January 1993. The agreement was to remain in force for four years, from 1 July 1994 to 1 July 1998. This was subsequently extended for another four-year period.

Distribution Companies renounced any possibility of complaining about and/or claiming any payment for the service derived from direct connections to the grids or any other illegal way

[6] It was necessary for each Town Council to sign the corresponding agreements with Distribution Companies.

of acquiring electricity in the Settlements and Deprived Neighborhoods during the period between September 1992 and January 1994. The Town Councils that entered into the agreements with Distribution Companies assumed a series of responsibilities, including conducting a census to record the number of inhabitants and dwellings in Types A and B1 Settlements, opening up streets, contributing an amount equivalent to the municipal tax implied by the amounts that were charged on all users included in the Outline Agreement.

Similarly, Distribution Companies had a series of responsibilities which featured the conducting a census in Type B2 Settlements and Deprived Neighbourhoods, setting up — within a 120-day period — one or more collective electricity meters in each Type A and B1 Settlement, issuing a monthly payment notice for each group, and defining a schedule to set up individual meters at the rate of 10,000 a month or 150,000 a year in Deprived Neighbourhoods.

The National Government and the Province of Buenos Aires were in charge of a "Special Fund" that was established under the agreement. The fund was to be applied in the following manner:

a) the National Government contribution was assigned to meet unpaid charges in Types A and B1 Settlements, after discounting municipal taxes; and

b) the provincial contribution was assigned to electric infrastructure works with the purpose of normalising electricity supply in the Settlements and Deprived Neighborhoods under the agreement.

The initial number of users under the Outline Agreement was 363,616. The economic value of the rights that each of the Distribution Companies renounced was 20 million Pesos, which was included among the obligations that had to be met by the Special Fund according to the decree regulations.

The Outline Agreement cannot be considered a subsidy to destitute sectors. It was actually a means to "normalise" irregular users through investments financed by the users themselves. In any case, if there was a subsidy, this existed among the neighbourhood users themselves, in as much as Types B2 and C contributed the payments for Types A and B1.

By means of Decree 0093/2001, an addendum to the Outline Agreement was published in the Official Gazette on 31 January 2001. It took into account the fact that, even when most of the objectives of the Outline Agreement were met, some of them could not yet meet the expected terms, and new settlers were recorded at the time that it was convenient to regularise. The parties to the agreement, through the addendum, therefore decided to extend its validity for an additional 50-month term, till 31 August 2002.

Because of the country's serious economic and social situation since 1997, the energy problem in Argentina is at present very much related to payments in arrears and new illegal electricity connections to the grid. These have grown in number and frequency in recent years, especially since 1999 (Table 6), as a consequence of the economic crisis affecting the whole nation, and manifested in high unemployment and inadequate incomes. As a result, the energy sector reform process has suffered a setback in terms of access to electricity, especially by the poor.

Before the reforms, however, the poor were illegally connected to the grid and this was not considered a serious problem. For example, in the area covered by EDENOR, technical and non-technical losses totalled 30 per cent, of which 9.5 per cent corresponded to 'non-clients' of electricity companies, that is, illegal users. By means of the Outline Agreement and through the contributions of the State and poor users, this situation was regularised. 370,000 users had individual meters set up and 47,000 had collective meters set up. During the second stage, 700,000 new users were meant to be regularised. However, as shown in Table 3, the number of users in arrears has become a new and serious problem.

It can, therefore, be concluded that even though more people today are legal users registered with electricity companies, this does not mean new access to a service that did not exist before, nor is it a direct consequence of market rules. If anything, it is an achievement resulting from the Outline Agreement, which was financed by the State and the users themselves.

Table 6
Users in Arrears in Greater Buenos Aires: 1999-2000

Distribution Company	Number of Users Under Outline Agreement	Users with Service Cut Off More Than Twice			% of Users with Service Cut Off More Than Twice		
		1999	2000	2001	1999	2000	2001
EDESURI	331,930	44,793	47,834	90,085	13	14	27
EDENORI	369,745	121,393	171,168	207,604	33	46	56
Total	701,675	166,186	219,002	297,689	24	31	42

Source: FB-CACME, (2003). "Metodologías y Criterios para analizar los subsidios energéticos en el caso de la electricidad para los pobres urbanos del Gran Buenos Aires", Fundación Bariloche-Comité Argentino del Consejo Mundial de Energía, S.C. de Bariloche, Octubre de 2003.

4.2.2 Electrification Rates

The source of information for this is the aggregate national statistics published by the Energy Department. The average annual rate presented in Table 7 considers the increase in the total number of users between 1989 and 1992, and between 1996 and 2002. As can be seen from the table, the rate of new connections diminished noticeably after the reform, from 2.04 per cent/yr. to 1.03 per cent/yr.

Although electrification rates refer to the total number of users, it is necessary to take into account that, in 1990, 86 per cent of that number were households whereas, in 1996 and 2000, the proportion of household consumers was between 84 and 85 per cent. This could indicate a decline in household electrification rates.

Table 7
Estimated Electrification Rates in Argentina

	Pre-Reform (1989-1992) %/Year	Post-Reform (1996-2000) %/Year
National electrification rates	2.04	1.03
Electrification rates of the poor	n.a.	n.a.
Electrification rates of the non-poor	n.a.	n.a.

Source: Authors' calculations using data from Energy Department, *Boletines Anuales del Sector Eléctrico*, several issues.

However, this indicator does not seem appropriate to evaluate the impact of the reform due to the wide coverage already achieved in the years prior to the reform. If the total population, especially the urban population, does not grow, the number of new connections would decrease as the system approaches 100 per cent coverage.

Data on connection rates classified by poor and non-poor users are not available at the national level. Nor has it been possible to obtain these data from the distribution companies that cover the main distribution areas (GBA and City of Buenos Aires). Even if they were available, their interpretation would be difficult, as it would be impossible to determine what proportion of the connections represented simply a regularisation of the service rather than a new connection to which the user had no access before.

4.2.3 Electricity consumption per capita

Aggregate household electricity consumption grew rapidly after the reform. This was due to the energy price policy, as well as the fact that all social sectors had easier access to larger electrical equipment because of the Convertibility Plan. As discussed later, the Convertibility Plan made it possible for electricity charges in the local currency to be more inexpensive than in the past for most consumers, that is, those who consumed more than 150 kWh per two-month period. At the same time, the availability of credit and stability enabled greater access to all kinds of household appliances and electrical equipment in general, even at the level of poor users. However, electricity charges for those with lower consumption levels grew even at the level of domestic prices, in contrast to the rest of the tariffs, which made electricity more expensive for the poor.

Table 8
Estimated Electricity Consumption in Argentinian Households

Indicator	Pre-reform, Year (1990) (kWh/month)	Post-reform, Year (1999) (kWh/month)
National average per capita electricity consumption	113	174
Average Household sector electricity consumption	155*	205
Average per capita electricity consumption by the poor	n.a	n.a
Average per capita electricity consumption by the non-poor	n.a	n.a

Source: Table devised by the authors with data from the Energy Department, *Boletines Anuales del Sector Eléctrico*, several issues. Data for household sector provided to FB by Ente Nacional Regulador Eléctrico (ENRE) database, Distribution companies of Great Buenos Aires (GBA), (Edenor y Edesur).
* provisional estimation

Table 8 shows that average per capita electricity consumption in Argentinian households grew from around 113 kWh/month in 1990 to 174 kWh/month in 1999, 6 years after the

electricity reform and 8 years after macro-economic reforms. As with the other indicators, data on average consumption by poor and non-poor users are not available. Information by consumption bands before and after the reform is also not available.

4.2.4. Electricity tariffs

Electricity tariffs rose considerably after the reform when their values were expressed in dollars (Table 9). However, only tariffs for low consumption users — those recording under 100 kWh per two-month period — rose to levels higher than the domestic price index. By contrast, the average tariff in Peso turned out to be below the average tariff in the period prior to the reform, although it grew by 82 per cent in dollar terms. In the same way, connection charges grew dramatically as a consequence of the general monetary appreciation, while they remained almost unchanged in constant local currency. Even during the reform period itself, charges for all types of connection rose gradually (Table 10).

On the other hand, there was no explicit free or subsidised electricity either before or after the reforms. The term 'subsidies' before the reforms means tariffs below real costs resulting from anti-inflationary policies and the deterioration of public utility incomes in that context. The effect of monetary appreciation on the splitting of domestic and foreign prices, and its impact on the poor is discussed further in Section 4.3.

Table 9
Estimated Electricity Tariffs in Argentina

	Pre-Reform Annual (1985-1989)	Post-Reform Year (2001)
Connection fees/charges (USD)	28.5	62.95
Existence of lifeline tariffs	No	No
Lifeline tariff charges (USc/kWh)*	4.35	11.77
Household tariffs**	5 (1986)	9.1 (1993)
Existence of free electricity consumption bands	No	No
Amount of free electricity provided to the poor (kWh)	-	-

Source: Authors' calculations using data from Energy Department and World Bank, 2001.
*Alexander, M., 2001. Who use as a *proxy* tariff equivalent to 100kWh per two-month period in GBA, EDENOR and EDESUR.
** Average tariff for the household sector.

Table 10
Trends in Connection Costs Under Reform in Argentina

(USD)

Home Connections	Aug 1992	Feb 1998	Feb 1999	Feb 2000
Ordinary connections by users				
Single-phase areas	56.00	61.20	61.15	62.95
Single-phase underground	174.00	190.10	189.95	195.65
Three-phase areas	106.00	115.80	115.70	119.20
Three-phase underground	266.00	290.60	290.35	299.10

Data source: Data provided to FB by Energy Department from his own files on Tariffs and charges.

4.2.5 Electricity expenditure

According to data from the Permanent Home Survey carried out by the National Institute of Statistics and Censuses (INDEC), the percentage electricity expenditure in total family expenditure increased after the reform (Table 11). While, in general, this was due to higher consumption levels in households, in the case of poor households it was also because of tariff increases for lower consumption users and the reduction in their average incomes due to unemployment, worsening employment conditions and wage reductions. For high-income families, the share of electricity expenditure in the total decreased, indicating higher income levels as well as lower electricity costs for high consumption levels. Consumption levels grew the most for these users.

Table 11
Estimated Electricity Expenditure in Argentina

	Pre-reform (1985-1986)	Post-reform (1996-1997)
National average of electricity expenditure as a % of total household expenditure	1.6	2.0
Average electricity expenditure as a % of total household expenditure by the poor (1st decile)	2.7	4.2
Average electricity expenditure as a % of total household expenditure by the non-poor (10th decile)	1.0	0.9

Source: Authors' calculations using data from Arza, C. (2002).
Note: *Each decile groups 10% of the homes according to their income level (total family income). The first decile includes the poorest 10% and tenth the richest 10%.

4.3 Indirect impacts of the reform on the poor

The relationship between energy sector reforms and the Convertibility Plan can be examined in different ways. For the sake of this study, it is important to be clear that the profitability of the privatised companies depended on monetary appreciation lasting at least ten years. The reason for this is that privatised company assets were bought in all cases at prices below their replacement values. The energy industry is capital-intensive by nature. If the sector's prices and tariffs cover total costs, then they normally reflect a high element of capital recovery. The real valuation of the companies in terms of tangible assets does not vary significantly in terms of currency due to the fact that these assets are mainly imported[7] or, if they are not (as in the case of gas pipelines), they can be exported.

Energy tariffs and prices prior to the privatisation did not cover the total costs, which would have included a profit margin on the capital and a rapid long-term expansion guarantee. This was partly because the system was already recouped and the need for expansion was not so urgent. However, making these elements explicit would have produced an economic and political impact difficult to cope with. Consequently, monetary appreciation was a key factor, deliberately sought for and concealed behind indexes that distorted its real magnitude, although none of the objective data needed to determine it were difficult to obtain. The ten-year term was implicit in the *ex ante* evaluation to fix the Net Present Value (NPV) of the assets to be privatised according to the expected cash flow.

[7] This is similar to the relation between foreign debt and GDP. The numerator is always in dollars, but the denominator varies according to the monetary appreciation or depreciation modifying this indicator (foreign debt/GDP ration) linked to the EMBI+ and to the availability of international financing.

Table 12 shows price and tariff fluctuations expressed in constant local currency and in constant dollars. It can be observed that in all cases after the reforms, prices followed a splitting trend, becoming globally cheaper in terms of domestic purchasing power and more expensive in terms of dollars. However, as mentioned above, for lower household consumption levels (conceptually associated with basic and minimum energy requirements), the increase was also considerable in terms of the local currency and domestic purchasing power, thus underlining the regressive nature of the energy policy in distributive terms, and its exclusive nature in terms of social impacts.

Figure 6 traces the evolution of the exchange rate over a considerable historical period in order to show the objectivity of this analysis. It should be noted that prior appreciation instances correspond to the beginning of foreign indebtedness during the 1978-1981 period.

Once these hypotheses and lines of reasoning are accepted, it is possible to analyse their consequences in terms of foreign indebtedness, de-structuring of the productive system and, therefore of employment — conditions that result in poverty and negative impacts on the poor. There is a close correlation in terms of econometric results between the exchange rate level, balance of trade and indebtedness level (Kozulj, 2002). On the other hand, a detailed analysis of privatisation in terms of its effect on the balance of payments shows how the transfer of profits abroad has affected the growing foreign debt imbalance, being responsible for more than 40 per cent of the total capital flow and financial account of the balance of payments, with a minimum of 19 per cent in 1996 and a maximum of 75 per cent in 1995 (Ongaro, Cena & Carluccio, 2001).

Table 12
Energy Price Fluctuations After the Reforms in Constant Pesos and Dollars

Natural Gas	**Household (75 M^3/ 2-month period)**	**Household (250 M^3 /2-month period)**	**Household (500 M^3/ 2-month period**	**Commercial (450 M^3/ 2-month period)**	**2,500m^3/ day**	**200,000m^3/day**	
1984-1989/1993-2000 in domestic prices	60%	29%	-1%	-11%	-14%	-45%	
1984-1989/1993-2000 in dollars	300%	219%	146%	122%	112%	35%	
Oil derivatives	Regular gasoline (l)	Premium gasoline (l)	Kerosene (l)	Gas Oil (l)	Diesel Oil (l)	Fuel Oil (k)	Price of the compound (l)
1984-1989/1996-2001 in domestic prices	-38%	-34%	-21%	-31%	-32%	-55%	-25%
1984-1989/1996-2001 in dollars	83%	95%	134%	108%	100%	33%	123%
Electric Energy (GBA)	**Household Tariff 100 kwh/ 2-mongh period**	**Average household tariff**	**Average commercial tariff**	**Average industrial tariff**	**Average global tariff**		
1984-89/1990-92 in pesos	-33%	-13%	18%	44%	11%		
1984-89/1990-92 in dollars	3%	30%	78%	119%	67%		
1984-89/2001 in pesos	28%	-39%	-51%	-44%	-49%		
1984-1989/2001 in dollars	270%	83%	47%	71%	55%		

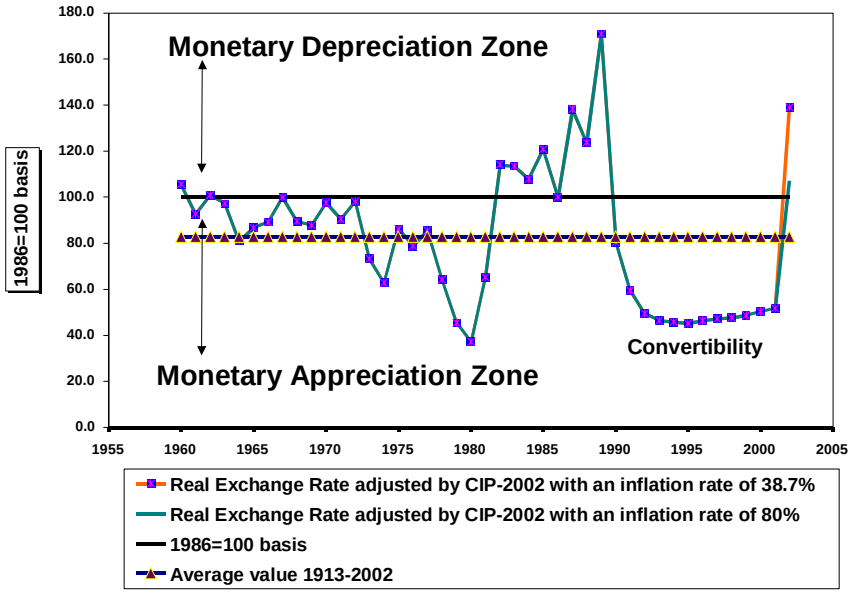
Data Source: Several IDEE/FB studies on energy price policies in argentina; COPED Network; Kozulj, 2,000 & 2002.

Similarly, variations in the employment structure during the 1990s and the inadequate dynamics of the creation of new job positions resulted from the domestic market loss of national products, which had to face foreign competition boosted by the appreciated exchange rate. Consequently, the resultant growth in poverty levels cannot but be attributed to the policies applied, even if the phenomenon does have prior, deeper, roots, given the collapse of the production modality and the rapid post-war urbanisation process.

However, the most serious, though least mentioned, process in analyses of this issue is the cumulative effect and the effect of the gradual increase of structural poverty after the collapse of each model. The increase in the percentage of poor in the total population and the widening gap between the poverty line and poor family incomes have been alarming (Figure 7). Unemployment rate increases coincide with and drag along the percentage of poor households, and devaluation (which is the unavoidable consequence of an overvalued currency due to the IMF refusal to continue financing the almost inevitable foreign gap caused by the interaction of global relative prices in the economy) raises the percentage of poor households and the income-poverty line gap again in 2002. Unemployment, however, shows a downward tendency in as much as, after an impasse, there is an interesting instance of productive reactivation, boosted by a larger bulk of exports and by the substitution of some imported production with national production in the domestic market.

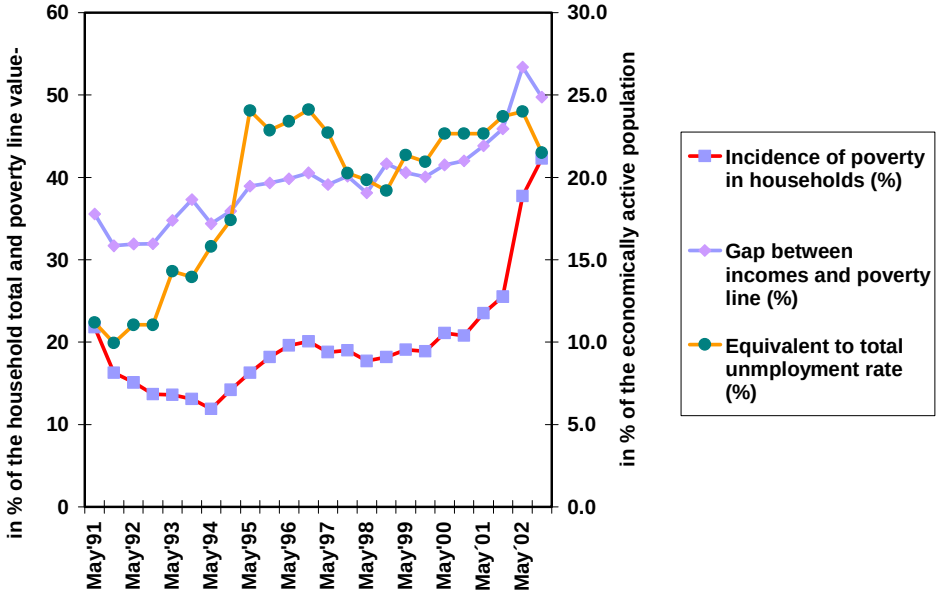
Another process that affected the middle class, and the poor indirectly, was the loss of savings in the financial system. Some banks liquidated their clients' deposits, sent dollars abroad after devaluation and cancelled their own corporate liabilities using that money (Cecchini and Zicolillo, 2002). The relations between privatised energy companies and financial system agents are numerous and significant. However, a detailed treatment of these aspects of the problem is beyond the scope of this study.

Figure 6
US Dollar Real Exchange Rate Adjusted by Consumer and Producer Index Prices: 1960-2002



Source: Authors' estimates using INDEC and BCRA data, on the basis of data from Techint News Bulletins, several issues.

Figure 7
Unemployment and Poverty Trends: 1991-2002



Source: Authors' estimates using data from EPH-INDEC data.

4.4 Overall impacts on the poor

One of the main conclusions from the analysis of the Argentine case is that there is insufficient data to assess the impacts in terms of better access conditions among the poor to electricity services or to other kinds of energy services. However, it is possible to state that progress in this field, for instance, the regularisation of illegal electricity users, was not the consequence of market mechanisms but of strong State intervention and the contribution of the users themselves.

On the other hand, it is evident that, given the high level of market saturation in terms of the horizontal component of the demand, the reform favoured the growth of the vertical component. This was a consequence of the Convertibility Plan, as it contributed to companies having high income levels in foreign currency without needing to increase tariffs in local currency. The Plan also made energy equipment affordable to the households. All this was, however, at the expense of a high indirect cost on society in terms of unemployment and debt increase.

The definitive conclusion that can be drawn, then, is that the most important negative impacts have been a consequence of macro-economic policies. This is in spite of the fact that direct impacts on the energy expenditure of the poorest households have also been negative, since much more was spent on energy products after the reform which, in turn, resulted from higher prices of energy products consumed by the poor.

The macro-economic policies have been inalienable from energy sector reform, since it was the energy sector that led the way in the privatisation process under the unique artificial conditions created in order to guarantee an accelerated accumulation and ownership transfer process. The main impact was recorded in terms of structural unemployment, rise in the numbers of new poor, and the weight of an increasingly larger indebtedness rate per individual, which limited the influence of means used to fight poverty.

5. PERUVIAN CASE STUDY

5.1 Background and description of the reform

5.1.1 Key characteristics of the electricity sector

In 1992, the three segments of the Peruvian electric energy chain – generation, transmission and distribution (including commercialisation) — were run by the State-owned utility, ELECTROPERÚ. Together with regional companies and State-owned remote systems, ELECTROPERÚ generated 70 per cent of the Peruvian electricity supply, mainly through hydro power generation. There were also distribution companies in the largest cities, such as Electrolima, and at a regional level. Some of the latter were in charge of both generation and distribution.

This situation changed substantially after the 1992 Law of Electricity Concessions, which started the privatisation process a two years later. One of the main goals of the 1992 structural reform was the incorporation of competition in the three segments of the electricity sector.

As a result of the reform, at present there is a high degree of horizontal and vertical unbundling, the main characteristics of which are the following:

Highlights

- The privatisation process of the sector began in May 1992, with the inclusion of Electrolima and Electroperú within the process of private investment promotion.

- Electrolima was by then the largest distribution company in the country and second only to Electroperú as a generator. Prior to its sale, it was divided into five companies: Edelnor, Edelsur, Edegel, Edechancay and Edecañete. Electroperú was divided into three units: Egenor, Cahua and Etevensa.

- In May 1996, a Special Committee was created to promote private investment in public service regional companies located under different departments throughout the country.

- The changes in the sector resulting from the 1992 Structural Reforms, and more overtly manifested towards the year 1994, led to a substantial increase in the system reserve. This was mainly due to the growth of installed capacity which, in the last eight years (1993-2000), recorded a cumulative growth rate of five per cent annually. The expansion was largely based on new thermal generation sources in particular *turbo gas* (gas turbines) and, more recently, *turbo vapour* (dual steam turbines), which replaced the old diesel equipment.

- Although thermal production increased within the electricity generation system, hydroelectric power continued to contributed an average of 76 per cent of the generated energy.

- The expansion of the transmission grid gathered momentum with the boost provided by the execution of BOOT (Build-Own-Operate-Transfer) type contracts, such as the one entered into for the Mantaro-Socabaya line. Other improvements were carried out by the State, with funds coming from tolls and other specific funds.

Generation capacity

While the hydro-thermal mix in generation capacity (60%-40%) underwent changes that characterise the present Peruvian electricity system, it remained practically constant until 1997 when new thermal capacity was commissioned, for instance, through investment commitments in the Ventanilla power plant and the Piura electricity company, both belonging to the Northern Interconnected System (SICN). Recently, there have been signs favouring hydropower, with State having decided to grant leasing for hydroelectric power plants.

Transmission

The changes of the 1990s resulted in the creation of new transmission companies. ELECTROPERÚ stopped operating the 220 kV SICN transmission system, which was taken over by a new company – Central-Northern Electricity Transmission Company (ETECEN). Similarly, the Southern Interconnected System (SISUR) was taken over by the new Southern Electricity Transmission Company – ETESUR. Both companies are controlled and operated by the State.

In January 1998, the TRANSMANTARO S.A. Corporation was created to take over the energy transportation concession through L.T. Mantaro-Socabaya, which started to operate at the end of 2000. This line interconnects the SICN and the SISUR grids, resulting in a single transmission system called the Interconnected National System (SINAC). In February 1999, the Southern Electricity Network Inc. concession company was set up to reinforce the Southern Electricity Transmission System and to rendering transmission services.

Distribution

Of the distribution companies and generation companies which sell electricity direct to end-users according to user type – free or regulated –, in 1999 the top three generation companies (with bypass distribution) supplied 73 per cent of end–users, and the top six supplied 91 per cent of end-users. The four most important distribution companies had a concentration of 80 per cent of the ‘free clients’ (those who can access the deregulated market, generally large users).

Current institutional structure of the sector

The following groups of actors currently play significant roles in Peru’s electricity sector (see Figure 8):

- Clients or users

There are two types of clients or users: free clients, with a demand higher than 1 MW, and regulated clients, with a demand lower than 1 MW.

- Electricity concession companies

Electricity companies comprise generation, transmission and distribution agents belonging to the National Interconnected Electricity System and to the Isolated Electricity Systems.

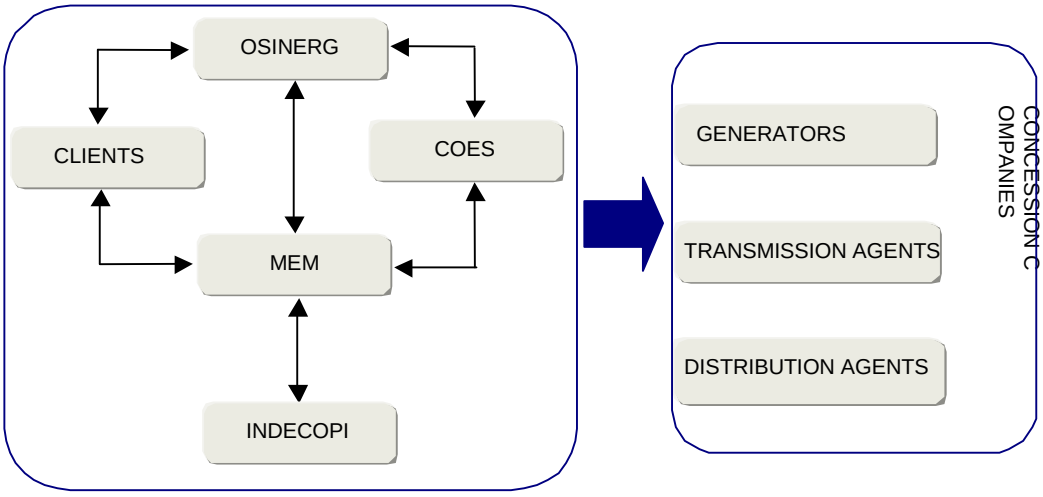
- Committee for the Economic Operation of the System (COES)

COES is made up of the generation companies whose real capacity is higher than one per cent of the total real capacity of SEIN, and which commercialize more than 15 per cent of the energy produced. Transmission companies which operate the main transmission system also form a part of COES, whose aim is to operate the system at the minimum cost, thus determining the order of electricity despatch.

- Ministry of Energy and Mines (MEM)

The Ministry of Energy and Mines is in charge of ensuring that the legal framework is enforced. It also develops medium and long term energy policies aimed at putting resources to the best possible use, and promoting private investment in the sector. In its conceding role, the ministry grants concessions and authorisations to participate in the electricity business in the country and, in its subsidiary role, it carries out rural electrification projects that expand the system's coverage to the most isolated areas of the country.

Figure 8
Actors in the Current Peruvian Electricity System



Source: Peruvian Ministry of Energy and Mines, Technical Bureau of Energy. OTERG-MEM, *Anuario de Energía Eléctrica, 2002*.

- Foreign Investment Supervising Body (OSINERG)

OSINERG is in charge of supervising, regulating and controlling the energy sector bodies, and ensuring the quality, safety and efficiency of the service. In May 2001, the energy tariff commission was taken over by OSINERG, and the Associate Management Body of Fee Regulation (GART) was created. This body is responsible for setting energy tariffs according

to criteria established by the law and applicable regulations for the sector. It is also responsible for setting tariffs for the transportation of liquid hydrocarbons and natural gas through pipelines, and for the distribution of natural gas through the grid.

- Institute for the Defense of Competition and Copyright (INDECOPI)

The institute is responsible for enforcing the Anti-Monopoly and Anti-Oligopoly Law of the electricity sector.

5.1.2 Description of past reforms

Peru's economic performance was consistent, though modest, till the beginning of the 1980s, and even till 1987, with an average annual GDP growth of 3.8 per cent between 1970 and 1980, and 3.1 per cent between 1970 and 1987. However, the collapse of an industrialisation process based on import substitution and the impact of urbanisation led to an inadequate dynamics to face growing foreign debt, falling prices of export products and the negative effects of the El Niño phenomenon on agriculture and fishing.

In the beginning of the 1990s, Peru went through a severe crisis. The decision to not pay the foreign debt and the handling of the country's financial policy led to a serious inflationary process that eroded the population's average income. Between 1985 and 1990, GDP per capita had fallen by around 18 per cent, the purchasing power of the minimum legal salary was reduced by 50 per cent, and social expenditure per individual was steeply reduced. In five years, the monetary unit changed twice, and its value multiplied by 10^9 during this period of high inflation and hyperinflation.

Traditional political parties were blamed for this situation and accused of leading the country into a political, economic and moral crisis (Becerra, 2002). As a consequence of this, Fujimori won the 1990 presidential elections and initiated a neo-liberal economic programme, but one with a strong popular content from the political, social and welfare points of view. As in the case of Argentina, the consequences of energy reform in Peru had strong connections with macro-economic reforms. In turn, this was related to the gradual worsening of long-term recession as the policies adopted led to a return to primary economic sector production. However, there were also differences with Argentinian situation due to the smaller divergence of the Peruvian model in terms of foreign and domestic feasibility, and the different depth of the reforms against the previous model.

During the first stage of the macro-economic reforms — consisting mainly of a monetary stabilisation plan based on the elimination of fiscal imbalance, the adjustment of basic prices of the economy and monetary anchorage by means of the Central Bank's intervention —, Fujimori did not have to face much political opposition. However, in 1992, he closed down Parliament and his government assumed was seen to assume a more authoritarian role. In 1993, a new constitution was proclaimed and the country showed clear signs that it would support a set of policies along the lines of the so-called Washington consensus, namely:

- emphasis on fiscal discipline with a view to paying foreign debt services,
- prioritisation of a certain type of public social expenditure,
- tax reforms,
- exchange and financial liberalisation,
- trade liberalisation,

- elimination of barriers to the entry of foreign capitals,
- privatisation and de-regulation, and
- defense of private property rights.

The purpose of these measures was for the government to be admitted back into the international financial system after the penalties it had to endure when it unilaterally abrogated the foreign debt.

Between 1993 and 1997, the economy went through a period of significant expansion, with GDP growth rising to 7.3 per cent/yr. However, since then and until now, it has stagnated. The high growth rate recorded was more a consequence of the previous recession than of the success of the reforms (GDP in 1997 was only 9.6% higher than that in 1987). On the other hand, the model led to high foreign indebtedness. Between 1990 and 1996, public foreign debt rose by 48 per cent, although from then on it began to stabilise and even declined slightly due to recessive measures.

5.1.2.1Pre-reform context and new institutional organisation emerging from it

Prior to the reforms, Peru, like many other Latin American countries, had State-owned companies in areas considered strategic, including the energy sector. During the 1960s and most of the 1970s, especially during the military nationalist governments of Velazco Alvarado, foreign private ownership of oil and electricity service companies had been taken over by the State.

In the electricity sector, a regulatory model established by the 1992 Law of Electricity Concessions was adopted. This was based on adaptations of the Chilean and Argentine models and the one in UK, consisting of the de-verticalisation of the industry by separating the generation, transmission, distribution and commercialisation functions. Until 1992, these were the responsibility of the State-run company, ELETROPERÚ. Between 1993 and 1998, the main generation and distribution units were privatised. As a result of this process, a high degree of horizontal and vertical unbundling took place, with a large number of companies being created in the sector.

Prior to the enforcement of the Law of Electricity Concessions, the Peruvian public electricity system was made up of ten companies: ELETROPERÚ and its nine regional subsidiaries, all of them integrated. When the institutional reform was implemented, the number of companies rose to forty — 16 generation, 20 distribution and 4 transmission companies.

In spite of these developments, the generation and distribution markets remain concentrated among a few companies. Six generators account for 87 per cent of the energy distributed and 66 per cent of the real capacity in public generation plants. In 1995, installed capacity in public sector electric power plants totalled 3,186 MW. By 2001, it reached 4,703 MW, 36 per cent of which belonged to the State and the remaining 64 per cent to the private sector. Privatisation of generation started in April 1995, with the sale of 60 per cent of Edegel's shares to the Endesa and Energy Corporation groups. In December of that year, 60 per cent of Etevesa's shares were put out to tender and purchased by Endesa. Later, in June 1996, Dominion and Duke bought 60 per cent of the shares of Egenor. Finally, in November 1996, Eepsa was put out to tender.

Table 13
Changes in Generation Capacity and Ownership

in MW	1995	2001
ELECTROPERÚ	3,186	1,027
State run Corporations		632
Private Agents		3,044
Total	3,186	4,703

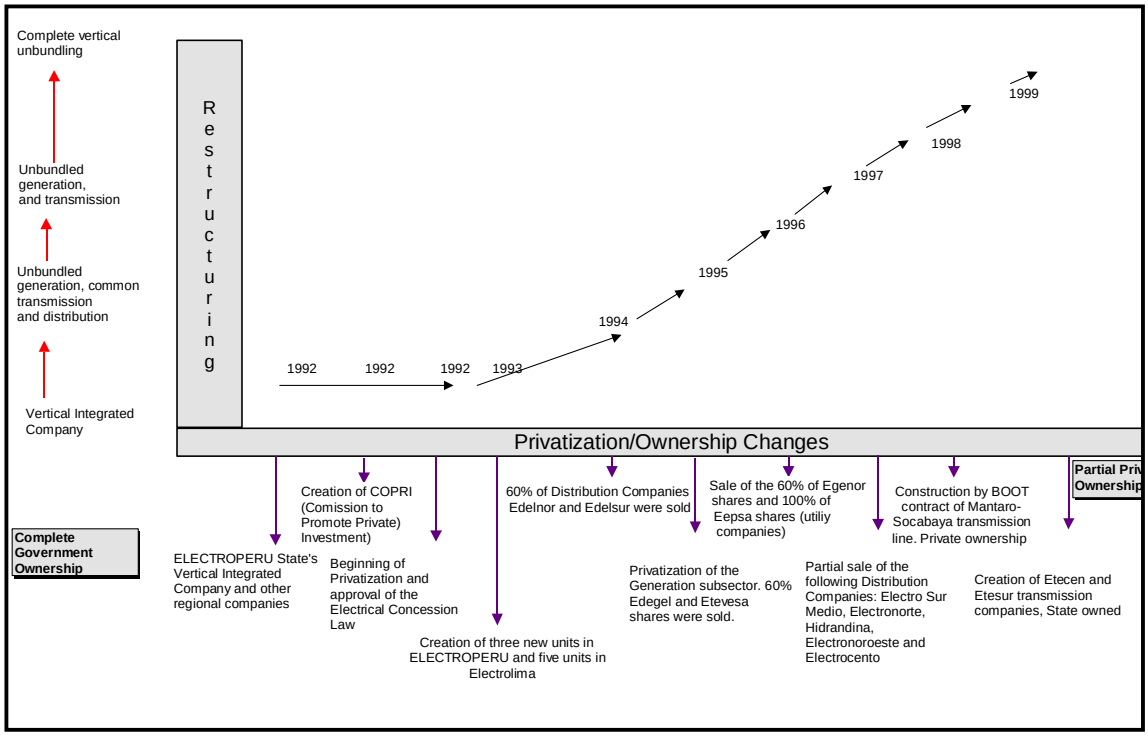
Data source: FB on the basis of data from *Anuario de Energía Eléctrica*, Peruvian Ministry of Energy and Mines, Technical Bureau of Energy., OTERG-MEM 2001.

In the transmission sub-sector, the Government decided to retain the ownership of the companies (Etecen and Etesur). In order to boost private investment in this segment, the BOOT (Build-Own-Operate-Transfer) modality was adopted, under which the interconnected Mantaro-Socabaya line was built in 1998.

The privatisation of distribution companies started in mid-1994 with the sale of 60 per cent of the shares of Edelnor and Edelsur. In February 1997, 100 per cent of Electro Sur Medio's shares were transferred to the private sector. The most recent instances of privatisation date back to 1998, when 30 per cent of the shares of regional distribution companies — Electronorte, Hidrandina, Electronoroeste and Electrocentro — were sold.

As an outcome of this process, the State still retains total control and ownership of transmission systems, except for lines leased under the BOOT scheme which formed 27 per cent of the total line kilometres in 2001. Similarly, it has a significant role in distribution, mainly through distribution companies that operate in the southern parts of the country. By means of these companies, the State provides electricity to 50 per cent of the national consumers. State participation in generation is also important, having reached 36 per cent of the aggregate real capacity in 2001. The growing complexity of the system in terms larger numbers of participating agents is shown in Figure 9.

Figure 9
Schematic Representation of the Peruvian Electricity Sector Reforms



Source: FB, on the basis of Karekezi (2003).

5.2 Direct impacts of the reform on the poor

The three indicators of *access* proposed for the study do not seem to suggest any significant direct impact of the reform on the poor. This is due mainly to the lack of disaggregated data about the electricity system's outreach to poor users. However, the impact of the reforms in terms of variations in non-technical losses is examined in the context of the urban poor as an indirect indicator. The behaviour of indicators of *affordability* is analysed on the basis of partial data.

5.2.1 Electrification Levels

From available data provided by SIEE -OLADE database on the urban-rural population mix and the extent of service coverage, it is estimated that the electrification level in Peru rose from 38 per cent in 1990/1991 to 62 per cent in 1999/2000 (Table 14). The reach of the system in urban areas increased from 50 to 73 per cent between 1990 and 2000. In the rural areas, the coverage was only 12 per cent in 1990, rising to 30 per cent in 1999. Other available data suggest that a larger proportion of the population may have access to electricity in urban areas, about 94 per cent in 1998 (Table 15).

Table 14
Estimated Electrification Levels in Peru

	Pre-reform Year 1991 (%)	Post-reform Year 1997 (%)
Total electrification levels	38	62[a]-72[b]
Electrification levels (data about the poor)	n.a.	n.a.
Electrification levels (data about the non-poor)	n.a.	n.a.

[a]Data from SIEE.
[b]Data from the Home Survey.
Data source: Authors' estimates using data from OLADE, SIEE database, UN population data in World Urbanization Prospect: The 2001 Revision, New York, 2002.

The rapid growth in electrification levels may be explained by the speed of the urbanisation process and the concentration of population in Lima, as well as by an explicit policy to provide basic public services to a larger number of people. The geographic characteristics of Peru make access to electricity very difficult in some rural areas. The possibility of interconnections is also very limited. On the other hand, the number of poor and destitute people in Peru is still very high, which explains why, in spite of the improvements, a substantial proportion of the population still does not have access to electricity in both urban and rural areas. In 2000, 38 per cent of the urban and 76 per cent of the rural population lay below the poverty line, while that below the indigent line was 12 and 50 per cent, respectively. The urban poverty line in Peru was USD 2/day and the rural poverty line USD 1.35/day in that year. The distribution of poverty between urban and rural areas approximates the respective proportions of people without basic electricity services — 27 per cent in urban areas and 70 per cent in rural areas.

Table 15
Distribution of Households by Area of Residence, Poverty and Electricity Access
(% of total households)

Lighting Availability and Area of Residence	Peru	Poor			Non-poor
		Total	Extreme	Non-extreme	
National					
With electricity service	72.1	47.7	26	61.8	82.7
Without electricity service	27.6	51.6	73.5	37.5	17.2
Some other kind of lighting	0.3	0.7	0.5	0.7	0.1
Urban					
With electricity service	93.5	83.4	71.6	85.6	96
Without electricity service	6.3	15.8	28	13.5	3.9
Some other kind of lighting	0.2	0.8	0.4	0.9	0.1
Rural					
With electricity service	29.2	17.6	15.6	20.4	40.6
Without electricity service	70.4	81.9	83.8	79.1	59.1
Some other kind of lighting	0.4	0.5	0.6	0.5	0.3

Source: Authors' estimates using data from Instituto Nacional de Estadísticas e Información (INEI), National Statistical Summaries 2000 – ENAHO, 4th quarter of 1998.

Data on electrification levels distinguished by poor and non-poor before and after the reforms is not available. Available data for 1998 is presented in Table 15. It should be noted that total system losses, which averaged 11.3 per cent between 1970 and 1990, increased sharply to 17 per cent in the pre-reform period (1990-1994) and gradually decreased to around 12 per cent

in 1999 (14.8% during 1995-1999)[8]. This could indicate that, similar to Argentina and other LA&C countries, the rapid rural migratory process to urban areas in Peru coincided with an increase in illegal connections, which were slowly regularised after privatisation. It is difficult to ascertain the incidence of this phenomenon, which is only implicit in the data on expansion of the electricity service and the increase in total connections.

5.2.2 Electrification rates

Data on Peruvian rural and urban population, and electrification rates is provided by OLADE through SIEE. Assuming there was relative invariability of the average size of the households, it is possible to estimate the total evolution of users in urban and rural areas and, from there, estimate their growth rate in the pre- and post-reform periods. As shown in Table 16, the growth in new users was very high in the period prior to privatisation (7.8% according to SIEE data; 7.1% p.a. in urban areas and 14% p.a. in rural areas). It declined subsequently, although the dynamics lasted till 1999 (an estimated average of 5.8% based on SIEE data; 5.6 % p.a. in urban areas and 7.8% p.a. in rural areas).

Table 16
Estimated Electrification Rates in Peru

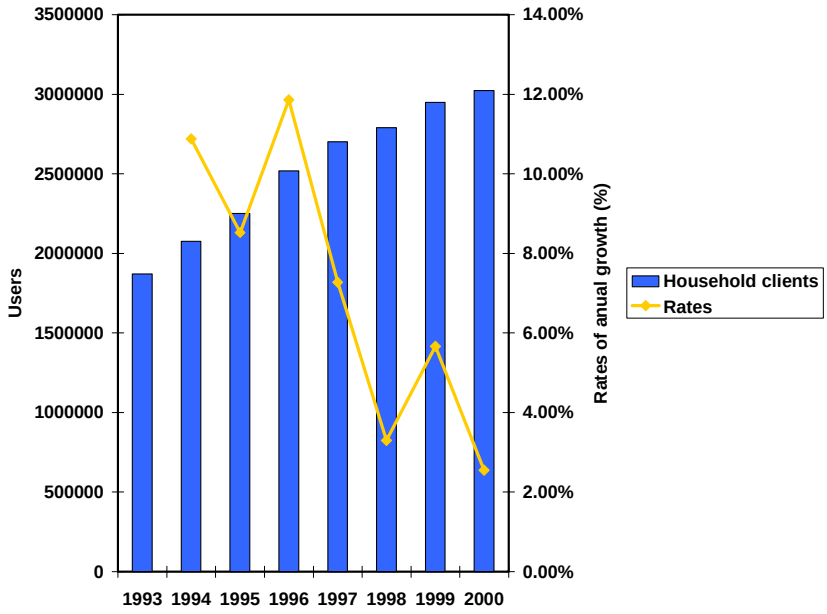
Indicator	Pre-reform (1990-1994) Year (%)	Post-reform (1996-2000) Year (%)
National electrification rates	7.8 p.a.	5.8 p.a.
Electrification rates (data about the poor)	n.a.	n.a.
Electrification rates (data about the non-poor)	n.a.	n.a.

Source: Authors' estimates using data from Authors' estimates using data from OLADE, SIEE database, UN population data in World Urbanization Prospect: The 2001 Revision, New York, 2002.

However, data according to poverty levels, or ways of estimating them reasonably, are not available. The data represented in Figure 10 shows the decline in the rate of growth of household users on the basis of the 1993-2000 series published by the Energy Tariff Commission. It can be seen that in the initial years the number of users grew considerably, and then it declined. This process might reflect the regularisation of illegal users mentioned above, a fact that would indicate more regular access to electricity on the part of the poor, but not the availability of a service they did not have access to before. The decline in the rate of connections, together with the relatively small range of the system, could point to the inadequacy of the reforms to solve the poor's problem of access to electricity.

[8] According to Campodónico Sánchez, 1999, distribution losses totalled 22% in 1993 and declined to 14.6% in 1997.

Figure 10
Evolution of the number of household clients and annual growth



Source: Comisión de Tarifas de Energía, Informe de Situación de las Tarifas Eléctricas 1993-2000, cuadro 41, p.124, Lima 2001.

5.2.3 Electricity consumption

Data on household electricity consumption trends show a drastic decline in consumption levels after the reform. Whereas, in 1993, average household consumption was 136 kWh per month, in 2000 it had declined to 106 kWh per month, a level that it had reached already in 1996 (Table 17). However, total consumption per individual rose from 366 kWh to 597 kWh[9] in the same period, indicating a growth in consumption in other sectors.

[9] The World Bank data, WDI online (2002-2003), shows different values: 1) for 1993 518.8 kWh per capita, per year; and 2) for 1999 654 kWh per capita, per year. The data presented in the text corresponds to the total energy sales according to CTE divided by total Peruvian population.

Table 17
Estimated Household Electricity Consumption in Peru (kWh/mth)

	Pre-Reform Year (1993)	Post-Reform Year (2000)
National electricity consumption average per capita (annual kWh per inhabitant) - CTE	366	597
Household average consumption (kWh per month / Household User) - CTE	136	106
Average electricity consumption per capita by the poor (kWh per month)	n.a	49
Average electricity consumption per capita by the non-poor (kWh per month)	n.a	165*

Source: Authors' estimations with data from the World Bank WDI online and CTE, *Informe de Situación de las Tarifas Eléctricas 1993-2000*, p. 124, Table 39.
*Average Consumption UBN 1 to 4 , according to the data presented in Table No. 5.1.3.2 below .

No data is available to distinguish between poor and non-poor users in the pre-reform period, although it is available for 1998. The 1998 Peruvian Useful Energy Balance offers a basis to estimate the differences in average electricity consumption of different social strata classified as UBN 1 to 5, with 1 being the highest income band and 5 the poorest (Table 18).

Table 18
Estimated Household Distribution by Level of Unfulfilled Basic Needs (UBN) and by Useful Energy and Electricity Consumption: 1998

Stratum	Percentage by Stratum			Electricity Consumption	
	Households (%)	Total Useful Energy (%)	Electric Energy (%)	kWh per month	Ratio of Electricity Consumption in Relation to Household Average Basis=100% = Average Consumption
UBN 1	1.9	2.6	5.9	337	311%
UBN 2	8.1	12.0	16.4	220	202%
UBN 3	11.6	13.2	19.6	184	169%
UBN 4	29.7	30.8	36.1	132	122%
UBN 5	48.7	41.4	22.0	49	45%
Total	100.0	100.0	100.0	109	100%

Source: Authors' estimates using data from the Peruvian Ministry of Energy and Mines, Technical Bureau of Energy.

As shown in the table, consumption by the poor amounts to 49 kWh per month, while the non-poor consume 165 kWh per month. However, as pointed out earlier, it is not known whether this indicator was better or worse after the reform.

5.2.4 Electricity tariffs

Household tariffs underwent marked adjustments after the privatisation process. Table 19 provides an estimate of the cost of electricity for consumption levels of 50 kWh per month. The connection cost corresponds to the C1 category, tariff option CT5 (low household

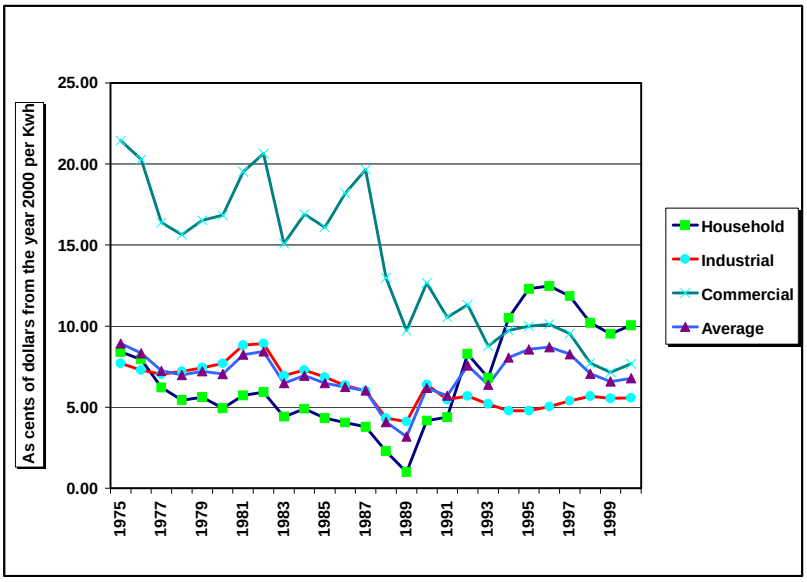
voltage), single-phase up to 3 kW[10]. However, the change from pre- to post-reform prices is mainly explained by the sharp monetary appreciation[11]. Trends in average household tariffs with respect to the rest indicate the nature of the reforms and their impact on electricity expenditure of all household users, including the poor (Figure 11).

Table 19
Estimated Electricity Tariffs in Peru

	Pre-Reform Year (1990)	Post-Reform Year (1994)
Connection fees/charges (US$)	n.a	115
Existence of lifeline tariffs (Yes/No)	No	No
Lifeline tariff charges (USc/kWh) 50 kWh per month	6.8	17.2
Existence of free electricity consumption bands (Yes/No)	No	No
Amount of free electricity provided to the poor (kWh)	No	No

Source: Authors' estimates from IDEE/FB on the basis of tariff information from several distribution companies from central Peru.

Figure 11
Evolution of EE prices according to type of consumer.



Source: Authors' estimates using data from OSINERG and OLADE, SIEE database.

5.2.5 Electricity expenditure

It has not been possible to obtain data on the proportion of electricity expenditure in the total household budge, or about expenditure patterns of the poor and the non-poor before and after the reform. Qualitatively speaking, it is known that income distribution improved slightly after the macro-economic reforms. On the other hand, as noted earlier, electricity charges went up considerably. This was evidenced by a reduction in average household consumption. Therefore, the proportion of electricity expenditure is probably higher now than before for all social segments.

[10] Resolution CTE N° 009-94 of 11/12/1994
[11] The real exchange rate index with a 1994=100 basis had a value of 148 in 1990.

5.3 Indirect impacts of the reform on the poor

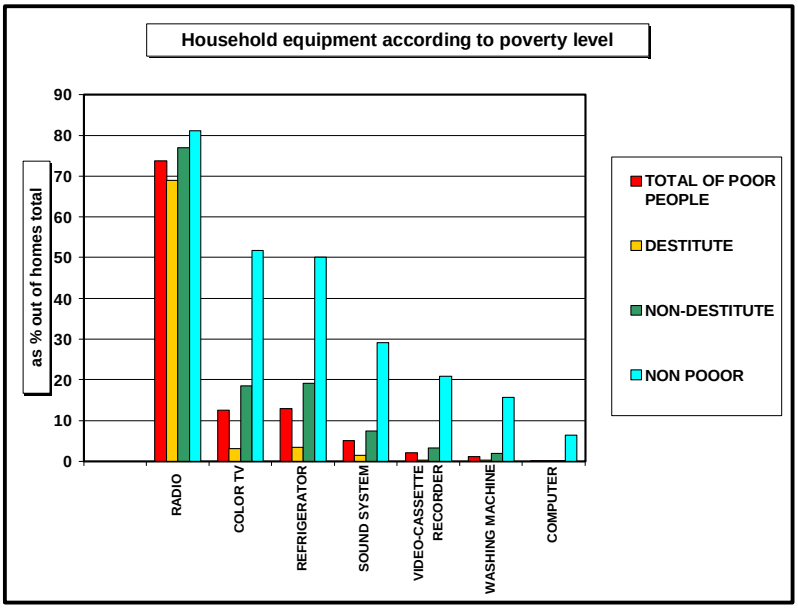
The analysis of indirect reform impacts in the Peruvian case reveals contradictory results. In the Argentine case, energy sector privatisation accounted for more than 70 per cent of the total amount derived from the sale of State-owned companies, and the profitability of the companies was closely connected to monetary appreciation. In Peru, however, the incidence of these two factors was more moderate as a consequence of both — a smaller role of energy companies in the privatisation process, and a smaller impact and monetary appreciation level. Unlike Argentina, monetary appreciation in Peru was never dependent on a parity fixed by law.

However, structural reforms had a negative impact on employment levels and foreign indebtedness. It is difficult to know whether the official statistics correctly reflect the level and evaluation of the poverty phenomenon during the two Fujimori administrations, as a consequence of the high level of authoritarianism and control of key indicators on the part of the State. But comparisons between 1979 and 1997 official poverty data show a slight improvement, even when Peru still presented unfavorable indicators compared to the Latin American average, especially in rural areas. Likewise, income distribution analyses show a slight improvement towards 1996 over 1985.

The evolution of employment has been clearly unfavourable, with all indicators related to adequate employment showing a worsening tendency. Nonetheless, second-hand car imports and urban transport de-regulation in Lima enabled the creation of numerous informal jobs that mitigated the negative social impact in terms of open unemployment. On the other hand, State action tended to reduce poverty levels among the destitute. Although Peru still presents serious structural poverty problems due to stagnation of production, the reforms were accompanied by State measures that prevented them from having worse impacts.

An indicator of the high incidence of poverty still present in Peru is the level of electrical equipment in households towards the end of the last decade, almost eight years after implementation of the reforms. This is illustrated by Figure 12, which shows that only 20 per cent of non-extreme poor households (non-destitute) and 50 per cent of those considered poor had a refrigerator. Less than 20 per cent of the non-poor households had washing machines. Except for radios, other electrical appliances were found in less than five per cent of destitute households, and the highest rate of ownership for some appliances was 20 per cent among the non-destitute. But the overall availability of modern electrical equipment (sound systems, video-cassette recorders, washing machines, computers) did not reach 10 per cent in that segment. These figures are very revealing, and they coincide with the low per capita energy consumption levels in Peru.

Figure 12
Household equipment according to poverty level



Source: INEI, 2001.

5.4 Overall impacts on the poor

In terms of electricity access, there are signs of some progress over the past in Peru, but it is not evident whether this is due to the success of the reforms. In fact, home connection rates began to decline, although the coverage of the electricity system is still relatively low. In terms of costs and incomes, reforms have not favoured the poor, nor have they favoured the household sector in general. The adjustments have implied a modification of what was considered a cross-subsidy from the commercial and productive sectors to the household sector, which was reverted after 1994.

Data on ownership of electrical equipment by households, system expansion in urban areas for the poor, and in rural areas in general show much more needs to be done in order to extend both components – vertical and horizontal – of the electricity demand. It is doubtful whether the present policies will be adequate to achieve these goals.

6. SALVADORAN CASE STUDY

6.1 Background and description of the reform

6.1.1 Key characteristics of the electricity sector

There electricity sector in El Salvador was brought under a new legal framework in 1996 which reflected its reform process. Based on this, and the General Electricity Law[12], the main characteristics of the sector at present are described here (see Figure 13 for a schematic representation of the Salvadoran power system).

[12]Legislative Decree 843. Official Gazette, San Salvador, 25 October, 1996

Generators

Electricity generators in El Salvador are free to fix their own prices, without intervening regulations. They are not obliged to provide electricity, although there are exceptions to this in their contracts. However, they must contract transmission agents and distribution agents, if they sell to end-users. They need to have a concession in order to operate hydro and geothermal power plants, and they may participate in the System Regulation Market (MRS). If they want to enter the market using hydrocarbons, they only need to enroll in the operators' register of the General Superintendent of Electric Energy and Telecommunications (SIGET) and submit a technical feasibility study of their interconnection with the transmission system.

Of the 12 electric power plants currently in operation in the country, only three are under private ownership, with the rest owned by the autonomous public utility, Comisión Ejecutiva Hidroeléctrica del Río Lempa (Hydroelectric Executive Committee of the River Lempa) or CEL. Duke, an American company, has bought the Acajutla and Salvadoreña power plants. The power generation mix in terms of installed capacity comprises 36.3 per cent hydro, 14.5 per cent geothermal and 49.2 per cent thermal. Table 20 and 21 summarise the evolution of installed capacity, electricity generation by type of actor (public or private), and changes in the ownership mix between 1996 and 2000.

Table 20
Installed Capacity and Energy Balances of Power Sector in El Salvador: 1980-2000

	Capacity in MW		Reserve		Energy in GWH								
Year	Installed Capacity	Maximum Demand	(MW)	% max.Dem.	Public Net Generation	Private Generation Buying	Exports	Imports	Available	Rationing	Sales	Losses	Load Factor
1980	440.0	269.0	180.9	67.2%	1427.8	0.0	0.0	0.0	1427.8	14.0	1261.4	11.7%	60.5
1985	631.8	318.0	313.0	98.4%	1650.6	0.0	0.0	0.0	1650.6	33.3	1439.6	12.8%	59.2
1990	650.4	412.0	238.4	57.9%	2164.3	0.0	9.4	10.8	2165.7	81.3	1828.2	15.6%	60.0
1994	817.5	566.0	251.5	44.4%	3075.3	0.0	43.3	32.0	3064.0	21.6	2586.7	15.6%	61.8
1995	908.5	592.0	316.5	53.5%	3071.0	200.0	64.9	29.7	3235.8	15.1	2832.7	12.5%	62.4
1996	943.4	626.0	317.4	50.7%	2686.2	654.0	21.0	41.7	3360.9	13.8	2926.2	12.9%	61.3
1997	943.4	666.0	277.4	41.7%	2622.9	925.0	18.2	106.3	3636.0	15.3	3184.5	12.4%	62.3
1998	943.4	694.0	249.4	35.9%	2804.6	933.0	22.7	60.7	3775.6	7.4	3375.1	10.6%	62.1
1999	988.4	718.0	270.4	37.7%	2319.4	1319.0	207.8	458.2	3888.8	7.0	3276.0	15.8%	61.8
2000	1102.5	758.0	344.5	45.4%	2465.0	912.0	111.7	807.7	4073.0	0.0	3436.0	15.6%	61.3

Source: IDEE/FB (2001) Diagnóstico del Sector Eléctrico de El Salvador, Análisis comparado.

Table 21
Evolution of Installed Capacity by Type of Actor: 1996-2000

In MW	1996	2000
CEL	943	806
Private Agents		300
Total	943	1106

Source: Authors' estimates on the basis of SIEE-OLADE data.

Transmission

The Salvadoran Transmission Company (ETESAL), owned by CEL, was created in 1999. ETESAL operates the electricity transmission system and is obliged to permit the use of its grid for energy transportation. Its charges are regulated and it does not carry out energy transactions. Its equipments are controlled by the Transactions Unit (UT), it is responsible for the upkeep of its facilities and it may make investments at the request of operators or when UT defines an investment as expansion of the common benefit network. Investments are recouped by means of the tariff.

Distributors

Distribution agents must permit the use of their networks for energy transportation. Their charges are regulated and they do not have concession areas, neither are they obliged to serve, subject to the exceptions incorporated in their contracts. They are responsible for the operation and upkeep of their facilities. They make the necessary investments and recover them through tariffs. In order to sell to end–users, they must enroll as commercialisation agents.

End-Users

End-users may choose their energy supplier freely. Their contracts with suppliers include compensation clauses for energy not served, and they may be served by commercialisation, distribution or generation agents. They may contract energy prices that fluctuate with the System Regulation Market.

Commercialisation Agents

Commercialisation agents buy energy from other operators for resale. They do not own facilities, nor do they participate in the System Regulation Market.

Transaction Unit (UT)

The General Law of Electricity confers the role of Market Administrator and Independent Operator of the Transmission System to the Transaction Unit (UT) company, in which all operators and end-users connected to the transmission system are shareholders. UT operates the Salvadoran power system, controlling the quality and reliability of electric power supply and the commercial operation of markets set up according to the General Law of Electricity, namely, the Contracts Market and the System Regulation Market (MRS).

UT has an Energy Administration System (EMS), which enables it to guarantee the quality and safety of operation of the transmission system. At present, the availability of a computerised system is being negotiated in order to handle the wholesale market efficiently, according to the requirements of the new legal framework for the electricity sector.

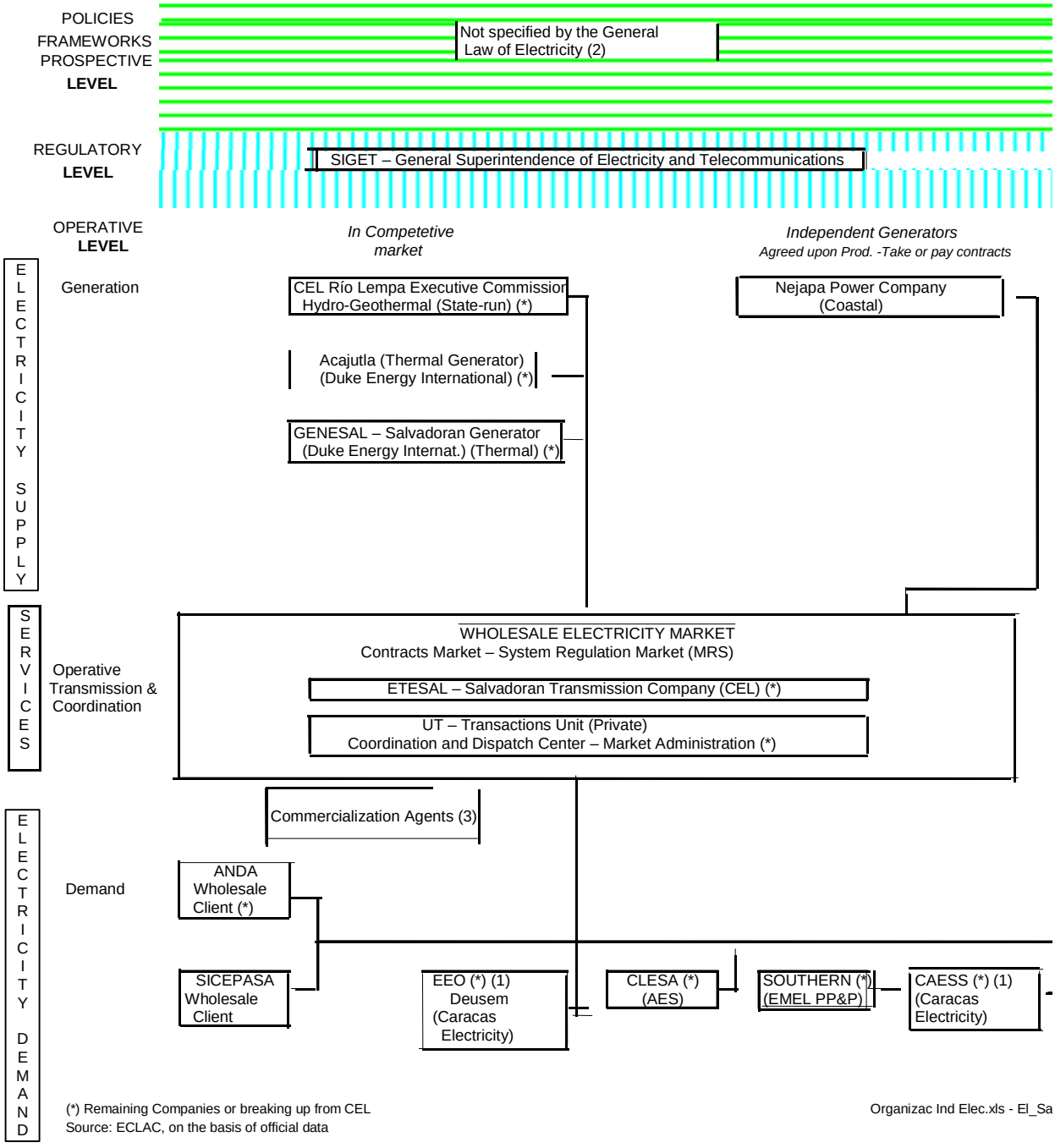
The main features of the Contracts Market are:

- It is based on "physical" (energy volumes) bilateral transactions between market operators.
- Neither the financial nor the commercial conditions of the contracts are detailed.
- Power is despatched as contracted, except when it is not feasible from a technical point of view.
- It is not necessary to have a contract.
- UT only records physical transfers.
- Any deviation between what was programmed and the real situation should be settled before the MRS (Energy Exchange).

The System Regulation Market, on the other hand, has the following characteristics:

a. It is based on supplies by generators, distributors and users, in blocks of energy as well as in prices.

Figure 13
Structure of the Salvadoran Electric Sector



(1) Transferred to AES in 2000.
(2) Agreement N°27, January 11, 2001, creating the DEE.
(3) Executive Decree Nº 90.

Source: IDEE/FB (2001) Diagnóstico del Sector Eléctrico de El Salvador, Análisis comparado.

b. The supplies are for each despatch period.

c. For each despatch period, all the participating generators receive the price of the most expensive unit despatched; buyers, in turn, pay that price.

d. Supplies of loads likely to be disconnected may be received, and they are paid to the MRS.

e. The prices resulting from the MRS are published periodically.

6.1.2 Description of past reforms and new institutional organisation

The Salvadoran electricity sector is governed by the General Law of Electricity and its regulations, which replace the 1936 Law of Electricity Services and the concessions that had regulated industry operations before. The main goals of the new law are to:

- develop competitive electricity generation, transmission, distribution and commercialisation markets;
- guarantee the free access of generators to transmission and distribution facilities;
- ensure the efficient use of resources; and
- protect the rights of electricity sector users and operators.

Until 1997, the electricity system was operated under a monopolistic scheme. CEL was an vertically integrated autonomous service company, covering the length of the energy chain from production to distribution. There was no organization to regulate the sector and control tariffs, and the Ministry of Economy determined end-user tariffs by means of decrees. CEL was in charge of awarding the rights to exploit natural resources, and it was the owner of the transmission and distribution grids. The operation and despatch of electric power was centralised and carried out by the CEL Operations Center, which also operated the hydropower dams centrally.

The General Law of Electricity limited the responsibilities of CEL, making it a company exclusively devoted to the generation of electric power. Within the scope of the new scheme that came into effect in January 1998, free market competition started (Figure 14). Several horizontally integrated generation and distribution companies, with free access to the transmission and distribution networks, were created. These companies resulted from the restructuring of CEL and the sale of the four electric power distribution companies (EEO, CAESS, CLESA and DELSUR) to the private sector. At present, the system is controlled independently by the Transaction Unit according to a Commercial and Operative criterion to ensure supply quality and reliability.

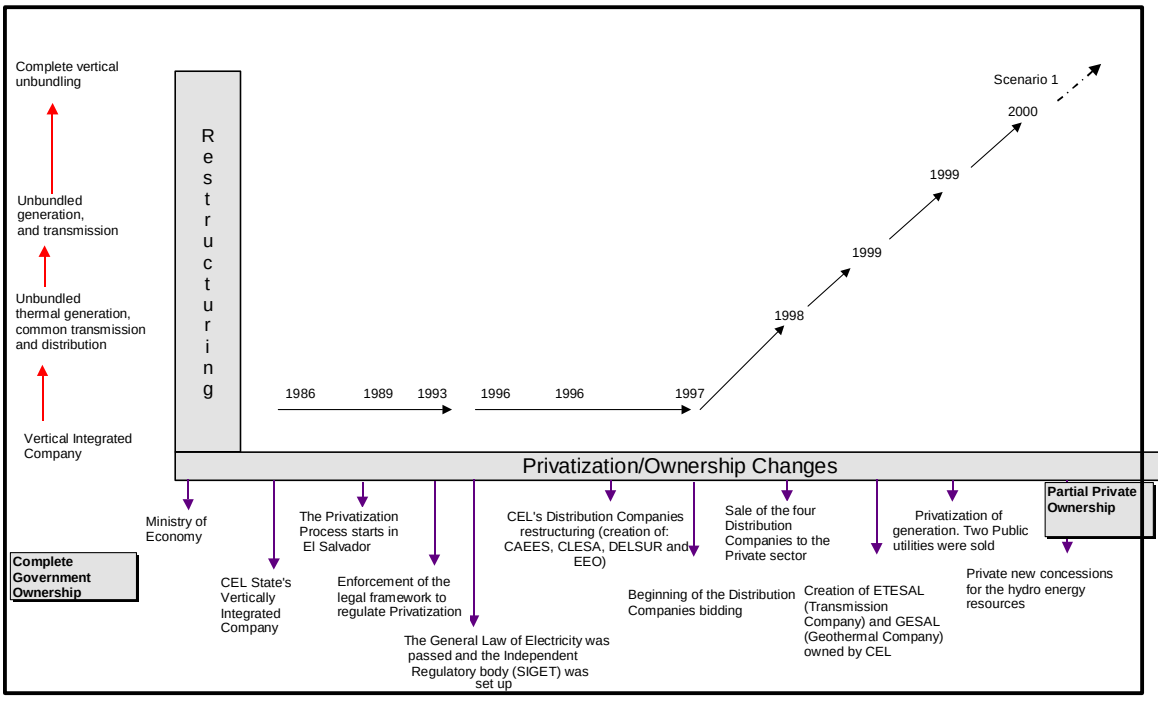
Unlike the previous arrangement, under which the optimisation of generation resources was carried out by means of an ‘economic despatch’, the new legal framework establishes prices that follow the behaviour and natural balance between supply and demand of electricity. The law allows free concession for the exploitation of natural resources to any operator that might request it, and the fees are fixed by the General Superintendent of Electricity and Telecommunications (SIGET), the regulatory body, on the basis of electric power market behaviour.

In summary, the main features of the General Law of Electricity are:

- Free competition between market participants
- Free access to transmission and distribution networks
- Free prices at the generation and end-user levels

- Regulated charges in transmission and distribution
- Wholesale market operated by the Transaction Unit (UT)
- Programmed despatch based on contracts
- System Regulation Market
- Concessions for hydro electric and geothermal generation.

Figure 14
Salvadoran Electricity Sector Reforms



Source: FB, on the basis of Karekezi (2003).

The Law provides for an open competition scheme to develop the Salvadoran thermal electric generation capacity. Generation projects must be registered at SIGET, but they do not require any specific approval. The competition and the central government's tariff opening for the import of hydrocarbons for thermo generation have been a central part of the reform. Parties seeking to develop geothermal and hydroelectric generation projects are awarded a concession by SIGET for the use of natural resources. The Law and its regulations establish the procedure and requirements for this process.

SIGET is responsible for ensuring compliance with all the laws and regulations related to electricity and telecommunication in El Salvador. It is an autonomous institution whose top official is the General Superintendent appointed by the President of the Republic for seven-year tenure. SIGET's responsibilities include:

a) fixing tariff ceilings for household consumers with low electricity consumption levels;

b) approving tariffs established by distribution companies in their distribution areas;

c) guaranteeing compliance with all regulatory requirements in the electricity sector;

d) penalising those who do not comply with its regulations; and

e) settling conflicts between operators.

Besides these responsibilities, some its operative functions include the following:

- Regulating transmission and distribution charges
- Monitoring market development
- Settling conflicts between operators
- Regulating Transaction Unit charges
- Granting concessions for the exploitation of hydro electric and geothermal resources for generation
- Requesting and publishing information related to the sector
- Guaranteeing the exclusion of practices against free market competition.

Finally, since decisions on expanding the electricity grid are entirely up to the transmission and distribution agents under the new law, the National Investment Fund for Electricity and Telephone System (FINET)[13] was created to promote electricity supply development, particularly for rural areas. In the context of the electricity sector, the fund is intended to finance the electrification of rural and lower income populations to whom transmission and distribution agents might not extend services for reasons of economic infeasibility.

6.2 Direct impacts of the reform on the poor

As stated against the other case studies, the indicators of access are not entirely adequate to measure the impact of the reform. On the one hand, their behaviour may be the result of a different dynamics, which cannot be attributed to or explained in terms of the impact of the reform. On the other hand, the lack of data on poor and non-poor users inhibits the analysis. However, the indicators can to an extent contribute information on the main topic of this study, especially with regard to prices and the impacts on family budgets.

6.2.1 Electrification levels

The electrification level in El Salvador rose from 43.6 per cent in 1986 to 62.2 per cent in 1993 (pre-reform period), and from 72 per cent in 1997 to 76.2 per cent in 2001 (post-reform period). These figures signify a number of simultaneous processes that it is necessary to distinguish between.

There was a rapid increase in electricity expansion in urban areas during the pre-reform period, coinciding with a process of accelerated urbanisation. In 1986, 47 per cent of the population lived in urban areas and, of this, 72.6 per cent had access to electricity (Table 22). Against this, 53 per cent of the population was rural and only 13 per cent of it had access to the service. Towards 1993, when the pre-reform period ended, 52 per cent population was urban and with 89.9 per cent of them had access to electricity service, while 48 per cent of the population was rural, only 28.6 per cent of them with access to electricity.

[13] Government of El Salvador, 1998.

Table 22
Estimated Electrification Levels in El Salvador

	Pre-Reform: (1986-1993) (%)	Post-Reform: 1997-2001 (%)
Electrification level total	43.6-62.2 %	72.0-76.2 %
Electrification levels (data about the poor)	n.a.	n.a.
Electrification levels (data about the non-poor)	n.a.	n.a.

Source: Authors' estimations with data from OLADE, SIEE database.

In the post-reform period, the urban population rose to 58 per cent in 1997, with 98.8 per cent having access to electricity, and, of the remaining 42 per cent rural population, 37.4 per cent had electricity service. For 2001, the figures were 60 per cent urban population, with 98.8 per cent having access, and 40 per cent rural population, with 45 per cent having access.

Thus, the system expanded more rapidly, in both the urban and the rural areas, in the pre-reform rather than in the post-reform period. In both periods, the expansion of the system can be associated with rapid urbanisation. However, the growth of new connections declined in the post-reform period, but this may the result of market dynamics as it came closer to its saturation point. Again, this illustrates the difficulty of linking access issues with reforms.

6.2.2 Electrification rates

Estimates of overall electrification rates (Table 23) are based on two sources. Studies of El Salvadoran (Bouille et al., 2001) show rates of growth in total users for the 1980-1990, 1990-1995 and 1995-2000 periods to be 5.9, 6.6 and 4.1 per cent, respectively. However, these figures do not correspond with pre- and post-reform periods. On the other hand, estimates combining population data with electrification rates recorded by the SIEE, OLADE permit, assuming the invariability of home sizes, a better identification with pre- and post-reform periods. They also offer a breakdown of results according to rural or urban areas, which is relevant to assessing the impact of the reform on poverty.

Table 23
Estimated Electrification Rates in El Salvador

	Pre-Reform: 1986-1993 (%)	Post-Reform 1997-2001 (%)
National electrification rates	6.6 % p.a.	3.5–4.1 % p.a.
Electrification rates (data about the poor)	n.a.	n.a.
Electrification rates (data about the non-poor)	n.a.	n.a.

Source: Authors' estimates using data from OLADE, SIEE and UN population data, *World Urbanization Prospect: The 2001 Revision* and Bouille et al., 2001.

As mentioned, the decline in the rate of urban connection growth can possibly be explained as a result of progressive market saturation. The decline in the rate of rural connection growth may be attributed to the impact of the reform by way of lower policy priorities for rural electrification. Rural growth rates are estimated to have ranged from approximately 11.5 per cent/yr. between 1986 and 1993 to 5.8 per cent/yr. between 1993 and 1997 (period of reform transition), and subsequently 3.2 per cent/yr. between 1997 and 2001 (post-reform period)[14].

[14] Corresponding urban growth rates for these periods were 5.9, 5.9 and 3.6 per cent/yr., respectively.

A part of this decline can be due to the smaller progressive dynamics of rural population as well as to the fact that the more inaccessible the areas where rural users live, the more inadequate the mean to electrify them become. In any case, this aspect should be studied in greater depth in subsequent stages.

6.2.3 Electricity consumption

Data on per capita electricity consumption indicate a significant growth both prior to and after the reform (Table 24). The overall national average consumption level rose from 308 kWh per individual in 1986 to 436 kWh per individual in 1993 at the rate of 5.1 per cent annually. The rate increased to 5.4 per cent a year between 1993 and 1997, the transition period. But once the sector was privatised, it declined to 2.4 per cent a year, with the average consumption increasing more modestly from 539 to 568 kWh per individual. These trends, however, conceal the fact that the average consumption in households remained practically stagnant at around 100-110 kWh per month throughout the whole of the 1980-1997 period. In the absence of data specific to the poor, it is not possible to comment on their consumption levels.

Table 24
Estimated Household Electricity Consumption in El Salvador: 1980-2000

(kWh/mth.)

	Pre-reform (1980/1986-1993)	**Post-reform (1997-1999)**
National consumption average per capita (kWh/yr.)	308-436	539-568[a]
Residential consumption average per capita (kWh/mth.)	103.7[b]	112[c]
Electricity consumption average per capita by the poor (kWh/mth.)	n.a.	n.a.
Electricity consumption average per capita by the non-poor (kWh/mth.)	n.a.	n.a.

[a]values corresponding to the first and last year of each sub-period
[b]average values 1980-1993 with variability coefficient (standard deviation / average) of 2.5%
[c]data for 1997
Source: Authors' estimations with data from CEL, *Boletin de Estadísticas Eléctricas*, several issues.

6.2.4 Electricity tariffs

Electricity tariffs increased significantly after the sector reform in El Salvador. The increase was smaller for low-consumption users than for those with average consumption levels. During 1998 and 1999, the first years after privatisation, subsidies softened the impact of the increase for all consumers. From 2000, however, subsidies were removed, thus increasing the impact of electricity expenditure on consumers.

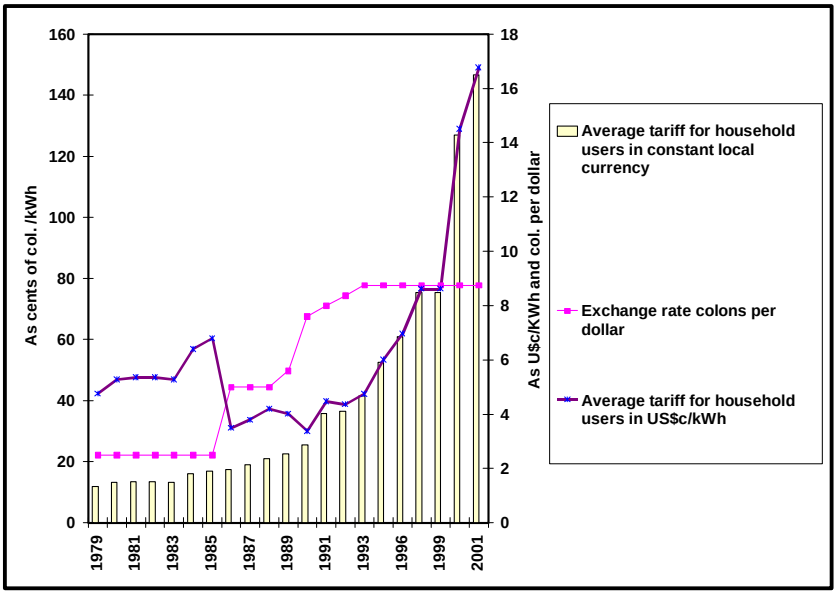
Although there is no data on the cost of home connections, it can be inferred that this has increased. The general reason for this is that a steep monetary appreciation took place simultaneously with the beginning of the reform. This phenomenon is indicated by Table 25 and Figure 15.

Table 25
Estimated Electricity Tariffs in El Salvador

	Pre-reform (1980-1993)	Post-Reform (1998-2001)
Connection charges (US$)	n.a.	n.a.
Existence of lifeline tariffs (Yes/No)	Yes	Yes[a]
Lifeline tariff charges (USc/kWh) up to 154 kWh (Southern Case)	4.8[b]	8.6[c] 16.8[d]
Existence of free electricity consumption bands (Yes/No)	No	No
Amount of free electricity provided to the poor (kWh)	-	-

[a]Low consumption tariffs were subsidised after the reforms, but the subsidies were removed after the year 2000.
[b]Data related to the 1979-1993 average of household average charges equivalent to the consumption band subsidised between 1998 and 1999. The variability coefficient (standard/average deviation) is 20.7 %
[c]Value corresponding to 1998 with its subsidy
[d]Value corresponding to 2001.
Source: Authors' estimates using data from CEL, *Boletin de Estadísticas Eléctricas*, several issues, and Center for the Defense of Consumers, www.prisma.org.sv.

Figure 15
Evolution of Average Household Tariff: 1979-2001



Data Source: Authors' estimates using data from CEL, *Boletin de Estadísticas Eléctricas*, several issues, and Center for Defense of Consumers, www.prisma.org.sv.

6.2.5 Electricity expenditure

No data is available for the period after the Salvadoran electric sector privatisation to analyse the impact of electricity expenditure on the poor consumers' incomes after the reform. The data surveyed by the OLADE/CEPAL/GTZ study (1997) contains information about the pre-reform period (1987-1992) and points to a smaller incidence of electricity expenditure at an average level and for the poorest population bands (Table 26). Since tariffs increased between 1994 and 2001 for the poor as well as the non-poor, it can be assumed that the incidence of electricity expenditure on family budgets has been negative in general. However, data confirming this hypothesis is unavailable to date[15].

[15] According to the Salvadoran Center for the Defense of Consumers, electricity expenditure now represents 18% of the minimum nominal salary, thus progressively reducing the possibility of access to this public service.

Table 26
Estimated Incidence of Electricity Expenditure on Household Incomes and Spending

Urban Sectors					
1987 Survey			1992 Survey		
Income band 1987	Reference Income (in current Colones)	1987[a] (%)	Quintile	Average Expenditure Inference (in current Colones)	1992[b] (%)
Less than 400	400	12.4	1	1,009	4.5
401-750	750	7.8	2	1,479	4.1
751-1,100	1,100	4.9	3	2,028	3.4
1,101-2,300	2,300	2.0	4	2,852	2.9
More than 2,300	4,600	1.0	5	6,071	2.0
Total	1,209	4.3	Total	2,648	2.9
Average income	1,209	4.3	Average income	2,152	3.5
Average expenditure	803	6.5	Average expenditure	2,648	2.9

[a]Estimated on the basis of the upper income in each band.
[b]Estimated on the basis of the average expenditure in each decile.
Source: Authors' estimates using data from OLADE-CEPAL-GTZ, 1996, Table Nº 14, p. 69.

6.3 Indirect impacts of the reform on the poor

In the Salvadoran case, the impact of energy reforms was not so closely connected to macroeconomic guidelines until the 1997 privatisation. At that time, it is to be supposed that the impact of the reform was negative on the poor and on the country's poverty level in general because it was accompanied by a harmful monetary appreciation process in terms of competitiveness. Income distribution data show that the relative gap between the poor and the rich has become wider. The Gini coefficient rose from 0.72 in 1977 to 0.74 in 1992, well above the 0.4-0.6 level recorded in more developed LA&C countries, and it can be assumed that it was even more unfavourable in 2000.

6.4 Overall impacts on the poor

The analysis above shows a worsening of all the indicators related to direct and indirect impacts of the reform on the poor. On the one hand, general access indicators reveal stagnation, particularly among rural populations (which account for about 42 per cent of the total population), only 37 per cent of whom have access to electricity. On the other hand, electricity costs are now considerably higher, and the low consumption tariff is higher than the average consumption tariff. Furthermore, the removal of subsidies has had an overall negative impact on the household sector, and presumably more so on lower income groups.

7. SUMMARY OF KEY FINDINGS AND RECOMMENDATIONS

The analysis of the impact of electricity sector reforms on the poor in the three cases studied offers a number of interesting insights. These aspects have to do with:

a) the extent to which the selected indicators may reveal the impact of reforms on the poor;

b) the extent to which it was expected that reforms should improve access to electricity;

c) the importance of analysing linkages between energy sector reforms, macro-economic reforms and their impact on the poor and new poor; and

d) the need to redefine the role of the State in ensuring access to basic electricity services by the poor, and the role of subsidies in this.

This section is divided into two parts. The first relates basically to the conclusions drawn from the three cases studies and is a response to the first three points above. The second has to do with broader questions, such as the adequacy of current international approaches to the connection between energy and poverty, especially due to the fact that in the LA&C region, this largely an urban issue. Questions related to the role of subsidies are also discussed, as well as of approaches that limit the role of the State in implementing the reforms.

7.1 Key findings of the three case studies

7.1.1 Indicators, their limitations and their results

As observed while presenting the three case studies, indicators related to system coverage and growth rate of new connections are not wholly appropriate to measure the impact of reforms in the region. This is due to the fact that the dynamics of such indicators depends on the relative development level of the system prior to the reforms and on the characteristics, pace and modality of the urbanisation process. Moreover, data disaggregated by poor and non-poor populations is generally not available. Although post-reform private companies in the sector could have such information, at least indirectly (for example, by poor and non-poor geographical areas), it is unlikely that such data can be processed in any systematic way for energy-poverty analysis. Even if it were, it would probably not be accessible to researchers. In general, private companies are reluctant to provide information that might be adverse to what was expected or contrary to the 'pro privatisation' ideology, and this is a gap that cannot be overlooked.

However, in spite of the shortcomings of these indicators, the data compiled by the study at an overall national level show a marked decline in service expansion after the reforms, irrespective of the causes. Where reforms were accompanied by a significant decrease in technical losses, access to electricity (illegal as it might have been) existed before the reforms. The three cases show a noticeable decrease in system loss levels as a result of regularising illegal connections after privatisation. At the same time, if macro-economic reforms do not solve the problem of poverty but, on the contrary, make it worse — as has happened in Argentina and El Salvador — then such regularisation might be undermined by a decline in tariff collection, in as much as users do not have enough incomes to afford the true cost of the service. In Argentina, this problem is being accepted as a fact even by private actors who, in spite of claiming higher tariffs after the year 2002 devaluation, admit that such increases could not be applied on low consumption users, who are synonymous with poor consumers.

The consumption level indicator shows a decline (in the Peruvian case), stagnation (in the Salvadoran case) and an increase (in the Argentine case). The decline and stagnation are related to inadequate electrical equipment ownership and scarce income (poverty indicators) relative to the higher cost of electricity after the reforms. By contrast, in Argentina the overall

consumption increased due to lower electricity prices in local currency terms for average and high consumption users (if consumption is equated with incomes). Reforms made possible by resorting to an appreciated or overvalued currency damage the production system which is the main cause of poverty as signified by unemployment and the negative effects on the cost of living incomes. Despite these results for the household sector, the national average of per capita electricity consumption (kWh/month) in all three countries increased after reforms as a consequence of the growth in the industrial and services sectors as previously shown in tables 8, 17, 24 and in table 27 below.

Indicators relating to electricity prices and their impact on the budget clearly show the deeply regressive nature of the reforms from the point of view of distribution. On the one hand, the service has become more expensive for low consumption users, who pay higher tariffs than non-poor users. On the other hand, people's incomes have decreased or remained unchanged. This explains the decrease of average electricity consumption in Peru and its stagnation in El Salvador. What happened in Argentina is not known, since there are no measurements of consumption levels by the poor and the non-poor and, besides, the analysis became more complex as a result of service regularisation which reached 700,000 users in Greater Buenos alone.

Table 27
Comparative Results of the Analysis of Selected Indicators

Selected Indicators	Argentina		Peru		El Salvador	
	Pre-Reform	Post-Reform	Pre-Reform	Post-Reform	Pre-Reform	Post-Reform
Total electrification levels (%)	91	95	38	62 [a]-72[b]	62	76
National electrification rates (% p.a.)	2.04	1.03	7.8	5.8	6.6	4.1
National average of per capita electricity consumption (kWh/month)	113	174	31	50	36	47
Average Household sector electricity consumption (kWh/month)	155	205	136	106	103.7	112
Poor households lifeline tariff proxy in U$S	4.35	11.77	6.8	17.2	4.8[c]	8.6[d]- 16.8[e]

[a]Data from SIEE, OLADE.
[b]Data from the Home Survey.
[c]Data related to the 1979-1993 average of household average charges equivalent to the consumption band subsidized between 1998 and 1999. The variability coefficient (standard/average deviation) is 20.7 %
[d]Value corresponding to 1998 with its subsidy
[e]Value corresponding to 2001

Source: results presented in the previous sections. National average of per capita electricity consumption kWh/month Data for Argentina case Pre-Reform (1990); Post-Reform(2000), Secretaría de Energía, data showed in table 8; for Peuvian case case Pre-Reform (1993); Post-Reform(2000), CTE anual consumption data showed in table 17, divided by 12 months; El Salvador case Pre-Reform (1993); Post-Reform(1999), World Bank , WDI-online database, data showed in table 24, divided by 12 months.
Average Household sector electricity consumption (kWh/month) data from tables 8, 17 and 24.

Table 27 compares the outcomes of applying some of the key indicators to the three case study countries. The main conclusion drawn from these is that in all cases electrification levels increased. However, the rate of growth of new connections decreased in the post-reform period. It is difficult to attribute such a decrease only to the impact of the reforms, since this could have occurred naturally when the electrification levels approached a saturation point. In urban areas, the system coverage is generally high due to increasing

modernisation. This, too, can slow down when it reaches a relatively high level, as it has in Argentina, or when it is affected by broader macro-economic adjustment.

All the case studies show that average per capita electricity consumption increased with a simultaneous increase in tariffs. This apparent contradiction is explained by a number of factors, of which two are especially important. First, average per capita consumption grows as an outcome of the expanding electrification process. Second, tariff increases in dollars reflect general monetary appreciation processes. Besides, since it is not possible to distinguish between the consumption in poor households and that in non-poor households, the growth in average consumption arises mainly in the latter, which outnumber the former. In most cases, non-poor households benefited from expansion of the distribution network and from the relative prices resulting from overvalued currency regimes which enabled them to acquire more electrical appliances. In Argentina, the distortion of relative prices and the difference between tariffs for the poor and those for the non-poor prompted excessive consumption by the latter.

7.1.2 Linkages between energy sector reforms and macro-economic reforms, and their impact on the poor

The most critical finding of the study is concerns the linkages between energy reforms and relative prices in the economy and their impact on poverty. The Argentine case is especially relevant as it shows that there may be incidences of covert subsidies for producers whose impact on the poor is very serious.

In all three case studies, monetary appreciation prompted an increase in the current incomes of privatised service providers, while leaving their cost structure practically unchanged. This was due the domination of capital costs which, in instances of privatisation, implied book values below replacement values, invariably expressed in foreign currency irrespective of the relation between local and foreign currency. This practice resulted in:

a) making viable the existence of prices and tariffs at values close to those of developed countries;

b) ignoring the average income differences of among different population segments; and

c) distorting the relative price structure of the economy, thus favouring importers and the financial sector to the detriment of productive sectors.

Consequently, once the effect of reactivation linked to price stability and access to credit for consumption was over, it inevitably caused a reduction of the productive system. This was manifested in unemployment and recession as time went by, in a cumulative, progressive and destructuring manner. This resulted in producing strong recessionary trends and an increase in poverty levels and social inequality. At the same time, the repatriation of earnings by privatised service providers led to the growth of foreign loans which, in turn, increased the foreign indebtedness level of the countries, rendering the continuity of the previous monetary appreciation level no longer feasible. This was followed by devaluation, establishing new poverty levels because of its negative impact on costs. The most evident example of this recurring and dramatic phenomenon is Argentina, but it is also observed in El Salvador and, to a lesser extent, in Peru where recession has been affecting the situation for three years.

It is intriguing to note that current literature on the topic of subsidies does not consider these aspects. On the contrary, several approaches present excessively broad definitions of

subsidies, to the point of regarding any deviation of prices and tariffs from ‘market values’ as a subsidy, without any reference to the question of costs. In these approaches, the distribution of one part of the energy rent to users is viewed as a subsidy, when the concept clearly refers to a product or service that is sold at a price below production costs, including all the stages of production and a normal level of profitability on the capital invested.

This issue is highly relevant for sustainable development, since such development is not possible if, in order to sell energy products at international prices, it is necessary to resort to permanent appreciation which implies the destruction of the economic base. In Argentina, for example, the foreign debt level rose from around USD 60,000 billion to more than USD 140 billion in just one decade. This can be explained to a large extent as the outcome of profit repatriation by privatised companies and payments for imports at a systematically higher price than exports — a pattern that is linked to the exchange parity level in both cases. Peru also increased its foreign debt level, but it managed to correct its growth with recession, which was not the case in Argentina. But what is relevant for the purpose of this research is that it is not sufficient to show consumer subsidies were removed after the reforms. It is equally important to point out that these new policies can legitimately be seen as producer subsidies which, however, have not promoted new and better forms of electricity access and, on the contrary, have had negative effects on prices, family budgets and the growth of the horizontal component of the market.

7.2 Related issues and next steps

The analysis so far has centered around the consequences of electricity reforms in three cases considered representative of the LA&C regional situation. The focus has been on the indicators proposed by the common approach adopted, with special emphasis on the complex linkages between macro-economic policy designs, reforms of the privatised public service sector, pricing policy and indirect impacts on the poor.

There are, however, other relevant issues related to the problem of energy access which deserve to be mentioned, although they are not directly derived from the analysis carried out here. These have to do with the role of the State, subsidies, and the types of solution suggested in order to improve the poor’s access to energy services in general, and to electricity in particular.

On the basis of what was described earlier, it can be stated that a decade after the reforms everything leads again to the question of the role of the State in public services. The scope of this issue is very broad, and it refers to regulatory aspects, especially to subsidies for service expansion to areas currently without access (rural areas) and the continuation of sustainable conditions for poor users in urban areas.

After the serious revision of privatisation experiences in the region and their connection with key macro-economic variables, there is little doubt that the coming decades will witness new policies on the part of the State. The debate will no longer be centered around the convenience of subsidising poor users, but on which methods may be more convenient and which are more appropriate to specific contexts. Such a debate seems to be just starting.

Among the policy solutions proposed, many have so far referred to the need to make access to electricity easier for poor populations in isolated rural areas by means of restricted subsidy programmes, generally aimed at financing investments in renewable energy systems provided

by private operators. In LA&C, these solutions can be very limited in that the natural contexts for their implementation are the more isolated rural areas rather than urban areas or other rural areas not so far away from the grid. Their results are still uncertain in the medium to long term, but they can be critically analysed on the basis of both (a) the analyses of the situation carried out in the preceding parts of this study and (b) a knowledge of the topic based on an extensive literature review.

This suggestion is based on the following perceptions. Even in the case of technological options especially suitable for isolated rural areas — such as solar energy, which has been promoted in many developing countries, including some in LA&C —, they normally permit uses that require a limited supply capacity (lighting, radio, TV) which are inadequate to stop migratory processes and to mitigate poverty. While these options may have positive aspects to them in terms of making days longer, permitting reading habits at night and so on, they also carry the risk of spreading modern cultural patterns in traditional contexts. In effect, they modify ambitions and values, but without the possibility of really incorporating these population sectors to the consumption and production patterns thus promoted. This relates to the question of sustainability of such patterns in a situation of greater equality, as is generally discussed in the context of this problem.

A second issue concerns a certain line of thought contrary to subsidies, and the tendency of many current political approaches intent on detecting 'monetary incomes and a willingness to pay' on the part of the poor. These seem to ignore the fact that, in practice, creditworthiness in many cases is almost non-existent and the incomes of the poor are not enough to afford minimum energy expenses compatible with modern lifestyles. It can be argued in this context that the criticism of generic subsidies is also applicable to many cases of renewable energy promotion by the World Bank and other institutions, in that they imply subsidies of the worst kind, that is, those aimed at equipment producers.

It would, therefore, be appropriate to ask whether it would be possible to acknowledge the real dimension of the problem and to devise a solution aimed at providing energy so as to improve productivity among rural populations. This may integrate them into development processes more effectively, even if at a higher cost in the short and medium terms, but in a manner that would ensure safe long term returns. An example of this could be supplying electricity with larger capacity systems, thus permitting uses such as food conservation, which would improve the farmers' economic status in an objective way.

In a related context, if one of the objectives of providing energy to the rural poor is to prevent their migration to the large cities, then partial solutions do not seem very appropriate. Some of the beneficiaries of such programmes may express subjective opinions about their satisfaction with the access to electricity in this limited way and for uses such as those described above. However, this form of access may trigger new motivations to migrate. Admittedly, this is a complex topic, one difficult to resolve given the evolution of present productive and social systems.

Thirdly, with regard to solutions aimed at improving the efficiency of traditional biomass resource use, it can be said that, desirable though they may be, they do not contribute much to solving the problem of basic energy and global poverty (at least in LA&C). Besides, they require complex training and promotional programmes. In this context, approaches proposing modern uses of biomass by means of their integration into productive circuits and the creation of added value chains seem more relevant.

Other more comprehensive solutions that have been suggested can, in general, be considered compatible with the situation diagnosed here. But they seem to resemble well-meaning expressions rather than of definite courses of action that could be put into practice. This is because implementing many of these solutions depends on a radical change in the understanding of the problem and in the attitudes of the authorities, citizens and multilateral financing institutions. This would imply adopting as the priority objective — in the form of definite courses of action — of diminishing or trying to eradicate structural poverty, considering that energy poverty is only a consequence of it for a large segment of the Latin American population.

In Latin American countries in particular, modernisation and development processes have not been able to assimilate in a stable and long-lasting manner rural populations that have migrated to urban areas. On the contrary, employment opportunities have appeared around the creation of urban lifestyles, but once the dynamics of such a process became exhausted, those opportunities gradually became more scarce, contributing to the origins of urban marginalisation.

At the same time, overt displays of the urban lifestyle lead to internal migratory processes which worsen the problem of rural and urban poverty alike. In the face of this reality, any lasting solution implies the need to accept the real mechanics of growth in our countries and to enforce effective redistribution mechanisms. These can only come from a consensus on the need for such redistribution in order to make the economic systems sustainable. In that sense, it seems important to observe that, from the 1980s onward, income distribution has become markedly distorted. Even if the degree to which the structural reforms of the 1990s have managed to reverse this process or not may still be debatable, the truth is that all agree that questions of redistribution and eradication of extreme poverty remain unsolved.

In fact, the cases analysed in this study have provided evidence that these reforms have made distributional and poverty problems worse — at least very clearly so in the Argentine and Salvadoran situations. Restrictive approaches to this question, that is, dogmatic opposition to generic and cross subsidies, certainly do not contribute to solving the problem. This is above and beyond the fact that some criticisms of subsidy mechanisms and their inefficiency are entirely justified against real experiences of the past. When this is so, it is easier to find solutions having to do more with the effects than with the causes of energy poverty, such as those referred to earlier.

In any case, even accepting these kind of partial solutions as the only feasible ones in the short term, a comprehensive region-wide diagnosis of the energy poverty situation would be needed since certain details — such as the energy deficit in each country, what part of such deficit corresponds to the urban poor and what to the rural, which strategies could be implemented to mitigate energy poverty in each case, and what financial efforts would be necessary to achieve such ends — cannot be clearly deduced from the present analysis. It is advisable, therefore, to use the data base already available in many research centers in LA&C about consumption patterns and amounts consumed by the poor, in rural as well as in urban areas, reinforcing these approximations with new research of a more comprehensive nature and specifically devoted to this topic.

It is crucial to bear in mind that actions taken to mitigate energy poverty should not be separated from other constituent elements of a comprehensive strategy to fight extreme

poverty in rural and urban areas. The question of sustainable energy access is important, but it is not the only one, nor perhaps the most important one, although it does constitute an essential strategic element in order to mitigate such extreme poverty.

8. SUGGESTIONS FOR THE NEXT PHASE OF STUDY

This initial phase has focused on the outcome of electricity sector reforms and their impact on access to electricity. It is possible to draw important conclusions from this about the policies implemented and the new context that has resulted from the ensuing processes of change.

Such reforms have meant structural policy changes that have given rise to a different institutional, regulatory and ownership structure. This new situation provides the context for and conditions the characteristics, possibilities and feasibility of energy policies to be enunciated from now on, and their instruments and actions. It also prompts new scenarios and challenges.

It must be noted here that: "*The primary objective of the theme 'energy access' was to identify viable and proven policy options that can assist in providing cleaner and more sustainable energy services to the world's poor in the context of a rapidly reforming energy sector. This should include assessing if previous energy policy reforms have addressed these challenges or have actually contributed to the growing problem of inadequate energy services for the poor in the developing world. Building on this assessment, focus will be on ongoing and planned energy policy reforms and on addressing the questions of how likely they are to lead to improved, cleaner and more sustainable energy services for the poor in developing countries and how the processes can be improved to promote better access to cleaner energy services*."

The second phase, then, should complement and build on what has already been developed, making use of the lessons learnt from electricity sector reforms and going deeper into aspects such as the following:

- Development of the consultation workshop planned at the TORs prior to the beginning of the second phase.
- The effects of reforms affecting other energy sub-sectors.
- A clear identification of the latest broader conditions resulting from the new context ("*take account of the broader macro-economic reforms that constitute the basis for the past, ongoing and planned energy reforms*")
- Assessment of the advantages and benefits, for the whole of the energy system, of enlarging consumption bases and facilitating access to clean commercial energy sources on the part of vast population segments which have no access to such markets at present.
- Research into energy policy-strategy lines, instruments and actions that will help policy decision-makers, who are overtly willing to favour a broader access to modern and clean energy sources on the part of the poorest population, to enunciate useful proposals.
- Assessment of the role that different national or international, public or private actors may play in order to facilitate and make viable the achievement of the said objective.
- Treatment of key issues for the identification of policy options. These issues, identified by the working group, are: cleaner household energy services, cleaner energy services for

productive purposes and institutional application and financing of cleaner energy services.

Following the analysis made in the first phase, and maintaining the objectives and results expected for the project as a whole, the second phase should concentrate on the search for an “initial set of policy options for the provision of cleaner and more sustainable energy services for the poor”.

REFERENCES AND BIBLIOGRAPHY

Alexander, M.(2001) 'Indicadores Selectos de Desempeño', in *Privatizaciones en Argentina,* ed. Belgrano, World Bank, Buenos Aires, 2001.

Arza, C, (2002) 'El Impacto Social de las Privatizaciones: El Caso de Los Servicios Públicos Domiciliarios', Flacso Working Paper Nº 3 under the Privatización y Regulación en la Economía Argentina Project, Inter-American Development Bank, 2002.

Banco Interamericano de Desarrollo (BID), *Elementos Estratégicos para el Sector Energía en AlyC,* September 1998.

Becerra, A. (2002), *Perú case study*, in Ericson de Paula , Energy for Development in South América, Mackenzie, Saou Pablo, 2002. pp. 279-304.

Bouille, D., *Diseño de las Políticas Energéticas, Diagnóstico del Sector Eléctrico de El Salvador*, IDEE/FB, 2001.

CAMMESA, *La transformación del Sistema Eléctrico Argentino***,** Compañía Administradora del Mercado Mayorista Eléctrico Sociedad Anónima, Buenos Aires, 1999.

_____, Annual Report 2001, *La transformación del Sistema Eléctrico Argentino***,** Compañía Administradora del Mercado Mayorista Eléctrico Sociedad Anónima, Buenos Aires, 2001.

Campodónico Sánchez, H., (1999), *Las Reformas Estructurales del Sector Eléctrico peruano y las características de la inversión 1992-2000*, ECLAC, Chile, 1999.

Cecchini, D. and Zicolillo, J. (2002), Los nuevos conquistadores, el papel del gobierno y las empresas españolas en el vaciamiento de Argentina, Siglo XXI, FOCA investigation 23, Buenos Aires, 2002.

Center for Defense of Consumers, at www.prisma.org.sv.

Comisión de Tarifas Eléctricas (CTE), *Informe de Situación de las Tarifas Eléctricas 1993-2000*, Lima, 2001.

del Buono, M., et. al., *Aspectos de la Electricidad Rural en Perú*, presented at the VII Encuentro Latinoamericano de Pequeños Aprovechamientos Hidroeléctricos (7th Latin American Meeting of Samall Hidro-electrical Developments), Cajamarca, Peru, July 1997.

Damill, M.(2000), *El balance de pagos y la deuda externa pública bajo la convertibilidad,* Techint News Bulletin n° 303, Buenos Aires.

Dirección General de Estadística y Censos 1995, *Quinto Censo Nacional de Población y Cuarto de Vivienda*, San Salvador, 1992.

ENRE, Files with data on Electricity consumption in Greater Buenos Aires corresponding to Edesur, Edenor and Edelap, 2002.

Fabris, Renewable Energy for Rural Electrification in Argentina, ILZRO RAPS Seminar, Lima, Peru, February 2001.

FB-CACME (2003), "Metodologías y Criterios para analizar los subsidios energéticos en el caso de la electricidad para los pobres urbanos del Gran Buenos Aires", Fundación Bariloche-Argentine Committee for the World Energy Council, S.C. de Bariloche, October 2003.

Frenkel, R. (2003), *From the boom in capital inflows to financial traps*, Initiative for Policy Dialogue, Capital Markets Systems in Transition Task Force, Barcelona, Spain, 2-3 June 2003

Foster, V., 'Measuring the Impact of Energy Reform — Practical Options', in *Energy Services For The World's Poor*, World Bank, Washington, 2001.

Government of Argentina, *Report on Privatizations to 5-31-1994,* Works and Public Services Ministry, Trade and Investment Department, Investment Sub-Department, 1994, Buenos Aires.

Government of El Salvador, Decree 354, Official Gazette, San Salvador, 29 July 1998.

IDEE/FB (2001) *Diagnóstico del Sector Eléctrico de El Salvador , análisis comparado*, Presidential Commission for the Modernization of the Salvadoran Public Sector, El Salvador, 2001.

Instituto Nacional de Estadísticas e Información (INEI), National Statistical Summaries 2000; data from Encuesta Nacional de Hogares– ENAHO (National Homes Survey), 4th quarter of 1998, Lima, 2001.

INDEC, Instituto Nacional de Estadísticas y censos, Encuesta Permanente de Hogares (EPH) , several years.

Karekezi, S. (2003), GNESD *Final Common Approach Paper*, 3/19/03.

Kozulj, R. Argentina, (2002) 'Los Desequilibrios de la Economía a 10 años de la Convertibilidad', in Comercio Exterior, Vol. 52, Nº 7, pp 640-655..

_____,(2001) 'People, Cities, Growth and Technological Change: From Golden Age to Globalization', in *Technological Forecasting and Social Change*, 70 (2003) 199-230, Elsevier Science, NL.

_____, (1996)'Uso y Abuso de la Paridad Cambiaria Como Instrumento de Política Económica', in Desarrollo y Energía, IDEE/FB, Vol. IV, Nº 8, 1996.

_____, (2000) 'Resultados de la Reestructuración de la Industria del Gas en Argentina', ECLAC, serie de Recursos Naturales e Infraestructura, Santiago de Chile, November 2000.

_____,(2002) 'Balance de la privatización de la industria petrolera en Argentina', ECLAC, serie de Recursos Naturales e Infraestructura, Santiago de Chile, July 2002.

Krueguer, A. (1984), *Problems of Liberalization*, in M. Armeani, Choksi and D. Papargeorgiu (eds.) Economic Liberalisation in Developing Countries, Basil Blackwell, London, 1986.

Little, I, (1995), Auge, crisis y ajuste, la experiencia macroeconómica de los países en desarrollo, 1970-1990, World Bank, Washington, 1995

Mendoza Ministry of Enrivonment and Public Works, *Estudio Energético Integral de la provincia de Mendoza*, Mendoza, Argentina, November 1998.

Ministry of Energy and Mines of the Republic of Peru, Energy Technical Office, *Balance Nacional de Energía Útil, año 1998*; Lima, Perú, November 2001.

Ministry of the Environment and Natural Resources (MARN), *Estudio de Opciones de Mitigacion de GEI en el Sistema Energético de El Salvador*, San Salvador, El Salvador, October, 1999.

OLADE, ECLAC and GTZ, 'Energía y Desarrollo en América Latina y el Caribre: El Salvador', LC./R.1645, Quito, 30 May 1996.

Ongaro, Cena & Carluccio, (2001), The privatisation process in Argentina from the external payment balance perspective, Sub Department of Macroeconomic Programming, Ministry of Economy, Buenos Aires, 2001.

OTERG-MEM, (Oficina Técnica de Energía del Ministerio de Energía y Minas del Perú), Anuario de Energía Eléctrica, 2002.

PRIEN – University of Chile, *Energía y Equidad: una propuesta de indicadores*, Santiago, Chile, November 1995.

Pistonesi, H., 'El Sistema Eléctrico Argentino: Desempeño Posterior a la Reforma', IDEE/FB, OLADE/ECLAC/GTZ Project, 1999, Buenos Aires.

Risø-UNEP, 'Newsletter of UCCEE and UNEP', December 2002.

Rubinstein, G., (1997) Presentation of Duff &Phelps, in ADEBA, National Convention of Banks ´97: Argentina in the World, Mercosur Forum, Buenos Aires, 19 – 21 May, 1997, pp.484-491.

Sánchez, H. Campodónico, 'Las Reformas Estructurales del Sector Eléctrico Peruano y Las Características de la Inversión 1992-2000', ECLAC, Economic Reforms Series, Nº 25, Santiago de Chile, May 1999.

SIEE-OLADE , Energy Economic Information System (SIEE online database version 2002-2003), OLADE, Quito.

Secretaría de Energía de la República Argentina, PERMER, at http://energia.mecon.ar.

Secretaría de Energía de la República Argentina, *Boletines Anuales del Sector Eléctrico*, several issues, Buenos Aires, 1985 to 1990.

Suárez, C.E., V.Bravo y R. Kozulj, *Revisión Bibliográfica Sobre: Energía y Pobreza en América Latina y el Caribe*, Fundación Bariloche — Consejo Mundial de la Energía, Bariloche, FB Working Paper 5/01, October 2001.

Techint, News Bulletins, several issues.

WEC, Energy for Tomorrow's World — *Acting Now!*, April 2000.

World Bank, *Privatizaciones e Impacto en los Sectores Populares*, Ed. Belgrano, Buenos Aires, 2001.

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