Energy and Sustainable Development in Latin America and the Caribbean: Guide for Energy Policymaking

ENERGY AND SUSTAINABLE DEVELOPMENT IN LATIN AMERICA AND THE CARIBBEAN: GUIDE FOR ENERGY POLICYMAKING

PROJECT: ENERGY AND SUSTAINABLE DEVELOPMENT IN LATIN AMERICA AND THE CARIBBEAN

IMPLEMENTED BY THE FOLLOWING ORGANIZATIONS:

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Foreword

The point of departure for the reflections, analyses, and results that are presented herein date back to the end of 1993 when the Latin American Energy Organization (OLADE), the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), and the German Technical Cooperation Agency (GTZ), with the sponsorship and financial support of the German Government, drew up an agreement to implement the project Energy and Sustainable Development in Latin America and the Caribbean, whose central purpose was *"to contribute to creating conditions so that sustainable development could be incorporated as a priority into the formulation and implementation of energy policies in the region's countries."*

It is clear that sustainable development does not refer to a tangible or quantifiable goal that can be reached over a given period of time or at a given point in time. Rather it refers to the possibility of striking a balance between factors that point to a certain level of development for human beings, a development that is always transitory and generally in the process of evolving and which should be conducive to improving the quality of living of persons.

From this standpoint, in its two previous phases, the Project had analyzed the problems being faced by the energy sector in the region's countries and had presented them in various research papers and at conferences and international forums. Their principal conclusions were summarized in the book *Energy and Sustainable Development in Latin America and the Caribbean: Approaches to energy policy*.

Nevertheless, it was deemed important that a methodological void be duly filled, not only in terms of guidelines for energy policymaking proposals but in terms of their conception. The Project views energy policy as a sector specification of the long-term socioeconomic policy aimed at inducing a certain orientation for the development process. From this perspective, energy policy decision making may exert a significant influence to achieve greater sustainability of the development process in all of its dimensions: higher efficiency in energy production and development (in order to contribute to the objective of achieving a steady pace of **economic growth**); growing coverage of basic energy requirements in terms of amount and quality (which is essential to ensure greater **social equity**); and the rational production of natural energy resources and the more extensive use of renewable sources of energy and clean technologies (which are decisive to reach the goals of **environmental sustainability**).

"It is a noteworthy fact that the governments and civil society of the region have made, over the last decade, major efforts to overcome social lags. In particular, public social investment has increased in the majority of the countries, especially in education and social security, and in many cases this has been achieved alongside a series of reforms in the social sector."*

^{*} Declaration of Santiago, Second Regional Follow-up Conference of the World Summit on Social Development, Santiago de Chile, May 2000.

This potential for ensuring social benefits has required the State to take active part in energy policymaking. As a result, the Guide that is provided herein is proposing that, in energy policymaking, the new national and international context in which the State's actions must be carried out be considered and that it take up the challenge of achieving greater sustainable development. The general principles serving as orientation for the energy policymaking process make it advisable that these policies be based on at least six fundamental tenets:

First of all, they must be based on the options of each specific reality and not on doctrinaire approaches supposedly applicable to all situations.

Second, a careful study of specific situations orienting the identification of objectives, the selection of instruments whereby options for action can materialize, and the analysis of the possible impacts of these actions on the different relevant dimensions are required. The experiences stemming from other realities can serve as reference elements.

Third, special attention must be granted to striking a balance between the different interests of the stakeholders and to preventing anti-competitive practices. The areas of action for market forces, in the new context stemming from reforms, require formally established and effective regulatory frameworks to guarantee and prevent this type of situation

A fourth consideration involves the introduction of reforms; although in many cases these reforms improved performance in the management of the companies and their productive efficiency, the market mechanisms on the basis of which these reforms were applied do not automatically ensure compliance with other important sustainable development objectives. Because of this, it seems that the complementary actions of public policies are indispensable. It should be highlighted that the improvement in coverage of basic energy needs, in terms of amount and quality, is not enough; it continues to be a problem of the utmost importance on the agenda of the region's countries, which cannot expected to be resolved spontaneously by the mechanisms introduced by the reforms.

Fifth, social domain over natural energy resources means that the State has an unavoidable responsibility in supervising their management on behalf of society, especially in the case on nonrenewable resources. Likewise, the eventual discrepancy between private costs and social costs that could lead to negative environmental impacts also require the undelegable intervention of an energy policy aimed at promoting sustainable development.

Finally, among the principles orienting energy policymaking, support to regional organizations in order to express and represent common interests in international forums should not be neglected.

The bias toward market coordination schemes that has been given by reform processes has led, from the public perspective of urgencies, to the predominance of aspects focusing on the short term to the detriment of long-term strategies. Nevertheless, it is felt that "public policies" require actions organized around objectives that benefit not only present generations but also future generations. In addition, the Guide suggests the need to visualize "public matters" in the broadest sense of the term, that is, involving all sectors of society and the need to open up opportunities for the participation of all those holding a stake in the decisions taken by the State. Many of these aspects, which are closely tied to the development process of each country, appear as "externalities" within the context of decentralized decision making or the operation of market mechanisms. Because of this, it is important to consider that the rationale of individual decisions will not necessarily include those objectives that have a preeminently global character.

In addition, integration processes can contribute significantly to the above-mentioned sustainable development dimensions. In Latin America and the Caribbean, there is still a wide range of integration opportunities for energy systems. Nevertheless, even in this case, there still are barriers that prevent them from being developed, and in many cases, the coordinated action and orientation of the States are required to dismantle them.

In the scheme that prevailed prior to the transformation processes, energy policy was elaborated by means of centralized decisions taken by the State, which exerted an impact on prices and the allocation of resources, since state-owned enterprises were simply an extension of the government's central administrative apparatus. In this situation, the actions of companies were clearly inserted in the general objectives of the country's socioeconomic policy, and energy planning had an eminently standard-setting character. Furthermore, it was not possible to view the State as a homogeneous whole, but rather it appeared as a conglomerate of interests that were oftentimes counterposed. Normally, to these differences in policy definition, were added pressures from the different social groups that were mobilized. The large public sector companies had the capacity to use their economic leverage to have their own objectives prevail over those of political administrative power.

In the new context stemming from the reforms, however, the conditions for formulating and implementing energy policy have become even more complex. In addition, the liberalization permitting the free play of market forces involves the need to use indirect instruments to exert an influence on sector players. In addition, decentralized decision making for the allocation of resources in the sector will lead to new challenges to achieve compatibility between microeconomic objectives and the global and subsector goals of energy policies.

In short, although it should be emphasized that, in the past, the region's democratic governments, when formulating and implementing energy policies, sought to resolve the situations that arose by consensus, this consensus was not always obtained. But in the new context, stemming from reform processes, there are very salient and necessary features of shared power, and because of this it is imperative that all those aspects involved in building up the viability of the objectives and instruments proposed must be duly considered.

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I. Introduction

1.1 Background

In the framework of the Energy and Sustainable Development in Latin America and the Caribbean Project being conducted jointly by the Latin American Energy Organization (OLADE), the Economic Commission for Latin America and the Caribbean (ECLAC), and the German Technical Cooperation Agency (GTZ), a series of case studies focusing on a wide range of countries in the region were conducted essentially to examine how energy policies contribute to enhancing sustainable development.

The transformation of the energy industry, implemented in the framework of the economic reforms promoted by the region's countries, was one of the principal targets of analysis in the above-mentioned case studies. The magnitude and degree of development of the countries, their available endowment of natural energy resources, and the level of progress achieved in the implementation of reform processes were the criteria used to achieve a reasonable diversity in the necessarily limited set of case studies conducted.

Research into the special dimensions of the region's energy problems, among which the analysis of subregional integration processes is noteworthy, along with the principal results of the first case studies (Chile, Colombia, El Salvador) and the use of secondary information, stemming principally from OLADE's data base, the Energy-Economic Information System (SIEE), was the groundwork on the basis of which a regional synthesis was drafted (Energy and Sustainable Development in Latin America and the Caribbean: Approaches to energy policy), providing an overview of the situation of the region's countries with respect to the interaction between the evolution of energy systems and sustainability. The different patterns that have been observed with respect to the behavior of this interaction enabled the project to identify a variety of priority objectives for energy policies to promote sustainable development. The subsequent study of energy restructuring processes implemented in the region, which contributed the basic elements to the Central Topic of OLADE's Meeting of Ministers (*Energy Sector Modernization in Latin America and the Caribbean: Regulatory Framework, Sale of Assets, and Free Trade*), as well as the implementation of new case studies (Bolivia and Brazil) and the follow-up of those previously conducted, enabled the project to carry out a preliminary analysis of the contribution of the new institutional framework of the energy systems of Latin America and the Caribbean (hereinafter referred to as LAC) to sustainable development.

On the basis of the principal conclusions drawn from these analyses, it is apparent that, despite the improvements achieved with the reforms for the functioning of energy systems (improvements in productive efficiency, higher investments for supply expansion, less discretionality in price formation) with respect to the contribution of energy growth, there is still a series of major challenges for energy policy that is pending, especially with respect to its social and environmental dimensions for the sustainable management of energy resources and to perfect regulatory mechanisms and public policymaking processes.

To address these challenges in particular, a series of subregional workshops was implemented in the framework of the project for the purpose of improving energy policymaking processes that would favor sustainable development. These experiences indicated the advisability of having a guide that could be used in future dissemination and training actions and would improve the process of identifying and formulating policies in a much more complex institutional context.

1.2 Objectives of the Guide

The guide intends to present the basic elements that are needed in energy policy identification and policymaking to ensure a development that is more sustainable, as well as to foster discussion of instruments and approaches that would permit improving the conditions of viability of the policies that are formulated.

On the basis of this principal objective, the present guide is aimed at tackling the following issues:

- Presenting, as an assessment, the principal characteristics of the transformation processes of the energy systems of the countries of LAC (status, scope, depth, speed of implementation). Analysis of the most typical forms presented by the new production and institutional organization of energy industry in the region's countries, the noteworthy features of their regulatory schemes, and the prevailing coordination schemes in the industry. This analysis responds to two objectives linked to the guide's central purpose: a) highlight the principal challenges that energy policy must take up, while addressing the problems that are pending in the reform processes or those problems not resolved by these reforms and that are crucial to achieve greater sustainability; b) show the greater complexity of the implementation of energy policies in the new production and institutional organization contexts.
- Analyzing the new dynamics of economic and energy integration while highlighting their linkages to reform processes. This analysis should also include the identification of the most typical opportunities of each subregion, which tend to favor sustainability, and the principal barriers that hamper this sustainability. In this case, it is also important to discuss coordination schemes for integration processes.
- Expounding the approaches that can be used to identify the objectives of energy policy that are more relevant or conducive to improving the sustainability conditions of development and the potential alternative instruments available to reach them. The use of these approaches imples: a) specifying the framework conditions for energy pol-

icy actions; b) specifying the principles and criteria used to identify objectives; c) defining the nature of the objectives identified (sphere to which they are linked); d) establishing priorities between the objectives identified as relevant and define the scope of the goals they imply; e) identifying the potential instruments linked to each objective, taking into account the context conditions in which policy measures are supposed to act; and f) examining the nature of the instruments that are identified.

1.3 Nature and orientation of energy policy

Energy policy is a sectoral specification for the long-term socioeconomic policy, which in turn is aimed at inflecting the orientation of the development process. In view of the importance of energy as a determining element for the population's quality of living, as an indispensable input throughout the entire production framework, and as the object of a huge amount of investment required by the supply system with a strong interaction with the environment not only because of the intensive use of natural resources but also because of the impacts stemming from its production, transport, and consumption, energy policy performs an especially meaningful role in development policies.

Thus, energy policy decisions can have a major influence on the achievement of greater sustainability of the development process, as a result of the following:

- Greater efficiency in energy production and consumption contributes to the objective of achieving steady economic growth.
- Meeting basic energy requirements, in terms of both quantity and quality, is essential for achieving greater social equity.
- The rational use of natural energy resources, higher efficiency in the use of energy, and the use of renewable sources and clean technologies contribute decisively to mitigating the inevitable environmental impact of

economic production and consumption activities.

Many of these aspects, which are closely linked to a country's development process, appear in the shape of externalities in a decentralized decision-making context or when open market mechanisms are in force. As a rule, the rationale of individual decisions does not necessarily incorporate those objectives that have a preeminently global character.

In addition, integration processes, depending on how they are managed, can contribute significantly to those three dimensions of sustainable development. In LAC, there is still a considerable amount of opportunities for energy system integration. Nevertheless, there are also barriers that prevent them from being tapped. In many cases, to overcome these obstacles, the concerted and guiding action of the State is needed.

Because of this, the possibility of ensuring global social benefits that would tend to enhance sustainable development belongs essentially to the State's sphere of activities, especially its energy policy activities.

As a result, what is being proposed here, as the central focus of the analysis, is an energy policymaking process that promotes greater sustainability in terms of the above-mentioned dimensions.

1.4 Changes in the energy policymaking process

Toward the end of the eighties and throughout the nineties, major reforms were introduced in almost all the energy systems of the region's countries. These reform processes have displayed a wide variety in terms of depth, scope or durability (energy chains they affected), and speed of implementation. Nevertheless, the prevailing orientations involved granting a greater share to private players and a leading role to open market mechanisms. Even in those countries where there was no major transfer of energy production activities to the private sector, greater managerial autonomy was granted to public enterprises, with the State in charge of regulation and monitoring.

Thus, the reforms have led to the growth of a large number of players, at least legally and formally, and to a decentralization of the decision-making process.

In the context prior to the reforms, vertically integrated public monopolies prevailed in the energy systems of the region's countries. In this situation, the State could directly control resource allocations to the different energy activities and the management of sector companies, including price-setting. Under these conditions, the rationale of business decisions was subject to the criteria established by development policies, albeit often also affected by the ups and downs of short-term policies.¹

In this context, the standard planning of sector investment was a privileged instrument of energy policy. The decisions contained in the plans were implemented by the state-owned enterprises that were nothing but a direct extension of the State's political and administrative apparatus.

It is clear that effectiveness of these mechanisms was affected by the own problems of the operation of state facilities² and/or by situations that were not planned in the external and domestic conditions (for example, changes in the world economic and energy context, changes in the growth rate of the national economy). In addition, planning was conceived as an activity that came to an end with the drafting of the Plan itself, not as an ongoing process requiring revision and updating, which at the same time

¹ In certain cases, this rationale was subordinate to party politics or the interests of certain groups of influence

² The State cannot be viewed as a single player that is internally consistent and monolithic with respect to preparing decisions and implementing them. From the strictly energy standpoint, it has been frequent for sector companies themselves to have more decision-making power than the authorities that are themselves in charge of political policymaking. In other words, partially or total contradictory rationales were frequently apparent at the very heart of the State itself.

enhances the viability conditions. This also conspired against the energy policy scheme.

As part of these new conditions, the formulation and, above all, the implementation of energy policy measures are far more complex in view of the following:

First of all, the broader decentralization of decision-making processes for the allocation of resources in the sector's different activities forces the State's intervention, which is aimed at ensuring that public interests are safeguarded, to be much more indirect. Thus, many of the administrative measures that were used in the prior situation to implement decisions contained in the plans must now be replaced by indirect incentive mechanisms or fiscal policy instruments.

Second, the wider participation of privatesector players has introduced changes in the rationale orienting the decisions. Development objectives, which were highly significant for the activities of public enterprises, have been replaced by business profitability criteria. Even the sector companies that have remained in the hands of the State no have greater decision-making autonomy, and the rationale driving their behavior has a more business-like bias.

Third, as a result of the previously mentioned aspect, even though the State now has a regulatory and oversight role, when it relinquished direct control over the sector's companies, its power to impose objectives and orient the direction of decisions was considerably curtailed. The pervasive presence of externalities in the development of energy activities (among which the most evident involve environmental consequences) is an important source of divergence between the rationale of the players (private or public enterprises of the sector, users) and the overall objectives of society. Conflicting objectives in the framework of a situation that requires power sharing with an abundance of players makes the building of viability for energy policy measures a much more complex task.

Finally, the prevalence of democratic regimes in the region's countries makes the task of identifying objectives and striving for political consensus to achieve these objectives far more complex. At the same time, the precariousness of current democratic institutions, especially judicial entities, considerably undermines the State's regulatory power over public service activities, which are now being managed on the basis of a decentralized scheme and a large share of which are now in the hands of private-sector national or transnational groups. This is a factor that reduces the State's capacity to implement its energy policies. Part A: Conceptual Bases: Energy Policy, Sustainability, and Reforms

II. Energy Policy and Sustainable Development

2.1 Concepts of sustainability

After the end of the Second World War, concerns about development problems were discussed extensively in economic literature. Although the debate about the nature of the development process, its many dimensions, and the design of policies aimed at furthering its momentum took up a large part of this literature, it was evident that there were still many difficulties in addressing theoretically the full complexity of this process as it unfolded over the long term. Thus, an important part of the theoretical output focused on the elaboration and analysis of stylized economic growth models.

The rapid growth of the world economy up until the mid-sixties³ made it easy to forget, at least partly, how social and environmental aspects affect the development process. Nevertheless, in the seventies, it became apparent that the characteristics and consequences of this growth, which in addition had already used up the sources for its impetus, were unsatisfactory.⁴

The work of some authors associated to ECLAC expressed a lack of satisfaction with the development styles that were part of this growth in LAC, highlighting that growth was actually highly concentrated: despite some improvements in the population's living conditions, social imbalances had become even more severe. These imbalances deepened even further during the eighties, as a result of the adjustment made because of the reversal of financial capital flows, triggered by the external debt. In most countries of the region, average income of the population fell steeply and poverty indices rose significantly.⁵

In addition, at the start of the seventies, concerns about the impacts of economic growth on natural resources and the environment began to surface. During the so-called golden age of growth, the problems of development were examined by focusing special attention on the scarcity of physical and financial capital (insufficient saving) and eventually on the endowment and quality of human resources, which was tantamount to admitting implicitly that there were no constraints on the natural environment and its growth.

Thus, the development styles that were historically applied involved a wasteful management of the natural environment: the extinction of species, deforestation, air and water pollution as a result of rapid urbanization, and industrial pollution, with severe impacts on the health and quality of living of the population. A large part of these problems has appeared in the form of impacts on the local environment, which in many cases have aggravated the poverty conditions in less developed regions. Nevertheless, prevailing environmental impacts stem largely from global problems: the potential impact of greenhouse gas emissions on the atmosphere.

In any case, it is clear that there is a growing awareness that the gradual deterioration of the environment leads to changes that are oftentimes irreversible, which can severely affect society's potential for future development. This has meant that the sustainability of certain styles of development is questionable.

Because it is closely linked to the dynamics of a complex system and the interplay of a wide variety of dimensions,⁶ the notion of sustainability is not susceptible to an easy defini-

³ This growth, which was essentially based on the technological paradigm drawn up during the Second World War, was driven mainly by the metal-mechanic industrial sectors (capital equipment, durable consumption goods) and the petrochemical industry (substitution of natural materials). During this period, world industry expanded at an annual cumulative rate of 6%. The consumption of commercial energy sources rose more than threefold during 1950-1973.

⁴ The so-called golden age of growth started to show symptoms of breakdown toward the end of the sixties.

⁵ See J.L. Londoño, *Poverty, Inequality and Human Capital Formation in Latin America, 1950-2025,* World Bank, June 1996.

⁶ When systems behave in a nonlinear fashion, nourished and characterized by uncertainty, it turns out to be quite difficult to deduce their possible future course, even in the simplest of cases. See, for example, P.W. Anderson, K.J. Arrow, and D. Pines, The Economy as an Evolving Complex System, Addison-Wesley P.C., 1988.

tion. Any definition that is proposed should clearly establish the essential elements that should characterize any development that can be qualified as sustainable.

In 1987, the World Environment and Development Commission (WEDC) defined the concept of *sustainable development* as "A development that meets the needs of the present without compromising the ability of future generations to meet their own needs."⁷ Presented in this general fashion, this definition of sustainable development may turn out to be quite acceptable for the majority of studies being conducted. Nevertheless, it is not clear what notion of equity is being proposed to meet the needs of the present, nor is it clear what type of management of the natural environment will guarantee that the capacity of future generations to meet their own needs will not be undermined.

For example, the Development and Environment Commission of Latin America and the Caribbean,⁸ in its report entitled *Our Own Agenda*,⁹ provides, among other aspects, the basis for a sustainable development strategy defined as "A development that distributes more equitably the benefits of economic progress, protects the national and world environment for the benefit of future generations and genuinely improves the quality of life."

2.1.1 Sustainable development and forms of capital

Some definitions of sustainable development have been based on a specific conception of the resources used in different social production processes, whether human, natural or produced/manufactured, whereby these resources are viewed as different forms of "capital."¹⁰ This type of approach belongs principally to the *envi ronmental economics* school of thought, based on neoclassical theories that pretend to assign monetary value to the goods and services stemming from the natural environment (resource supply and waste absorption), on the basis of their relative scarcity. This approach advocates that these goods and services should be dealt with just as any other, subject to individual preferences that are channeled to the corresponding markets or, in the absence of these markets, determined by the mere willingness to pay.¹¹

By accepting this definition of the WEDC, this school of thought claims that sustainability can be guaranteed by the accumulation of physical capital (comprised of produced goods) which is capable of compensating for the decline of the material assets; in other words, it assumes the unlimited substitution of the elements that constitute the natural environment for goods produced by man and that are accumulated in the form of physical capital. Thus, sustainability will be guaranteed if the "total capital" that is transferred to future generations is not smaller than that which is available in the present.¹² This conception is clearly linked to the traditional production theory with its neoclassical bias, which assumes that there is a perfect substitution between "production factors."

The advocates of the so-called ecological economics, however, question the validity of this perfect substitution and reject the possibility of viewing environmental elements as merchandise, arguing that our natural assets hold an inherent value that the capital produced by man cannot

⁷ WEDC, *Our Common Future*, Oxford University Press, Oxford, 1987.

⁸ Promoted jointly by the Inter-American Development Bank (IDB) and the United Nations Development Programme (UNDP),

with support from ECLAC and the United Nations Environment Programme (UNEP).

⁹ Washington, D.C., 1990.

¹⁰ The quotation marks intend to alert the reader that this notion of capital, which is aimed at encompassing the elements of a given natural endowment, on the one hand, and the set of human resources, with all of their qualities and cultural diversity, on the other hand, should be used and interpreted with caution. It should be recalled that the notion of capital, whether physical or financial, is closely tied to the existence of markets, which in turn are based on a highly exclusive and excluding definition of ownership (private or public).

¹¹ See P. Bartelmus, *Sustainable Development: Paradigm or Paranoia*, Wuppertal Papers No. 93, May 1999.

¹² In addition to the objections that can be made to the assumption that there is an unlimited substitutability between produced capital and natural resource endowment, this approach must tackle the major problem of appraisal that is implied when referring to the concept of "total capital". It has already been demonstrated, in economics, that the valuation of physical capital is not independent of income distribution and, therefore, of the notion of equity that is adopted.

possibly replace and that markets or individual preferences cannot ascribe to them a suitable value. In other words, they underscore the complementary quality between both sets of elements and emphasize the importance of natural environmental conservation, which is what sets biophysical limits to the growth of economic activities, in view of the irreversibility of certain processes that have triggered an impact on nature.

To a certain extent, this conservationist approach can be interpreted as a constraint on the possibility of present generations to achieve adequate coverage of their needs, which in turn would be undermining another dimension of sustainability. In reality, the quest for sustainable development should be aimed at striking a harmonious balance in the management of the elements that comprise both the physical capital and the natural resource endowment, while ensuring that certain criteria of fairness and cultural diversity in society are respected.

For example, ECLAC asserts that "sustainable development requires a dynamic equilibrium between all forms of capital or endowment that take part in the economic and social development effort of the countries, so that the rate of use stemming from each form of capital does not exceed its own rate of reproduction, taking into account the substitution or complementation ratios there are between them."¹³

In short, the previous discussion can be summarized by resorting to the following expression

(*) KT KF KN KH

Where the symbols mean the following:

KT: set of elements that constitute "total capital." This is not mere sum or aggregate but rather a diverse group of elements (or preferably a vector). **KF:** Set of physical capital elements or its aggregate in terms of value.¹⁴

KN: Set of elements that constitute the endowment of natural assets.

KH: Set of human resources, added up in terms of quantity in each qualitative category.

and : symbols that replace, respectively, the algebraic signs of equality and addition, in the understanding that the expression (*) cannot have an algebraic equivalent.

As part of the neoclassical theoretical approach, the terms of the expression (*) are viewed as value aggregates that can be added up to constitute "total capital" KT (and in this case mean , respectively). When and assuming a quasi perfect substitution (at least within certain limits) between the different forms of capital, the notion of sustainability is defined in terms of **KT**, which means that future generations must receive a **KT** endowment that is not less than the one available at present. In keeping with this conception, the use of the notion of "genuine saving" is proposed as an indicator of sustainability.

(**) KT KF KN KH

This notion can be drawn from the expression (**), which is always interpreted algebraically. A positive sign for **KT** means that genuine saving has a positive value and viceversa.¹⁵

Believers in ecological economics, as well as followers of other economic schools of thought, refuse the possibility of giving an algebraic interpretation to the expressions (*) and (**) and highlight the irreplaceable qualitative specificity of the elements that constitute natural assets. As a result of this standpoint, they underscore the need to undertake a sound management of these assets, taking into consideration certain limits based on the laws of natural reproduction.

¹³ ECLAC, Sustainable Development: Productive Transformation, Equity, and the Environment, Santiago de Chile, 1991.

¹⁴ It is evident that, even in this case, there can be an identical level in value and combinations that are more or less functional for sustainable development.

¹⁵ The discussion about the meaning of the notion of genuine saving will be focused on again when discussing sustainability indicators.

2.1.2 Human being as both subject and target of sustainable development

In the framework of the OLADE-ECLAC-GTZ Project on Energy and Sustainable Development in LAC, it is being proposed that the human being should be the active subject and ultimate objective of development; as a result, human development is a core element of sustainability.¹⁶

The concept of human development that has been adopted in this debate is the one set forth in the annual reports of the United Nations Development Programme (UNDP). It is viewed as "the process of enlarging the range of options of persons, providing them with greater opportunities for education, medical care, income, and employment, and covering the full spectrum of human options, from good physical environmental conditions to economic and political freedom."¹⁷ This definition of human development points to a set of dimensions that are relevant because of their principal components:

- When referring to "education, health, income, and employment," it focuses on the social and economic dimensions of development. Higher income for the population and job generation are only feasible when the social product is enlarged and when it is distributed in a more balanced/equitable fashion. From the social standpoint, these four elements are an indispensable basis for improving the quality of living of everyone.
- When referring to the "physical environment", the concept implies the **environmental dimension.**
- When referring to "freedom", such as the options of a person in society, it means the **political dimension.**

Thus, when placing "... the human being at the very heart of any consideration, ... it is clear that development should be viewed as something occurring to persons and, by extension, to society. Each human being is at once an active subject and target of State policy, which as a manifestation of society as a whole and not only the ruling class performs an important role in this process."¹⁸

Nevertheless, these dimensions of human development should fit within the notion of sustainability set forth by the WEDC so that they can include a temporal dimension and add to this notion a more specific content in terms of the needs of present and future generations.

Thus, bearing in mind the living conditions that a high percentage of the world population is currently facing, it is quite clear that the present situation, characterized by the following, cannot be viewed as sustainable: extremely low average incomes and difficult access to basic services (health, education, housing, energy). Furthermore, it cannot be expected that, on the basis of this situation, the changes that are needed to achieve greater sustainability in the future will take place spontaneously. The absolute prevalence of market mechanisms highlights a growing gap between the countries and the components of their respective societies, thus consolidating mechanisms that foster the cumulative circle of causes.¹⁹ In other words, the lower is the status of human development in the present, the greater is the urgency for political efforts to be made to change this situation.

In addition, in the environmental dimension, it is not apparent that there are any conditions that can be viewed as compatible with sustainable development: some countries indiscriminately use the global environment, creat-

¹⁶ OLADE-ECLAC-GTZ, Energy and Sustainable Development in Latin America and the Caribbean: Approaches to energy policy, Quito, May 1997, page 3.

¹⁷ UNDP, *Human Development: 1992 Report*, published for UNDP, Bogotá, 1992, page 18.

¹⁸ OLADE-ECLAC-GTZ, op. cit., page 3.

¹⁹ Already in the fifties, Gunnar Myrdal was warning that, far from producing convergence, market actions would unleash processes of cumulative circular causality, which would tend to heighten divergence (G. Myrdal, *Economic Theory and Underdeveloped Regions*, Economic Culture Fund, Mexico, 1962).

ing highly damaging conditions (greenhouse effect) in the territories of other countries, which can only be corrected by establishing "...the right to international equality of opportunities, within each generation, to have access to a nature that is as intact as possible."²⁰

2.2 Dimensions of sustainability

On the basis of what was described in Section 2.1, it is evident that:

- There is an open controversy about the notion of sustainability.
- It is very difficult to specify in great detail the conditions that should be met to conduct a development process that can be qualified as sustainable. This is essentially due to the difficulty encountered by science when it attempts to deal with the dynamics of complex systems under conditions of uncertainty.
- It is evident that the human being should be the active subject and target of sustainability, that the current reality of the world population and the management of the natural environment are far removed from any notion of sustainability.
- It cannot be expected that the courses that would have to be adopted to lead to a greater sustainability of human and social development will be taken spontaneously on the basis of decentralized decision making of social players or market actions.
- State policies expressly aimed at orienting these decentralized decisions and market operations are needed to ensure the evolution of economic, social, political, and environmental systems toward greater sustainability.

Although it may turn out to be quite difficult to give a functional meaning to general definitions of sustainability (as with the definition of the WEDC, which is widely accepted), it is possible to determine progress toward greater sustainability in each one of the principal dimensions of development.

"In short, it is evident that the relevant dimensions of sustainable development are political freedom, economic well-being, social equity, and a healthy environment, in addition to a certain conservation of natural resources. These dimensions are extended in space (land and air) and over time (present and future)."²¹

2.2.1 Sustainability indicators

Associated with these dimensions of development, sets of indicators that enable situations to be characterized and compared, whether transversally (cutting across different countries) and/or in their evolution over time (for each one of the countries), can be defined. Instead these indicators refer to situations where a wide number of indicators are used. As a result, it is not possible to add them up to obtain magnitudes of scale, and therefore vectorial expressions have to be resorted to.

The indicators, whose components can be expressed in different units of measure, do not lend themselves to relationships of order that would help to define a relative degree of sustainability. They are only able to characterize "situations" with respect to the different dimensions of sustainability, selecting for each dimension a limited number of indicators, as was done in the study *Energy and Sustainable Development in Latin America and the Caribbean: Approaches to energy policy* (OLADE-ECLAC-GTZ), which provides selected patterns of situations which can be approximately linked to the reality of different countries (in this case, those of LAC).

²⁰ See the proposal Zukunftsfähiges Deutschland: Ein Beitrag zu einer global nachhaltigen Entwicklung [A Sustainable Germany: A Contribution to Global Sustainable Development], Wuppertal Institut für Klima – Umwelt – Energie GmbH im Wissenschaftszentrum Nordrhein – Westfalen, September 1995. Reference taken from OLADE-ECLAC-GTZ, op. cit., page 3.

²¹ OLADE-ECLAC-GTZ, op. cit.

When a limited number of indicators are selected, there is the risk that the characterization of the complexity of each situation will be oversimplified. That is why this type of analysis should only be viewed as a preliminary approach to the characterization of concrete situations.

In the above-mentioned study, four major indicators are proposed to typify these patterns of development sustainability:²²

- GDP per capita, for the economic dimension. "A high per capita gross domestic product (per capita GDP) not only means a high average income but also high productivity of the economy, which in turn is an important element for economic sustainability. Nevertheless, even when taking into account purchasing power in estimating per capita GDP in constant terms, it is evident that this indicator implies constraints in satisfactorily reflecting the population's quality of living."²³
- The **distribution of income**, which represents the social dimension with respect to equity or, in other words, the degree of asymmetry. It should be kept in mind that the availability of income permits access to meet a more or less wide set of needs. Because of this, the income level displays a high correlation with the degree of access to those goods and services that characterize the guality of life of the different strata of the population. It is therefore understood that a reduction of the asymmetries in income distribution is socially more sustainable and that "... low average income levels or shapr imbalances in income distribution are the subject of much concern and, for policymaking, they should be viewed as severe problems for sustainability."24

The net domestic investment in physical and natural capital (genuine saving). "[It is assumed that] the notion of genuine saving has a direct linkage to sustainability since it translates efforts that are made in the present to give impetus to the pace of development toward the future." According to K. Hamilton,²⁵ the indicator of genuine saving is defined as follows: "... in addition to net investments calculated traditionally (gross investment less depreciation of physical capital), the reductions in the stock of natural resources (because of depletion), the deterioration of the environment (because of deterioration) stemming from emissions, and investments financed with foreign capital (external saving) subject to being retransferred are also taken into account."26

This third indicator is not as evident in its definition nor is it so simple in its meaning (see Box 1). Nevertheless, the sets of elements that are symbolized by **KF**, **KN** and **KH**, considered separately, undoubtedly contribute valuable indications to examining sustainability. In the first case (KF), the parameter indicator of gross investment/GDP can be used as it provides clues to the dynamics of economic growth.²⁷ The second set of elements (KN) is somehow partially represented by the fourth indicator that is mentioned immediately afterward. It intends to be an estimate of the monetary value of the national natural resources of each country.²⁸ The greenhouse gas emissions are also important owing to their impacts on urban air quality and the constraints that can arise internationally as a result of Climate Change Party Conventions. Finally, some indicator that summarizes the level of formal education of the population could represent approximately the set (KH). Although "opening up" the "genuine saving" indicator would mean broadening the number of indi-

²² The precise definition of these indicators can be found in an annex to the paper quoted herein.

²³ OLADE-ECLAC-GTZ, op. cit., page 4.

²⁴ Ibid., page 4.

²⁵ K. Hamilton, *Genuine Saving in Developing Countries*, CSERGE, University of East Anglia, October 1995.

²⁶ OLADE-ECLAC-GTZ, op. cit., page 4.

²⁷ Remember the importance assigned to the multiplier-accelerator mechanism in the macroeconomic thinking of Keynes.

²⁸ Beyond the already mentioned problems of appraisal, the scalar expression has the limitation of concealing the composition of the natural assets: the same scalar value can correspond to two extremely different situations.

cators to be considered, the results obtained and their interpretation would have a much higher validity.

• The endowment of natural capital per capita for the dimension of physical environment, including natural resources and the environment. It encompasses both nonrenewable (fossil) and renewable (soil, forest, etc.) natural capital.

"Whereas the first three indicators express current annual levels (flow variables) or changes in structure (income distribution), the fourth indicator reflects the physical-natural base for development (stock). The relevance of this indicator for sustainable development is obvious when you take into account that the greater the abundance of natural resources, all other things being equal, the higher the economic growth that essentially depends on the use of these resources, which is the case for a large number of the countries of Latin America."²⁹

2.2.2 The most characteristics patterns in LAC

On the basis of these four indicators, situation patterns that were assigned to the different countries of the region were determined. These patterns are the following:³⁰

- A: High levels of average income, moderate social inequality, low integration of production, dependence on energy exports (Venezuela, Trinidad and Tobago, Barbados).
- B: High integration and diversification of production with major domestic absorption, marked or moderate social and regional differentiation, important natural resource

base, which is self-sufficient or moderately dependent on energy imports (Argentina, Brazil, Chile, Uruguay, and Paraguay).

- C: Moderate or high integration and diversification of domestic production, marked social inequality, diversified exports based on natural resources (Colombia, Costa Rica, Mexico, Panama, Jamaica).
- D: Low level of relative development, based on natural resources and the export of primary, mining and/or energy products (Bolivia, Ecuador, Guyana, Nicaragua, Peru, Suriname, Cuba).
- E/F:Low or very low degree of development, with a limited endowment of natural resources (Guatemala, Honduras, Dominican Republic, El Salvador, Grenada, and Haiti).

Countries that can differ to some extent with respect to some of the indicators but that are similar with respect to the others are included in the same category. For example, in category B, Uruguay displays a degree of social equity that is greater than Brazil, although the two have similar GDPpc levels and a similar endowment of natural resources per capita. As it was indicated earlier, the inclusion of the countries in each category is only a preliminary approach to this level of simplicity as a result of the limited number of indicators considered. In any case, this cross-wise comparison provides a rough picture of each country, which can be complemented by a historical analysis that would permit analyzing the evolution of the indicators that were mentioned and evaluating the trends toward greater or lesser sustainability.

²⁹ OLADE-ECLAC-GTZ, op. cit., page 4.

 $^{^{\}rm 30}$ Ibid., page 5.

Box 1

Meaning of the concept of "genuine saving"

The definition of the concept of "genuine saving" involves a series of theoretical difficulties, and the use of the corresponding indicator, set up as proposed by K. Hamilton, to conduct comparisons between countries and regions can lead to erroneous conclusions.

Conceptually speaking, this concept stems from a neoclassical approach that postulates the possibility of a perfect substitution between the elements of natural assets by means of the accumulation of produced goods and asserts the existence of a scalar magnitude of "total capital." Indeed, taking the expression (*) as the algebraic definition of this magnitude, the determination of genuine saving would lead to the expression (**), also interpreted algebraically.

Nevertheless, when proceeding in this fashion, the essential difference between produced goods and the elements of the natural environment from which they come (in other words, not produced by the intervention of the labor force, using physical capital facilities) is being omitted. This difference is decisive for appraisal purposes and is crucial in the difficulties in determining the ownership of these original natural elements.

When focusing attention on environmental pollution concerns (stemming from production or consumption processes), it is clear that these concerns involve a decline in the "natural capital." Nevertheless, it is not possible to determine the holder(s) of this capital which has been damaged or to identify who has reduced its "genuine saving" in this magnitude. Attributing this reduction to those who have produced the environmental damage implicitly involves assigning ownership of these natural commons to those players. This situation has arisen because these players do not feel in any way obliged to make any compensation to the rest of world society for this deterioration and the impact of their actions remain at the accounting level (if there were to be a accounting recording system that would incorporate this type of entry).

But if some criterion were to be defined a priori for the distribution of ownership of these natural commons, at least among the different countries, it is clear that there should be effective (financial) compensations between the countries and these financial flows would be affecting the level of genuine saving of the various countries and regions.

Thus, for example, if it were assumed that all the dwellers of the planet held the same right of property over natura, that is, if property were distribution on the basis of the population of each country and if it were deemed that each country should pay for the negative impacts on common assets, in proportion to their intensity, the comparisions that are being proposed on the basis of the genuine saving indicator would have a totally different aspect.

For example, if a value of US\$20 were attributed to each ton of CO_2 discharged into the atmosphere and if the previously mentioned criteria were used, the LAC region should have received, during the period 1980-1995, a net compensation virtually equivalent to the total amount of its external debt (*). It is evident that, if these compensations had effectively been made, then the economic history of the region, as well as the performance of its genuine saving indicator, would have been quite different.

It is important to emphasize that the above-mentioned considerations are not aimed at only discussing the equity of the distribution of ownership of natural assets implicit in the notion of genuine saving. Rather they focus on the theoretical difficulties stemming from this notion and the errors inherent to the comparisons that are being proposed.

(*) See H. Pistonesi C. and others, "Las falacias ligadas al concepto de ahorro genuino"[Fallacies involved in the concept of genuine saving], Annals of the Argentine Association of Political Economics, XXXII Annual Meeting, Universidad Nacional del Sur, Bahía Blanca, 1997.

2.3 Energy policy and sustainable development

2.3.1 Energy and the dimensions of sustainability

Energy is a basic element for the quality of living of the human being and a widely disseminated input for all productive activities as a whole. As a result, energy has performed a central role in the development of mankind. In addition, the major technological revolutions that have affected production and consumption activities have been closely tied to the substitution of primary energy sources.

In addition, energy production and consumption are also interacting extensively with the natural environment. The use of fossil fuels is leading to the gradual depletion of the

	Dimensions	Objetive and how the energy sector contributes
	Political	Sustained political maneuverability/leverage Mantaining international ranking/influence Breakup of political and economic power (public and private) Safety of facilities in the face of conflicts Safety and diversification of external supply Sufficient degree of energy autary
Sustainable Development	Economic	Reduced energy quota in imports Less weight of variable incomes in the budget Less weight in the balance of payments Stable flow of income from exports Taking energy earnings Stable flow of fiscal revenues Investment of energy earnings in other forms of capital Reduced energy intensity Rational use of energy in production sectors Energy efficiency Production efficiency in the energy sector Sufficient sector financing Higher added value in the energy chains Higher quality of energy supply Reliability of supply Reduced costs of energy supply Diversification of the energy mix
	Social	Meeting basic needs Access to modern energy sources Greater access to electricity Social service supply Paduction of local and clobal impacts stamming from emissions
	Environmental	Land conservation Sustainable management of firewood Nonpollution of water Ecologically compatible management of fossil resource production Sustainable management of hydraulic basins Sustainable fossil resource production programs Long-term sustainable production of fossil resources Use of renewable sources of energy

Box 2 Contribution of the energy system to sustainable development

corresponding reserves. The unsuitable management of some renewables (biomass, hydraulic) may lead to their degradation with the resulting decline of their future availability. There are many negative impacts on the soil, the water, and the environment stemming from the production/transformation/use of energy.

The oil crises of the seventies, the social reactions to steep energy price rises, and prolonged electric power outages are only a few examples of the meaningfulness of energy issues for politics and geopolitics.

These brief considerations highlight the important ties that exist between energy and the dimensions of development examined in the preceding section. This implies that the contribution of energy policy to achieving higher sustainability can turn out to be highly significant. Several objectives or actions related to energy systems and their linkage to the different dimensions of sustainable development are listed in Box 2.

2.3.2 Energy indicators and the dimensions of sustainability

In view of the many interactions of the energy systems to the different dimensions of the development process, a series of indicators related to the structure and variables of these systems and corresponding to aspects linked to the above-mentioned dimensions of sustainability can be identified.

Thus, for example, with respect to the social dimension, indicators aimed at highlighting the extent to which basic energy needs are met, in terms of quantity and quality, or the share of the energy bill in household budgets can be selected. This type of indicator can be calculated as an average for the population as a whole. Nevertheless, if enough information is available, in order to characterize equity conditions even more clearly, it would be advisable to link these indicators to the different strata of society. Thus, Lorenz curves focusing on the distribution on total, final, and useful energy or electricity consumption among different household strata could be plotted as indicated in Box 3. As a rule, in the absence of the caloric uses of electricity, the above-mentioned Lorenz curves display the patterns shown in the chart: the largest imbalances in consumption are observed in the sources with the highest quality (electric power). The highest-quality sources display an asymmetry that is very similar (proximate) to that of income. The respective value of the Gini indices,³¹ which could be used as indicators, can be made to correspond with the Lorenz curves of consumption. If enough information is not available to build this type of indicator, final and useful energy consumption per capita in the residential sector and the level of electric power coverage can be used as close substitutes.

Likewise, indicators focusing on economic and environmental dimensions can be selected. In the case of the political dimension, the indicators are generally qualitative. Box 4 presents a list of indicators that were used in the analysis of the energy situations of the LAC countries, in terms of their contribution to sustainable development, in the previously quoted OLADE-ECLAC-GTZ publication.

As in the case of more general indicators, the selection of those corresponding to the energy sector is aimed at typifying situations that would



³¹ It is obtained by multiplying the area between the diagonal straight line of equidistribution and the corresponding Lorenz curve by two. The Gini index takes values in the interval (0, 1) and the degree of distribution in equality grows as its value grows.

lead to the establishment of patterns that specify and complement those previously identified at the general socioeconomic/environmental level.³²

In this publication, four major patterns as well as variants within some of them (seven groups in all) were identified, as indicated in Box 5.³³ These situation patterns highlight the major positive and negative aspects regarding the contribution of the region's energy systems to the sustainable development of the corresponding countries.

Because these are situations that are characterized by means of vectors with eight dimensions (the values given to the eight indicators), it is not possible to establish ordinal relationships that indicate the relative position of each

Selected energy sustainability indicators							
High sustainability is elated to the following:	Responds to the following objectives:						
ow share of imports in nergy supply	 external supply security sustaining political maneuverability/leverage (high degree of political autonomy) reduction of the risk of imbalances in the balance of payments 						
ow contribution of energy kports to GDP	- stable flow of export earnings - lower share of variable income in the budget - reduction of the risk of imbalances in the balance of payments						
igh GDP per unit of energy	 efficiency in production energy efficiency sufficient financing (owing to the reduction of investment needs in the sector) reduction of energy supply costs sufficient supply (owing to decline in demand) higher air quality (owing to reduction in emissions with local impact) reduction of the emission of gases that have an impact on the climate extension of the durability of nonrenewable sources of energy 						
igh percentage of electrified ouseholds	 diversification of energy mix sufficient supply access to modern and productive energy sources supply of social services 						
ufficient consumption of seful residential energy	- meeting basic needs - diversification of energy mix - sustainable management of firewood						
ow CO ₂ emissions levels	 higher air quality (owing to the reduction of emissions that have a local and regional impact) reduction of gas emissions that have an impact on the climate 						
igh share of renewables in nergy supply	 higher air quality (owing to the reduction of emissions that have a local and regional impact) reduction of gas emissions that have an impact on the climate 						
igh reserves-production atio for fossil energy and rewood t.	 extending the durability of long-term resources long-term supply security maintenance of minimum natural assets 						
	Selected energy High sustainability is elated to the following: w share of imports in ergy supply w contribution of energy ports to GDP gh GDP per unit of energy gh percentage of electrified useholds fficient consumption of eful residential energy w CO2 emissions levels gh share of renewables in ergy supply gh reserves-production cio for fossil energy and wood						

Box 4

³² Furthermore, at this level, the cross comparisons can be complemented by an analysis of the historical evolution of the levels of each country's energy indicators in order to determine if the trends are pointing to greater sustainability or not. In OLADE-ECLAC-GTZ, op. cit. (Chapters II, III, and IV), this type of analysis is provided for the countries of the region.

"On the basis of the classification of the LAC countries, in keeping with the eight indicators mentioned above (Box 3) it was possible to identify seven types of situations, differentiated by important differences in at least two of these indicators. As a result, it was observed that these situations could be grouped under four basic types with subgroups" (OLADE-ECLAC-GTZ, op. cit., page 9).

country. "Classifying countries in terms of a multi-dimensional issue such as sustainable development is a complex task, involving a wide range of value judgments at different levels, which are oftentimes implicit in the selection of indicators, their standardization, their relative valuation, etc."³⁴

Box 6 provides an ordered listing of the countries based on the simple average of the eight indicators considered. Although in extreme situations, which are clearly differentiated, this order can provide correct definitions with respect to the degree of the energy sector's contribution to the sustainable development of the corresponding countries, in other cases, the order that is described in this box should be interpreted with the caution previously indicated.³⁵

2.3.3 General and energy sustainability patterns

When referring to energy sustainability, what is actually meant is the contribution of the energy sector to sustainable development, evaluated in terms of the general dimensions specified in Section 2.2. As a result, it is of the utmost importance to examine the degree of correspondence of the patterns identified at the level of these dimensions (on the basis of the four indicators selected) with the situations typified with respect to the energy sector.

Regarding this, the OLADE-ECLAC-GTZ publication indicates that "Even though a wide number of indicators have been used and various levels have been defined for each one, it has been possible to establish relations between the typical situations that are observed at the socioeconomic-environmental level and those that correspond to the energy sphere so that eight patterns in terms of sustainability can be identified. Nevertheless, linkage of several countries regarding these sustainability patterns does not always turn out to be clear, and a country frequently differs from the typical situation where it has been classified in some of the dimensions considered or two countries linked to the same sustainability pattern differ considerably in some of the indicators considered. Thus, for example, Paraguay (PY) is different from the III-b pattern because of its widespread use of renewables, and Suriname (SR) differs from the IV-d group because of its high genuine saving. Brazil (BR) and Argentina (AR), which have been placed together under the same typical situation, are markedly different in terms of indicators for equity and coverage of basic energy requirements"³⁶ (see Box 7).

2.4 Some conclusions regarding the contribution of the energy system to sustainability³⁷

Despite debates that might arise about the notion of sustainability, the constraints with respect to the identification of indicators that were pointed out (selection of the most suitable to represent the different dimensions of development, amount to be used, concrete construction of these indicators) and their use to typify situations that have a valid differentiated interpretation, there is no doubt that an analysis of the type that has been presented in the previous sections highlights the importance of the ties between the characteristics of the energy systems (and their evolution over time)³⁸ and their contribution to sustainability.

³⁴ Ibid., page 11.

³⁵ "But the relative ranking of Jamaica and Haiti must be explained because it shows the influence of the selection of indicators and their definition and standardization on the results... Jamaica has a better ranking than Haiti in four of the eight indicators whereas, in two indicators, its ranking is the same. Only in terms of emissions and autarky does Jamaica show lower indicators. Evidently, Jamaica's energy system emissions are relatively higher owing to its extensive fuel-consuming power system and to high consumption in its transportation sector. Haiti, despite its higher population, does not have these systems. Regarding the autarky indicator, the fact is that Haiti does not import primary energy products because it does not have financial resources to do so whereas Jamaica is a large importer." (OLADE-ECLAC-GTZ, op. cit., page 11)

³⁶ OLADE-ECLAC-GTZ, op. cit., page 12.

³⁷ This section is based on the contents of the previously quoted OLADE-ECLAC-GTZ publication, pages 12-14.

³⁸ See chapters II, III, and IV, op. cit.

Box 5 Typification of situations and classification of LAC countries in terms of energy sustainability

Situations/Countries		Economy			Equity		Natural Resources		
		energy autariky	soundness	energy productivity	electricity coverage	cove rage of basb need s	environmental purity of energy use	use of enewable energy	durability of fossil resources
	a: VE, TT	hig h	very bw	medium low	high	medium high	medium	bw	hig h
	b: BB	bw	bw	hig h	high	medium low	medium low	bw	bw
II	a CO, MX	hig h	medium high	medium low	medium high	medium	medium high	medium low	hig h
	b: BO, BC, PE	hg h	medium bw	medium low	medium	kw	medium high	medium low	medium low
Ш	AR, CL, BR, UY, PY	hg h	hig h	medium	medium hg h	medium high	high	medium high	medium high
N	a C R, PA, JM	bw	ին ի	medium low	medium high	medium low	medium high	medium low	very bw
	b:GY, SR, NI, CU	medium bw	hig h	bw	medium bw	medium low	medium high	medium	medium low
	C GT, HN, DO, SV, HF, CD	medium high	hig h	bw	kw	bw	medium h gh	bw	very bw

	I. Single (II. Energy a) med b) med III. Countr energy IV. Importi a) med b) med c) low (export countries -exporting cour lium-high electric ies with self-su needs. ng countries wi lium-high cover ium-low covera coverage of ele	s (oil an d products) v tries with: idty coverage pply and with a rela th: age of electricity and ctricity and basic en	with high elec dively low imp basic energy basic energy ergy requirem	tricity coverage. port burden, but varia y requirements requirements ents	ble coverag	e of basic	
Refe	ren ces:							
VE:	Venezue la	π:	Trinitiad & Tobago	BB:	Barbado s	00:	Cobmbia	
MX:	Mexico	BO:	Bolivia	EG:	Ecuador	PE:	Peru	
AR:	Argentina	CL:	Chile	BR:	Brezil	LIY:	Uruguay	
PY:	Paraguay	CR:	CostaRba	PA:	Panama	J M:	J amaic a	
GY:	Guyana	SR:	Suriname	NI:	Niceregue	CU:	Cube	
GT:	Guatemala	HN:	Hond unas	DO:	Dominican Republic	SV:	ElSalvador	
HT:	Hali	GD:	Gienada					



Box 7 Sustainable development patterns and types of energy situations

Patterns	1 11		111	IV	
А	VE, TT, BB				
в			BR, AR, CL, UY, PY		
с		MK, CO		CR, PA, JM	
D		BO, EC, PE		GY, NI, SR, CU	
E/F				GT, HN, DO,SV,GD,HT	

Source: OLADE-ECLA C-GTZ, op. cit.

The indicators presented show that are there are voids and suggest what energy policy priorities should be established for sustainable development. An energy strategy that is compatible with sustainable development assumes the balanced rise of all indicators.

The examples of the region's countries that show the greatest achievements in terms of sustainable development confirm the viability of this approach. "It is possible to further develop the energy systems so that it can become more efficient in terms of productivity, less vulnerable, and more equitable, produce less emissions (regarding this the region is very advanced), use natural resources on the basis of a more balanced approach and with a closer focus on time, and tap renewable energy resources even more extensively. There are actually few conflicts between objectives if it is understood that they can be achieved gradually. In some cases, they can even mutually reinforce each other."³⁹

Nonetheless, there can be conflicts between energy policy instruments used to reach these objectives, as well as unwanted impacts stemming from an instrument designed for a given objective, over the remaining objectives. Thus, for example, the rise of energy prices aimed at reflecting economic costs involved in energy supply (in terms of productive efficiency) generally exerts a positive impact on the allocation of resources and the financing of the corresponding production units; at the same time, it exerts a negative impact on the social dimen-

³⁹ Ibid., pages 12-13.

sion because of its income effect, especially in the poorest strata of the population. But if in this case as in the other, instruments are used flexibly, along with well-oriented compensatory measures, these conflicts can be resolved or considerably mitigated.

It is evident that financing imposes limits on the rapid achievement of objectives such as: greater electric power coverage, broader diversification of energy sources, optimization of renewable sources of energy, higher-quality supply, among others. Nevertheless, in view of the multiple impact of some instruments, the problem of financing to a certain extent becomes relative. Some examples of this type of instrument are: energy integration, which contributes to various sustainable development objectives; rural energy supply, with the suitable involvement of renewables; the adequate use of taxation to enhance energy efficiency, reduce emissions, and collect revenues for the State without necessarily incurring a negative social effect.

Among the regions of the country, there is a wide variety of situations and trends with respect to sustainability: there are some that have made steady improvements over the last 25 years; others were able to improve their situation over the few years; but some, however, have such an unfavorable situation that there seems to be no improvement in view for them. Nevertheless, in all the countries, it is possible to design energy scenarios that are more sustainable in political, economic, social, and environmental terms, that is, scenarios that over the long term can come true with the resources of the country itself.

The major changes implemented in the region's energy systems over the last few years have taken place in the framework of the reforms stemming to a large extent from the breadth and depth of the macroeconomic problems. These economic restructuring processes have emerged as a result of the need to adapt to changes in world economic conditions. In the face of these new world conditions, the permanence of these previous schemes of accumulation in the region is clearly unsustainable. In extreme situations, the most radical changes with the least amount of transition time have been able to take place in specific political situations, marked by a certain dose of authoritarianism. The example of other countries shows that there is also the coordinated approach to achieve changes favoring sustainable development; although it may seem to be slower and, in some cases, painful, it is the most advisable approach.

The impediments usually appear in the transition phase as a result of reforms that are implemented, since these reforms imply adjustments and redistributive effects that in turn require transitory measures to mitigate negative social impacts. The fear of belonging to the group of laggards in the redistribution process oftentimes prevents certain important groups of society from going along with the strategy of change. If sustainable development implies a major change at many social levels, the transition will be more difficult. A major effort of persuasion and coordination is required, including cautious measures and, above all, a stimulation of management decentralization processes, along with the corresponding resources, to ensure the effectiveness of a democratic scheme of living.

The elaboration of policies from the perspective of sustainability should be based on local or regional realities. To the extent that there are highly sustainable situations in cities or regions inside a country, the study of these situations, as well as the policy instruments that turned out to be crucial for the success of these situations, can serve as the groundwork for the elaboration of practical proposals in other cases.

Finally, it should be recalled that the observations that have been made on global indicators do not mean that the most important elements for sustainable development must necessarily focus on, or be limited to, the overall national framework. Quite the contrary, since economic and social development affects human beings concretely (in the same way that the local incidence of the majority of local environmental damage), the approach that is adopted for policymaking should be presented in terms of improving the living space of people. This space is determined by local consumption, production, and distribution styles; in these areas, certain aspects of energy use are evolving in a distressing fashion.

The next chapter provides an analytical assessment of the characteristics of reform processes in the energy systems of the region's. The principal purpose of this analysis is to focus on the additional contributions and/or conditioning factors that the changes that have been

implemented or are underway in the energy systems have brought to improve the sustainable development conditions in these countries.

The last chapter returns to political concepts in order to draw more concrete conclusions regarding these concepts. In addition to objectives, actions or instruments, players and their possible roles are presented more systematically in order to facilitate a sustainable development strategy from an energy perspective.

III. Institutional Arrangements and Sector Coordination Schemes

As indicated in the introduction, this chapter and the following are aimed at describing the principal characteristics of the processes reforming the energy industry of the region's countries. To do this, the most relevant aspects of these characteristics, related to the typologies of new organization and coordination schemes, have been highlighted, in order to show the essential features of the context in which energy policymaking and implementation will have to evolve.

In this analysis, special attention will be focused on aspects directly linked to the energy sector's contribution to and the energy policy measures that affect the achievement of the greater sustainable development of national socioeconomic systems. Likewise, the recent evolution of energy integration processes, their interaction with reform process and their contribution to sustainability will be examined.

The framework of reference begins with a systematization of the institutional characteristics and the resulting coordination schemes.

3.1 Principal aspects of the energy sector restructuring process and institutional arrangements

The energy sector reform process has adopted and combined a wide range of measures. These measures or elements can be encompassed into three groups, which represent the most important dimensions in terms of the sector's institutions:

- a) those affecting the **legal status** of the companies and/or their ownership rights;
- b) those that introduce changes in the productive organization of the sector or some energy chains; and
- c) those that determine the coordination and operation schemes.

Although some of the reform measures or elements simultaneously affect the three dimensions set forth above, a listing of measures, albeit incomplete, in keeping with this classification, can be illustrative. 3.1.1 Legal status of the companies and ownership rights

If it is assumed that the point of departure is characterized by the presence of public enterprises, which are an integral part of the State's administrative and financial apparatus, one can differentiate between the following two sets of measures:

- Measures that modify the legal nature of the companies and/or their rights and obligations, without changing the ownership of the assets. The modification in legal status has generally implied greater autonomy of the companies with respect to the State's administrative apparatus. The change in rights and obligations usually involves the relationships:
 - i) between the State and public enterprises;
 - ii) within the state enterprises themselves; and
 - iii) between public enterprises and third parties (keeping the state enterprise as the core player).
- Measures that involve a change in ownership scheme (sale of assets or privatization), that is:
 - i) partial; and
 - ii) total

It is clear that privatization only represents one of the many modalities of changes in the legal and institutional situation of the sector's companies. In addition, bearing in mind that these changes are only one of the dimensions characterizing the process of change, it is clear that restructuring cannot be viewed as synonymous with privatization.

3.1.2 Productive organization of energy industry

The measures focusing on the legal status of the sector's companies and on ownership rights of these companies can be differentiated from those that modify the company structure of the energy subsector (structural organization of the energy industry), although some of them may be common to both dimensions.

If at the start the structure prevailing during the period prior to the process of change was that of an integrated monopoly, among the measures to be taken to implement the reforms, the following must be included:

- Forms of breakup of the state enterprise
 - Virtual separation of business units and/or effective separation of marginal activities.
 - ii) Vertical breakup of accounting according to the links of the energy chain.
 - iii) Vertical business breakup (strict or weak)
 - iv) Horizontal division of supply in a single link (multiplication of the suppliers in the different links of the energy chains).
 - v) Regional division (by area inside a country).
- Openness to the participation of new companies (players):
 - As third parties for the supply of certain services and products (partial opening) to a single buyer, on the basis of contracts (whether establishing or not mechanisms aimed at introducing some degree of competition in the market).
 - ii) As equals in a competitive scheme due to the dismantling of barriers.
- 3.1.3 Forms of functioning and regulatory framework

The third group of elements characterizing the restructuring process consists of the set of norms setting up the new regulatory framework for the functioning of the sector and/or production chain. The following are included in this group of measures:

• The norms that constitute the institutional framework (institutional organization of the supervisory and regulatory agencies for the

bulk market, of the agency in charge of electric power dispatch, etc.).

- The regulations concerning the obligations and rights of the players (national State, decentralized governments, state institutions, autarkic entities, companies, consumers, etc.).
- Provisions regarding the formation or determination of prices, development investment, etc.
- Issues linked to the supervision and jurisdiction with respect to enforcement of these norms.

The different coordination schemes (presented and described in a subsequent section) generally correspond to different regulatory schemes:

- Command and direct control.
- Negotiated regulation.
- Technical regulation.
- Greater role of market mechanisms through competition.

As will be seen below, each one of the coordination modalities involves certain variants concerning energy policy, especially with respect to the management and determination of prices and investments. Thus, in order to ensure the functioning of the market, the State should restrict its activities to indirect ways of influencing overall supply and demand and prices (for example, using fiscal instruments such as taxes and subsidies), thus adopting a subsidiary function with respect to investment decisions, when investments are essentially managed by private players.

Nevertheless, even in the coordination scheme where market mechanisms prevail, there can be control approaches or direct intervention, especially when referring to environmental policy. In this domain, because of the strong presence of externalities, high transaction costs, and the difficulties in providing a thorough definition of property rights, it is quite clear that the use of market mechanisms is insufficient.
3.1.4 Emerging forms of sector institutions

A classification of measures that constitute the reform process on the basis of the abovementioned dimensions indicates the huge variety of elements that have to be taken into account and underscores the fact that sector reforms should not be considered synonymous or confused with the decision to privatize.

Nevertheless, as indicated, some of the measures belong to more than one dimension or maintain a logical inter-relation through them. Because of this, the combination of measures belonging to the different dimensions define certain strategies that determine the orientation of the process of change. In order to highlight the most significant schemes of each dimension, the following grouping is proposed, based on the previous details:

i) Ownership:	Public, mixed, or pri- vate
ii) Organization:	Monopolistic and inte- grated, partially inte- grated and monopolis- tic, or vertically broken up with different degrees of horizontal breakup.
iii) Functioning:	Command, negotiated regulation, independ- ent and technical regu- lation, and competi-

On the basis of the combination of elements of this typification, it is possible to cover, in an approximate fashion, all the situations that can be observed at present in the energy industry of the countries of LAC.

tion.

3.2 Sector coordination schemes

The reforms introduced in the energy systems of the region's countries involve more or less drastic changes in the coordination scheme of the corresponding production chains. The concept of coordination scheme essentially means the following:

- Forms of organizing institutions and/or coordinating decisions for the allocation of resources in the area of each chain of production and in the energy system as a whole.
- Type of rationale orienting these decisions, that is, the principal ends that are to be reached.
- Scheme used for regulating the functioning of sector markets.

Although it is possible to identify two pure or extreme forms of coordination schemes (centralized command control and market), where there is full internal correspondence between the characteristics indicated in the previous paragraph, concretely speaking there is a wide variety of intermediate situations with respect to the features that are specified in these schemes.

In order to render the concept of coordination schemes operational when applying it to the reforms implemented in the region's countries, in addition to those forms that are pure and extreme, there are two typical intermediate schemes that are especially relevant: the regulated integrated system and the single buyer.

Each one of the above-mentioned coordination schemes is characterized below.

3.2.1 Centralized command and control

The **centralized command and control scheme (CC)** is characterized by exclusive State powers in decision making, based on centralized planning with standard setting and the establishment of political priorities for its implementation by state enterprises.

Historically, this scheme arose as a result of the previous restructuring of the world economy at the end of the Second World War, which led to the so-called golden age of growth. This scheme gradually prevailed in almost all the countries and, in many of them, it was a consequence of the reconstruction and development process that had been undertaken. The need to speed up these processes, high capital intensity, the widespread presence of economies of scale, and the little interest displayed by private players in this type of investment were the factors that led to a consensus regarding the advisability of entrusting the State with the management of the energy industry.⁴⁰ In the case of hydrocarbons, the government's appropriation of revenues coming from natural resources was an element that was in keeping with nationalization and state control.

In this scheme, political outlooks determined the decisions taken for the allocation of resources (investments for expansion, territorial occupancy) and even for the pricing policy. These decisions are directly determined by the government's general objectives, especially sector promotion and/or regional development purposes.

In addition, in this coordination scheme, regulatory standards are generally limited to the establishment of institutional barriers to outside participation, the specification of certain technical characteristics for the sector's goods and services, and the establishment of responsibilities within the State's own apparatus.

Throughout this period, when the models for the accumulation of wealth laid out right after the Second World War were fully in force, the state-owned enterprises of the energy sector were clearly an instrument for growth and development. The accumulation crises that started appearing in the industrialized countries at the end of the sixties and the notable financial difficulties that were experienced by the developing countries (especially those of LAC) during the eighties, started eroding the consensus about the implementation of the CC scheme.

The process of change started to become apparent when the legal status of state enterprises was reconverted; this involved decentralization of the State's administrative status, although without changing the ownership scheme. By assuming a business approach, the companies acquired greater decision-making autonomy and greater responsibilities in the management process. The decisions are based on a more commercial rationale or orientation, which in turn restrains government interference in price-setting and investment decisions.⁴¹

With this legal and institutional reconversion, a new situation arose in terms of coordination, with characteristics that were qualitatively different from the stringent centralized command and control scheme. Nevertheless, in order to avoid an excessive enlargement of the typification of the coordination schemes, it will not be considered here as a change of scheme.

3.2.2 The single buyer

The **single buyer (SB)** scheme is typical of a situation that permits the incorporation (in an energy production chain) of private enterprises as third parties, in charge of producing and delivering energy products to the integrated state enterprise, which would be acting as the single buyer. This scheme is also known as *par tial opening up*.

⁴⁰ The favorable assumptions that fostered a preference for this scheme were as follows:

[•] guaranteeing domestic energy supply and, at the same time, proposing a wide range of socioeconomic objectives, viewing energy supply as a public service that is strategic and which should be guaranteed by the State;

[•] facilitating revenue taking by the State in countries with an abundance of natural energy resources;

[•] maintaining strategic control over energy resources using a national defense approach;

facilitating optimization in the use of resources (capital, energy, human) on the basis of a planning, eventually
comprehensive, of sector development, especially permitting the tapping of economies of scale and scope.
 All of these factors made it seem that the widespread presence of integrated state monopolies was the most suitable

solution.
 ⁴¹ In various countries of the region, the business orientation of state enterprises is not a novelty introduced by the reform

⁴¹ In various countries of the region, the business orientation of state enterprises is not a novelty introduced by the reform process. Although they continued to be in the hands of the State, many oil companies were "incorporated" many years ago. Likewise, albeit less frequently, some state power utilities enjoyed a certain independence in various countries and were governed more by commercial objectives than purely political purposes. In some cases, the utilities reached such a high degree of autonomy that sector authorities were unable to keep a tight control over them. Nevertheless, political supremacy was maintained as a result of their direct subordination to the executive branch of government.

Thus, the segments of activity that are added on to the realm of integrated public monopolies maintain a CC scheme. Nevertheless, a new sector is introduced, one comprised of private companies in charge of making investment decisions in the framework of contracts negotiated with the State. The degree of freedom on the characteristics of the investment may vary according to the terms of reference established by the State. If the participation of third parties is based on bidding processes, then the scheme has evolved toward a system where there is competition for a specific market. The State can determine the terms of the business, which can more or less be in keeping with market conditions and, in most cases, it can provide some kind of security so that the business will be attractive.

Thus, the growing and significant presence of private-sector players involves a change, at least partial, in the rationale that governs the CC scheme. The private players incorporated into the system combine their interest in earning profits with that of minimizing risk; as a result, they need to guarantee certain conditions of profitability.

In this case, it is also necessary to modify the regulatory framework in order to establish the conditions for entry and the rights and obligations of the new actors with respect to their participation in the corresponding energy production chain.

3.2.3 Regulated integrated structure scheme

As for a **regulated integrated structure scheme (RI)**, there is greater autonomy for the privately owned companies, mixed enterprises, or public entities under provincial or municipal jurisdiction. The State assumes the role of regulator, whereby it can given priority to technical and economic considerations, but always maintaining a certain amount of political considerations. This scheme is characterized by the absence of disputability on the markets. The State effectively participates in investment decisions and in price formation.

3.2.4 Market coordination scheme

The scheme whereby the effects of competition between markets are fully tapped is characterized as an open market scheme (OM). To do this, changes in the structure of production and institutional organization and in regulatory principles must generate conditions of disputability. In the case of energy products carried and distributed by means of networks, such as electricity and natural gas, there must be a strict separation and incompatibility of functions, as well as enforcement of the regulatory principle of free access to these installations in order to avoid discrimination. In some cases, vertical integration is allowed to remain, but with the provision that there be a virtual (accounting) separation and bidding process mechanisms in the transactions. Regarding the links that continue to have natural monopoly characteristics (transport, distribution), there is a regulation based on technical and economic criteria and with certain rules that promote, to the extent possible, disputability (commercial bypass, competition via markets, competition via comparison or reference).

In this scheme, investment decisions are taken in a decentralized fashion by the many participating players, and they are coordinated through the market except for the transmission and distribution functions, where regulation prevails.

It is important to emphasize that the open market scheme does not necessarily imply the existence of atomized markets in the supply sector or behaviors that are close to the idea of per fect competition. This scheme also includes markets that are characterized as oligopolistic that are more or less concentrated, where there can eventually be bids between suppliers to take over increasingly large areas of corresponding markets. According to the modern theory of oligopolies, even in the case of standardized products, suppliers are not used to embarking on "price wars" but rather follow the lead of the largest company in setting prices. Where products are differentiated (for example, fuels and

Box 8 Characteristics of contestable markets*

The theory of contestable markets emerged in the United States at the end of the seventies and early eighties. According to its principal authors, this theory sought to generalize the neoclassical model regarding perfect competition when there are industries with growing yields on a large scale, which therefore display monopolistic and oligopolistic structures. If the markets of these industries were perfectly contestable, then (despite the presence of monopolies and oligopolies) there would be conditions for the free play of market forces to allocate resources optimally (as in perfect competition). Contestability assumes that effective competition on the market is complemented by potential competition: the threat of the potential competitor imposes discipline on the behavior of the company(ies) present on the market.

An especially important question is that this contribution is at the same time a theory for industrial structure and introduces a new concept for economic efficiency: structural efficiency. It is said that an industrial structure is efficient if it minimizes the costs of production required to supply demand.

Market availability: The basic idea of contestability is that a market may be vulnerable to competitive forces although it is characterized by a monopolistic or oligopolistic situation. In other words, if the companies that are on the market are technically inefficient, set excessively high prices for their products or somehow exploit consumers, the successful entry of competitors is possible. As a result, contestable markets should be characterized by free and easy entry and exit so that potential competition is sufficient to impose discipline on the behavior of oligopolistic or monopolistic firms on the market.

A market is said to be perfectly contestable if it has the following properties:

- 1) Companies that are potential incomers have access to the same set of production techniques and market demands as those that are available for companies on the market.
- 2) There are no legal constraints for market entry or exit, nor are there any special costs that the incomer should pay or that should be covered by the companies on the market. In other words, the technology used can imply economies of scale but does not necessarily require sunk costs.
- 3) The companies present in the market can only modify their prices within a certain period of delay (noninstantaneous reaction), but consumers respond immediately to the difference in prices.

Indirectly these conditions assume that the entire capital required by the potential incomers are available in cash and that it can be displaced rapidly from industry to industry. This means that there are highly developed markets for "leasing" or re-sale of capital equipment so that the liquidity of capital can be recovered quickly, without incurring any loss of value. In these circumstances, a company can enter into a monopolistic or oligopolistic market if it hopes to obtain profits setting prices that are lower than those set by current companies and meeting a part of the demand that was met until then by these companies. If the companies that previously occupied the market adjust their prices, in reaction to a new competition, then the company that has recently entered can leave the market quickly without the loss that could lead to any type of sunk costs. In these conditions, economies of scale do not constitute barriers to entry. If the technology that characterizes the industry involves sunk costs, then these costs will become a barrier to entry because they will have to be addressed by the potential incomer but will not have to be paid once again by the company(ies) already present on the market.

Sunk costs are those that cannot be recovered, or at least not rapidly. For example, investment costs for the transmission or distribution networks in an electric power system and the tracks of a railway system are examples of this kind of cost. These are investments that cannot be transformed easily and rapidly in cash, although they continue to have the value of the capital that was initially invested.

Contestability and regulation: The principal criterion for the contestable market theory is the absence of the need for, or the inadvisability of, regulation on markets that are contestable, especially if the regulation constitutes a legal barrier to the free entry of new firms into the industry being considered. It is clear, however, that in those industries characterized by the presence of monopolies or oligopolies, whose markets are not contestable, regulation turns out to be indispensable as an instrument to promote greater welfare. Of course, perfect contestability does not exist in real markets; nevertheless, in those markets whose goods are tradable, this contestability comes from imports. In addition, the State can create approximate contestability conditions on certain markets through institutional and regulatory measures.

^{*} For a more detailed presentation of this topic, see Pistonesi, H., "Elementos de la Teoría Económica de la Regulación", IDEE/FB, Bariloche, 1998.

Table 1 Coordination schemes stemming from the alternatives chosen with respect to ownership and structural and functional organization of the energy subsectors

Production Structure (Ventbal Integration)	rtegrated Monopoly			Parial Breakup	Breakup	Strid Breakup	
	. Part of	Part of Incorporated M		Public or private (upstreem)			
Ownership	the State	state company	private	Public or mixed (downstream)	Private, mixed or public		
Functioning (Fundamental Principle)	Mandatory control	Control Ceit ain business aut onomy	Neg cliated regulation	Centralized control and neg of lated regulation Competition for the contract market	Competit there is o and regulat canno (natural m Independent ent	ion where ontestability tion where it staxist tonopolies) tragulatory ities	
Resulting Coordination Scheme	Centralized control (CC)		Regulated integrated (RI)	Single buyer (SB)	Oper compet	n market ition (OM)	

lubricants), the objective of expanding their portion of the market is sought by highlighting the differences of the products by promoting brand names (in the example being given here, this would involve service stations with the name of refinery, brands and innovations in the design and quality of some products). In the best of cases, they oligopolistic markets can be "disputable" (see Box 8) as result of potentially threatening competition (a typical example consists of national oil markets where there are various players in refining).

In addition, this scheme also includes the situation of those energy industries that, in some of their links, are characterized as nondisputable natural monopolies; if in other links of the same chain there are markets that have no entry and exit barriers, resource allocation decisions respond to decentralized decisions by supply players, and there is the opportunity for market mechanisms to exert pressure on the setting of prices (including those cases in which this part of the market has been built by means of regulatory norms).

3.3 Combinations: coordination schemes and institutional arrangements

Table 1 provides the most typical combinations in Latin America and the Caribbean among coordination schemes and the other elements of the reform process (legal status and ownership rights; productive and institutional organization; control and regulation).

IV. Recent Energy Reform Processes in Latin America

4.1 Economic reforms and energy system reforms

4.1.1 Economic reforms as framework

The long-lasting crisis affecting the countries of the region in the eighties, the high external debt, and the new conditions that were emerging in the world as of the seventies were decisive to promote structural reforms in the economies of LAC. As a rule, adjustments were required to ensure the viability of the accumulation process under these new conditions, strongly influenced by neoliberal doctrines.

The transformations introduced in the energy industry are part of these structural reforms of the region's economies. Nevertheless, as indicated below, the implementation of these reforms did not have the same scope, depth, and pace in all the countries. The transformations implemented in the energy systems also show a great variety, even though they responded to common general orientations.

The principal axes of economic reforms were the following:

- Reordering of public accounts in order to reduce the deficit and even to achieve a primary surplus that will help to ensure external debt service.
- Reduction of the degree of discretionality of the governments in the management of monetary emission, giving greater autonomy to central banks.
- External liberalization of economies and greater discipline in managing exchange rate changes. This greater openness also implies the free movement of financial capital.
- Revitalization of subregional integration processes, achieved by the widespread policy of unilateral openness.

- Deregulation of domestic goods and services markets. In particular, this deregulation intends to attract foreign investment.
- Less discretionality in the management of public service prices, especially energy prices, with attempts to adjust prices in line with cost criteria.
- More or less drastic change in the role of the State, including its withdrawal from business functions and focusing its attention on specific activities (health, education, security, defense, etc.) and regulatory and monitoring functions.
- Sale of the assets of state-owned enterprises (divestiture) and improvement of the management of those that remain in the hands of the State.

All of these structural changes in the economy had different degrees of intensity, depending on the starting point of each individual country.

In any case, it is clear that the framework conditions in which energy sector reforms were promoted were an essential element of the process, especially with respect to the schemes established for the functioning and the ways of promoting private-sector participation. The level of economic development and natural and human resource endowment have also been fundamental conditioning aspects. Therefore, it is possible to distinguish several preliminary patterns of linkage between the conditions established by the reforms in the economy and energy system restructuring.

In some countries, the viability of macroeconomic stabilization plans required the rapid start-up of profound, wide-ranging reforms in the respective energy systems (encompassing the oil, natural gas, and electricity production chains). Nevertheless, even within this set of cases, the speed of implementation and the schemes for this implementation were quite different. In the most extreme situations, energy industry restructuring meant a profound reorganization of both production and related institutions, a radical change in regulatory principles and the massive transfer of the assets of stateowned enterprises, all of which occurred over a brief three- or four-year period.

In contrast, in certain countries, energy reforms involved longer periods of implementation (although not necessarily coinciding chronological periods) and were promoted more for ideologically oriented reasons or to ensure the specific performance of one of the production chains than for urgent global economic reasons. In these cases, the deepest changes focused on electric power systems and eventually on natural gas transport and/or distribution. In other cases, despite severe macroeconomic disequilibria, energy reforms faced serious implementation difficulties and displayed progress and setbacks owing to the opposition of political and social groups.

Finally, another set of countries can be identified; in this group, beyond the different degree of intensity of economic difficulties, the process of energy industry change was only partially initiated and/or started up with a great deal of delay. In some countries of the Caribbean, the preexisting participation of private-sector players limited the scope of the reforms (especially in the electric power systems). In other cases, the political will to maintain state monopolies and/or to keep natural energy resources in the hands of the State prevailed. For the principal oil-exporting countries, this policy orientation was not only due to the intention of ensuring control of the State over revenues stemming from these resources but also due to the interest in keeping control over the country's principal source of foreign currency earnings, owing to their macroeconomic repercussions.

In any case, the general orientation that prevailed with respect to reforms of the region's economies involved changes in the functions of the State, a greater role granted to market mechanisms, and increasingly larger role of privatesector players in resource allocation decisions. As a rule, the intensity of these changes was reflected clearly in the restructuring of energy industries, beyond the specific schemes applied for implementing this restructuring.

The assistance and conditionality imposed by multilateral credit institutions for renegotiating the external debt of the region's countries, as well as the abundance of capital available on international financial markets at the start of the nineties, were decisive factors favoring the general orientations of the reforms.

Deregulation of markets for tradable energy, the openness to the participation of private investors in the production of oil and gas resources, and the introduction of market mechanisms into energy industry, linked to transport and distribution networks, were the principal elements of the general scheme being promoted by multilateral credit organizations, in keeping with the structural reforms promoted at the overall economic level.

The abundant availability of capital on international financial markets at the start of the nineties and the severe financial difficulties being experienced by the public sector of the region's countries since the early eighties to address the need for investments in the energy sector were also factors that led to the liberalization of the sector's industries.

4.1.2 Outstanding features of the interaction between general economic reforms and restructuring of energy systems

As indicated earlier, despite the diversity in terms of scope, depth, and speed of implementation, economic and energy reform processes showed orientations that were, in general, quite similar.

4.1.2.1 Reform of the State and decentralization of decision making

The economic restructuring process in the countries of Latin America and the Caribbean has implied a redefinition of the roles of the State and market, in terms of coordination and implementation schemes for resource allocation decision making.

On the one hand, this process has tended to give priority to the use of market forces as the most suitable instrument for coordinating resource allocation decisions and, in any case, has promoted a far more decentralized decisionmaking scheme, not only for the economy as a whole but also for energy production activities.

On the other hand, the reform covers not only the structure of the State and its policy implementation functions but also all activities involved in the production of goods and services that belong to the public sector, encompassing in particular those areas that were previously considered strategic.

The new model also involves a different "division of labor" between the State and the private sector. In this new model, the State is starting to perform a predominantly supplementary or subsidiary role with respect to private-sector activities, while taking over monitoring and regulatory activities. Thus, albeit at different degrees depending on the country, the State has abandoned its business role and has limited its actions to these new functions, although they have not always been clearly defined in terms of their scope. In particular, the mechanisms aimed at monitoring monopolistic practices in the new scenario are still very weak and even nonexistent.

Alongside this, the relationship between the central government and local governments has also been modified. The growing involvement of other groups of society in controlling or discussing concerns of public interest has been observed. Nevertheless, these latter forms of participation are only now beginning to be developed and therefore their channels of communication are not well structured. In the energy sector, as in other areas of activity, an explicit regulatory system has been established, whether to determine the limits for the free play of market forces or to replace them when it is deemed that they will not lead to satisfactory or acceptable results from the standpoint of the community as a whole. These new regulatory

schemes have been gradually implemented with the establishment of institutions, with different degrees of autonomy, from the executive branch of government.

4.1.2.2 Economic reforms and their impacts on the energy sector

The process of change in economic systems has been implemented by means of the introduction of new schemes for macroeconomic functioning and the corresponding structural reforms.

Among the macroeconomic and structural reforms elements that affected the energy sector, the following are noteworthy:

- Profound change in the relationship between the State and public enterprises in the sector, owing to the need of tackling fiscal problems and adjusting or redefining the functions of the State itself.
- Processes for the privatization of state-owned enterprises.
- Trade liberalization, deregulation of markets for goods and services, liberalization of financial flows and the unrestricted openness to foreign investment.

Although general macroeconomic and structural reforms involved transformations in the energy sector, it is not possible to distinguish a typical pattern in terms of scheme, scope or time sequence of these reforms, whether for the macroeconomic or the energy sector. Although there is a general common orientation to the reforms carried out in the countries of Latin America and the Caribbean, there is a wide variety of specific schemes for their implementation.

4.1.2.3 Specific motivations of energy sector reform

The need to adjust the structure and functioning of the region's economic systems to the new world context, which became apparent as a result of the crisis of the eighties, was the principal driving force behind the reforms. The previous growth and development model for the region's countries was no longer sustainable, especially owing to the State's inability to secure the necessary financing to support this scheme. Thus, restructuring of energy sector production activities arose principally from the requirement of adapting their management to general economic transformations.

As a result, it can be said that, in general, energy sector reforms have been subordinate to the modernization of economic systems. Although it can also be said that restructuring, especially the sale of state-owned assets, had certain microeconomic objectives, such as upgrading efficiency and expanding the range and quality of services offered, the fundamental motivation of this was to reach macroeconomic objectives.⁴² Among the arguments that were set forth to justify the need for reforms and their advisability, the following are noteworthy:

- Reduction of public sector indebtedness needs as a result of the resources obtained from privatization over the short and long terms, unburdening the public sector from its operating deficits and investment needs of state-owned enterprises.
- Improving the balance of payments situation. Apart from the previously mentioned microeconomic objectives, the sale of State assets was essentially motivated by the goal of reducing the external debt and securing a larger amount of foreign currency.
- Promoting macroeconomic stability, especially as a result of the two preceding impacts.
- Increasing investments with a larger contribution of private-sector players and promoting the development of local capital markets.
- Incentives for competition through deregulation of market operations, in order to achieve greater efficiency in production and improve the economy's external competitiveness.

In keeping with these overall purposes, sector objectives, especially greater operating efficiency, were also defined.

4.1.2.4 Greater symmetry between energy policies and macroeconomic policies

As a result of the reforms, there is at present a greater balance between energy sector functioning schemes and macroeconomic policy. In the previous experience, a certain subordination of the sector to objectives that were not always clearly defined was observed. The new situation, on the other hand, has been characterized up to now by a notable weakening of the role assigned to public policy.

In macroeconomic terms, the reforms are also geared to reducing fiscal deficits; this coincides with the need for energy company management to adopt a business approach to ensure financial viability and greater efficiency of production:

- Greater self-financing capacity facilitates supply expansion, with higher investment and improvements in supply quality, factors that are equally important for competitiveness and for sufficient coverage of the population's needs. Nevertheless, it is clear that a rationale driven by the search for extraordinary profits could turn out to be opposed to this goal, undermining sustainability of social achievements.
- Dropping the practice of widespread, indiscriminate subsidies not only enables the economy to reduce its burden on the public sector, it also increases incentives for the rational use of energy in the framework of a better allocation of resources. Negative social impacts could be minimized by the establishment of highly focused and transparent subsidies, based on the subsidiary role of the State, separate from the business management of the energy activity considered. Nevertheless, if this new subsidy scheme does not materialize with its due insertion in a regulatory framework, with clear provisions

⁴² See IDB, Economic and Social Progress in Latin America: 1996 Report, Washington, D.C., November 1996.

indicating the origin of the funds, there is a risk that it will simply become a mere rhetorical formulation.

• The opportunities for developing the sector, in addition to facilitating the expansion of energy supply, are capable of attracting foreign investors and encouraging the repatriation of national capital. As a result they will contribute, at least over the short term, to improving the balance of payments. In addition, the possibility for savers and investment funds to make placements with a profitability that is more or less secure in some of the least-risk energy activities, will promote the development of local capital markets.

4.2 Transformation of national energy systems: changes in coordination schemes and new institutional arrangements

Energy system reforms in Latin America and the Caribbean involved significant changes in the centralized command and control scheme or required that the sector switch to a different coordination scheme. When there is a process aimed at carrying out deep reforms, the CC scheme, when shifting to an OM system, requires total liberalization. If the single buyer system is maintained, then there is only partial or limited opening up.

Even when the general orientation of the energy industry transformation process is characterized by favoring market mechanisms, the decentralization of resource allocation decision making and the broader participation of private players, as well as the diversity of courses adopted observed in the above-mentioned processes in the energy systems of the region, respond both to conditions of the context (economic, political) prevailing in the countries and to the specific characteristics inherent to the different production chains of the sector. 4.2.1 Specific characteristics of energy production chains

In the case of electricity and natural gas, which are deemed to be nontradable commodities (owing to the need for networks/grids for their transport and distribution), the introduction of a market mechanism implies a complex process of institutional and regulatory building. As observed in Table 1, in these cases the introduction of disputability requires a vertical breakup of three major processes (production or generation, transport, and distribution), strict incompatibility in the management of these functions, and the principle of free access to networks by third parties. The horizontal breakup of production or generation and distribution links is also necessary if some degree of competition in the corresponding markets is to be promoted.

In the case of electricity alone, owing to technological concerns and the prevailing rationale among potential private-sector players (high rates of return and rapid recovery of investment), the availability of low-cost natural gas is also a conditioning factor for contestability on the power generation market.⁴³

As for the natural gas chain, the possibility of competition is severely limited owing to the small number of players normally working in production. The sparse network of gas line systems is another factor constraining the promotion of competition.

In the oil chain, a vertical breakup is not required to promote competition. Quite the contrary, the prevailing trend in business strategies is to achieve greater integration of national and international activities. The openness to import possibilities turns out to be essential for contestability on the crude oil market. The situation on the markets for oil products, however, is different. First of all, in contrast to the international oil market, the one for oil products is much less significant. What is more important,

⁴³ Possibility of using high-efficiency equipment even on a small scale (open-cycle gas turbines and, especially, combined cycle turbine).

however, is the nontradable nature of distribution and marketing services/channels (brand name service stations, storage facilities), controlled by current players (refineries), decisively limit the possibility for potential competition of imports. Furthermore, the presence of economies of scale in the refining link has kept the number of players on the market very small. In general, there is an oligopolistic, or even monopolistic, market; therefore, the possibility for collusion under one leading company or a company with absolute control is quite high. Because of this, in the absence of a state-owned enterprise that can facilitate protecting the interests of society, regulation is an indispensable instrument to carry out this task.

Therefore, the typification of situations presented in Table 1 does not necessarily involve placing the energy industries of a given country in the same category, either because of the specific characteristics mentioned earlier that are inherent to each production chain or because the context conditions imply the adoption of different courses for the transformation of these chains.

4.2.2 The courses adopted by the reform process

4.2.2.1 Reforms in the electric power systems

Before the reforms, the electric power systems of almost all the countries of LAC are characterized by the exclusive or high predominant presence of public enterprises.⁴⁴ In general terms, these utilities were vertically integrated and a high concentration was observed (concentrated monopoly or oligopoly) in large-scale generation and transmission. In some countries, however, distribution was more decentralized (public utilities of states, departments, or provinces). In any case, the global management of systems was subject, in general, to central control by the national or federal State: tariffsetting and investment decisions were centrally managed, and the rationale was determined by promotion and development objectives, although other short-term political purposes intervened (fiscal, monetary, political party objectives).

Therefore, it can be asserted that, in the situations prior to the reforms, there was a clear prevalence of the command and control scheme for the coordination of electric power system operation and expansion in the region.

Despite the previously mentioned diversity of reform processes, with respect to the speed of implementation and the scope of the reforms, certain characteristic patterns in the courses (pathways) adopted by the different countries can be observed.

Chart 1 provides a schematic outline of the orientations prevailing among the reforms implemented in the electric power systems of the region.⁴⁵ In this chart, the general tendency to give priority to the introduction of market mechanisms (OM scheme, with total or partial transfer of assets to the private sector) or the maintenance of integrated public enterprises (with greater autonomy and a more business orientation), with openness to private-sector players and new regulatory approaches (IR or single buyer scheme) is highlighted. There are very few situations where there have been no substantial changes either in the coordination scheme or the ownership of assets.⁴⁶

In general terms, the predominant trend is toward the abandonment of the centralized command and control scheme. From the standpoint of regulatory norms, even in the case of Mexico, there is the possibility of permitting the entry of independent generators, although in practice this partial liberalization is still not significant. Nevertheless, in the future, it can be expected that both Mexico and Cuba will be shifting their electric power systems toward situation (c).

⁴⁴ Only in some countries of the Caribbean are there private enterprises that are vertically integrated, regulated according to the Anglo-Saxon tradition.

⁴⁵ The thickness of the segments that are oriented indicates the magnitude of the frequency of the cases and the broken lines attempt to represent the courses expected for the future. It should be emphasized that the shaded grid area of the chart is only one matrix comprised, in its boxes, of different qualitative situations.

 $^{^{\}rm 46}$ Situations indicated with a loop (curled arrow) in boxes (a) and (g).

Furthermore, it is quite likely that, for various countries that are already in the latter situation, the partial opening up that is carried out is only an intermediate step toward greater private-sector participation and toward an even greater role on the market. Nevertheless, in the countries located in situation (c), contestability in the generation sector is severely constrained by the absolute size of the market. The shift toward situation (e) in the case of this grouping is only applicable to the Central American countries, when they have achieved fuller integration of their electric power systems, as well as compatibility of their regulatory frameworks. In view of the regulatory frameworks that they have already enacted, Venezuela, Brazil, Ecuador, and Costa Rica should be placed in situation (e). Nevertheless, albeit with different degrees, institutional transformation is not yet complete and market actions are still insignificant. In other words, the placement of the coun tries in the different boxes was determined pre dominantly by the real situation prevailing at the end of 1999, with the broken-lined arrows indicating the courses that are expected in the future on the basis of regulatory standards already in force.

Chart 1 Evolution of reform processes in electric power systems

Private	Vertical Breakup with Incompatibility of Functions				(h) Argentina (***) Bolivia(**) Guatemala(*)
Ownership	Vertical Integration Permitted		(g) Barbados Grenada	$\mathbf{/}$	(f) Chile(**) Peru(**) El Salvador(**)
Mixed Ownership o Partial Partic of Private Se	r ipation ctor		(d) Venezuela Brazil Costa Rica Ecuador		(e) (*) Colombia(**) Panama(**)
Exclusive State Proper	¢.	(a) Mexico	(b) Uruguay Paraguay Haiti	(C) Suriname Guyana Nicaragua Jamaica Honduras T & Tobago Dominican R.	

Centralized	Regulated	Single	Open
Control	Integrated	Buyer	Market

Probable fu ture courses pathways

With or without strict vertical breakup (incompatibility of functions)

with or without strict vehical breakup (incompatibility of func

With weak horizontal breakup

With strong horizontal breakup

The diversity indicated in boxes (e), (f), and (h) depends mainly on the degree of contestability introduced by the reforms, expressed in terms of its materialization or not, a strict vertical breakup, a more or less market horizontal partition, and real transparence in transactions.

4.2.2.2 Reforms in the natural gas industry

Except for Argentina, Venezuela, Mexico, Trinidad and Tobago, and, to a lesser extent, Bolivia⁴⁷ and Colombia,⁴⁸ natural gas markets are only beginning to be developed in the region. Nevertheless, only in Argentina has this source of energy been able to penetrate considerably the residential sector and, therefore, to foster a much more mature development of the market.⁴⁹

In the remaining countries that have significant reserves of natural gas (Brazil, Peru, and Bolivia),⁵⁰ development of the natural gas industry has not as yet been promoted significantly. In the case of Bolivia, there are various important export projects, whether natural gas directly or electricity generated using this fuel as feedstock. As indicated below, the prospects for natural gas are among the most promising for energy integration in the region (Southern Cone, Venezuela-Colombia; toward Central America or Ecuador, and Mexico-Central America). In addition to the advantages stemming from the use of this fuel for residential use, in the services sector and in industry, its contribution to contestability on electric power generation markets has been underscored.

As in the remaining energy chains, the CC coordination scheme was predominant in the natural gas industry of the region's countries. In general terms and owing to the specific characteristics of the gas chains, the reforms introduced into these chains followed guidelines that were similar to those applied in the upstream activities of the petroleum sector and to those in the downstream activities of the electric power chain.

Chart 2 presents schematically the most typical courses of gas reforms in the downstream sector.⁵¹ In the case of Argentina, in view of the general orientation applied in the restructuring of its economy, the reform of its energy system, and the advanced development of its natural gas industry, it was determined that it displayed a type **(a)-(d)** pathway, in other words, an OM scheme was adopted with vertical breakup and horizontal partition. Nevertheless, competition in the market was limited by the previously indicated factors⁵² (high concentration in supply, radial-type gas line system) to which must be added a lack of transparence in the bulk market (including large users).

The **(a)-(c)** situation corresponds to Mexico and Bolivia. In Mexico, there was an opening up to private-sector participation in downstream activities, with upstream activities remaining in the hands of the state monopoly. Nevertheless, imports from the United States (especially aimed at ensuring supplies to industrial activities located on the country's northern border) has led to the emergence of spheres of activity where market mechanisms are in place. In Bolivia, there are already highly developed projects for the export of gas, with the construction and operation of the corresponding gas pipelines in the hands of extra-national consortiums.

The **(a)-(b)** course is close to the situations of Venezuela, Trinidad and Tobago, Colombia, Brazil, and Chile. In the case of Venezuela, it is because of the liberalization of upstream activities and the eventual appearance of private-sector projects in transport activities. In Brazil, it is mainly because of potential import projects. In the case of Colombia, there is private-sector

⁴⁷ In this country, major hydrocarbons deposits have been discovered in the south.

⁴⁸ In the early nineties, this country has promoted a policy aimed at ensuring the mass consumption of natural gas and the market of this energy product is expanding substantially.

⁴⁹ In Mexico, Venezuela, and Trinidad and Tobago, the destination of natural gas is industrial use, power stations (Mexico and Venezuela), and non-energy consumption (T&T).

⁵⁰ Countries to which Chile and Ecuador could be added, although their resource availability is much more limited.

⁵¹ Subject to the same qualitative interpretation that has been pointed out for the case of electric power.

⁵² Section 1.4.1.



Chart 2 Evolution of reform process in downstream activities of the natural gas industry

involvement in the three links of the gas chain, along with state-owned enterprises, and in the main system (central zone), the vertical breakup of processes was promoted. Nevertheless, the action of market mechanisms is still seriously limited owing to the incipient development of industry (especially in the above-mentioned zone) and owing to pre-existing contracts at the start of reforms in the upstream sector.⁵³

It can be expected that part of the countries that are on this course (Colombia, Brazil) will eventually and gradually be headed toward situation (c). Even Chile could be placed in this situation.

4.2.2.3 Reforms in the oil industry

Changes promoted in the oil and products production chains responded to different criteria, depending on the magnitude of available reserves and the size of the domestic market. The orientations of the reforms applied in upstream and downstream activities were also different.

Chart 3a, which also includes natural gas, provides the most typical courses in upstream activities.⁵⁴ In this case, the concepts that are indicated to typify the various situations differ from those used for gas and electricity, owing to the specific characteristics of oil production

^(*) With strid vertical breakup (incompatibility of functions) (**) With weak horizontal breakup

⁵³ It is expected that the free functioning of the bulk market will be fully in force around the year 2005. Nevertheless, because of the high concentration of natural gas supply it is envisaged that competition will be very limited.

⁵⁴ See V. Bravo, "Modernization in the oil sector of Latin America," IDEE/FB, Bariloche, 1999.

activities. Although the indication of the coordination schemes is kept, it is more relevant to focus on the contracting forms used to concretize liberalization and whether the product is available on the open market or not.

The extreme cases pertaining to the pathways that adopted the reforms (in both the upstream and downstream sectors) are those corresponding to Argentina⁵⁵ and Mexico. Whereas in the first of these two countries, total privatization of the oil industry was undertaken,⁵⁶ shifting from a CC scheme (with the presence of private contractors in the production stage)⁵⁷ to another of total market deregulation (in both upstream and downstream activities); in the second, the totally integrated state monopoly and the centralized command and control coordination scheme were maintained.⁵⁸

In intermediate situations, in upstream activities, the predominant courses of the reforms have been (a)-(b) and (a)-(c). The first of these courses, which assumes that the integrated state enterprise is kept and that there is a regulated liberalization permitting the participation of private-sector players, corresponds approximately to the cases of Venezuela, Chile, Cuba, Trinidad and Tobago, and Barbados. The second also implies the permanence of the integrated state enterprise and the presence of private players, with a growing role for market mechanisms.

The pattern emerging from the reforms implemented in the oil industry in Peru and Bolivia corresponds to a pathway plotted as **(a)**-**(b)..(d)**; in other words, the current placement in situation **(b)** is only a transitory status and public authorities have set as their ultimate goal total privatization of assets and the full validity of market mechanisms (situation (d)). Nevertheless, this course differs qualitatively from the one adopted in Argentina, especially owing to the vertical breakup of the industrial processes that were promoted in Peru and Bolivia.

In downstream activities, the courses are far more diverse (Chart 3b), owing to a large extent to the presence of the corresponding activities in a larger number of countries of the region and the different treatment applied to crude oil refining processes and the marketing of oil products.

Only in the cases of Mexico and Cuba is there a clear political intention to keep the CC scheme and exclusive public ownership with respect to both processes (situation (a)). In Costa Rica, Paraguay, Trinidad and Tobago, Uruguay, and Venezuela, these characteristics are only applicable to refining activities (situation (a)), with private-sector players being allowed to participate in the marketing of oil products under a price regulation scheme.

In a significant amount of countries, the predominant course has implied the liberalization of refining and marketing processes to permit the involvement of the private sector.

In some cases, limited liberalization has been promoted, with the state company remaining in the refining sector (Brazil, Colombia,⁵⁹ Chile, Ecuador) and with a scheme for the regulatory intervention of public authorities on the market (Colombia, Ecuador) or an open market scheme (Brazil, Chile). In the case of Brazil, even when the participation of private-sector players has been, and still is, of little significance, it would seem that there is the intention

⁵⁵ The case of Guatemala could also be included in this situation.

⁵⁶ All the while maintaining its vertical integration.

⁵⁷ Nevertheless, all the oil produced by the contractors should be delivered to YPF at prices previously agreed upon. In addition, this company is in charge of almost all exploration and development investments.

⁵⁸ Permanence in situation (a) (courses indicated in black in the upstream and in red in the downstream, within the same box).

⁵⁹ In Colombia, it has been proposed that the potential expansion of refining activities be left in the hands of the private sector. Although there is a strong trade union opposition to this policy, a private initiative has been undertaken to build a new refinery in Sebastopol, guaranteeing the supply of crude oil and the sale of oil products to ECOPETROL at international prices for 12 years.

Chart 3 (a) Evolution of reform processes in upstream activities of the oil and natural industry



(*) Only natural gas

(*) Without open market disposal of crude oil

(**) Open market disposal of crude oil through cost recovery

(***) Open market disposal of crude oil through remuneration

(*****) Open market disposal of crude oil with total dominance by the contractor

(*****) Open market disposal of crude oil through participation or partnership

to extend liberalization to the participation of private capital and a greater preponderance of market mechanisms in the marketing of oil products.

The case of Peru comes close to the (b)-(f) course. This terminal state is also applicable to the case of Bolivia, since the objective that is being set by the reforms (as in the upstream sector) is to attain this situation.

The trend being observed in the Central American countries (except Costa Rica) and in the Caribbean countries (except Trinidad and Tobago) corresponds to the (g)...(h) course. In these countries, oil refining and/or oil product



Chart 3 (b) Evolution of reform processes in downstream activities of the oil industry

marketing activities were already in the hands of private-sector players and there was already a negotiated regulation scheme (situation **(g)**); as a result, the course indicated by a broken line would be implying the progressive deregulation of these markets. Finally, course type **(a)-(h)** corresponds to the case of Argentina. It is precisely in this country where the reform carried out throughout the oil chain reached a comparatively greater depth. In short, in the oil chain, reforms have generally been less drastic than in the case of electric power systems. In a large number of cases, the presence of state enterprises has been maintained.

4.2.2.4 Energy reforms in the case of small mar kets

On the basis of the most typical courses characterizing the reforms implemented in the region, with respect to the different energy production chains, the previously mentioned trend favoring the introduction of OM schemes and liberalization permitting the participation of private-sector players has been confirmed.

In view of the relevance of the different production chains and their links in the region's countries, the analysis of issues regarding smallsized energy markets focuses on electric power systems and the marketing of oil products.

According to what was indicated in the previous sections, the intention to introduce competition or the contestability of markets in the particular case of electric power systems requires a reorganization of the production structure, implying the vertical breakup of generation, transport, and distribution processes, some degree of horizontal splitting of generation and distribution activities, and the establishment of the following regulatory principles: i) free entry into (and exit from) the generation sector (at least with respect to conventional thermoelectric generation), and ii) open access by third parties to transport and distribution networks.⁶⁰

In those countries where electric markets are small (for example, peak power demand less than 5,000 MW), vertical breakup of processes and horizontal split-up of generation and distribution would surely require reallocating the development of economies of sequence (or vertical integration), economies of scale, and economies of scope (or horizontal integration).

It would be difficult to imagine that, in these systems, the eventual social benefits that the introduction of competition would be able to bring would be greater than the losses stemming from the failure to take advantage of these economies.

Therefore, in view of this type of consideration, in the case of small markets, it would seem preferable to adopt some of the alternatives for partial opening up with negotiated regulation (that is, an IR or SB coordination scheme). These small markets could opt for the following: i) some form of legal divestiture of state-owned enterprises; ii) regulation schemes driven by incentives; or iii) market competition mechanisms in partial opening up. In this case, with the attempt to introduce competition in the market, higher efficiency (productive and structural) could be achieved.

In addition, it should be kept in mind that the attempt to set a competitive environment in power generation and supply markets requires the introduction of transaction costs that could be significant compared to the total magnitude of the transactions.

Table 2 provides the approximate current placement of the different countries of the region in terms of the size of their electric power markets and the characteristics of the institutional and regulatory changes introduced by the reforms.⁶¹

On the basis of this table, the majority of the countries with small electric power markets have opted for a single buyer or regulated integrated system coordination scheme or for keeping the centralized command and control scheme with changes that are really not significant in concrete

⁶⁰ This type of requirement can be extended to the natural gas production chain. Nevertheless, it is important to keep in mind the observations made in Section 1.5.1 regarding the real possibility of competition in natural gas systems, taking into consideration the size of the markets, location in space, and the size of the reserves and the degree of interconnection of the trunk gas line networks.

⁶¹ The information comes from the year 1998. Nevertheless, by then, the changes or the orientation of the transformations were already well defined in almost all the countries of the region. Chart 1 provides an indication of possible future courses.

							1	
Instailed	Centralized control		Regulated Integrated System		Single Buyer		Open Market	
Capacity of Generation (MW)	Integral Pat of the State	Cetain Degree of Business Autonomy	Single Integrated Structure	Verious Business Units	Integrated Distribution	Distributb n Breakup	Vertical Integration Permitted	Obligatory Verical Breakup
0-500		Hati	Barbados Gienadia		Surin ame Guyan a Nicaragua			1
500-4 000					Jamaica Honduras	Panama(**)	El Salvador	Bolivia
1001-2000	Cuba	Unguay		Cost a Rica	T. & Tobago			Guatemala
2000-5000		Paraguay		Ecu ador(*)	Dominican Republic		Peru	
5000-1 0000							Chile	
1 0000-20000							Colombia	Argentina
>20000				Venezue la(*) Brazil(*)	Mexico			

Table 2 Reforms in the electric power systems and size of the markets

(*) According to the approach appearing in the regulatory norms, these countries should be included in the OM scheme. The placement in the table reflects the situation of transition.

(**) The introduction of market mechanisms is forecast for the year 2001. In this transition, the power transmission utility will be the single buyer (not-for-profit) of the energy to be transferred afterwards to distributors.

terms, although it can be expected that there will some degree of liberalization in the future. The most outstanding cases where attempts have been made to introduce competition mechanisms in small markets correspond to Bolivia, El Salvador, and Guatemala, to which can be added Panama as of the year 2001.⁶² In some of these countries (Bolivia, El Salvador, Panama), peak power demand is never over 750 MW and, in the absence of natural gas, thermoelectric generation alternatives are expensive and provide economies of scale, even with the new technologies. The installed capacity of Peru is close to 5,000 MW, and the regulatory scheme that is used is very similar to that of Chile. The intention of tapping the gas of Camisea could, in the future, lead to the use of natural gas for electric power generation, as in Chile with gas imported from Argentina. Nevertheless, in neither of the two cases can it be hoped that players will multiply in the power generation sector, but rather there will be a reintegration of the market, and transnationalization of the electric power industry, which is already becoming evident.

⁶² According to the information drawn from OLADE's SIEE, the values for installed capacity and peak demand recorded by these countries were as follows:

	Installed Capacity (MW)	Peak Demand (MW)
Bolivia	862	
El Salvador	943	666 (1997)
Guatemala	1188	870
Panama	973	

In the case of oil products, the existence of significant sunk costs in distribution and marketing (port facilities and storage infrastructure, distribution channels established as brand name stations) heavily limits the possibility of introducing contestability on the corresponding markets.⁶³ Even in larger markets for these products, in the region the structure for the production of oil products has oligopolistic characteristics owing to the extensive economies of scale in refining activities. In general, this is further consolidated by the historical evolution of the industry. The situation of Argentina, after implementation of reforms in the oil area, is a clear example of this: the three principal refining companies account for 90% of refining capacity and the largest one in the country handles 57%. In this situation, it is customary for the leading company to set prices in a clearly oligopolistic scheme, since potential competition would be severely limited by established marketing networks. As a result, the prices of products will not respond to real cost conditions, leading to margins from the taking of monopolistic revenues that were surely not among the motivations for implementing the reforms.⁶⁴

In countries with small markets, in addition to the previously mentioned constraints on potential competitors, stemming from the sunk costs in infrastructure investments, existing monopolies in the refining sector must also be included, owing to the above-mentioned economies of scale. Therefore, it is misleading to think that the marketable character of oil products will induce contestable markets via imports. Under these circumstances, with the strict application of the theory of disputable markets, price regulation is needed.

4.2.3 Reforms and price systems

As a rule, reform processes have involved a very significant change in the management of

energy pricing policy. As indicated earlier, in the first stages of reform, governments attempted to improve the management of state-owned public service companies, giving them greater administrative autonomy (a more business orientation) and modifying the price structure and levels, so that they could come close to supply costs, by dismantling a large part of existing subsidies.

In many cases, this shift of orientation in pricing policy (in keeping with macroeconomic reforms) was an indispensable condition for privatization and openness for the entry of new private-sector players. Thus, in those situations where it was thought necessary or advisable to keep the subsidies, they became transparent and the sources of the resources required, sometimes from the public budget itself, were determined.⁶⁵

In response to the general orientation that was proposed, the changes made by the different schemes in the different energy changes focused on whether the energy products were marketable or not and on the potential contestability of the corresponding markets. The term "potential contestability" is used because, as indicated earlier, in some cases (bulk markets for oil products), the existence of contestability is accepted although concretely speaking there is no contestability.

In the case of electric power chains, the theoretical model of reform proposes, as seen earlier, the breakup of the three processes (generation, transmission, distribution), as an indispensable prerequisite to build up a space of contestability on the generation market. In the stricter applications of this model (Argentina and, to a lesser extent, Guatemala, Bolivia, and Colombia), the operation of spot bulk markets was implemented, where prices are determined on the basis of the system's long-run marginal cost, plus a charge for power capacity. Thus,

⁶³ See Section 1.5.1.

⁶⁴ The topic of prices will be examined again in a later section.

⁶⁵ The case of Argentina provides a clear example of the latter option. In Colombia, the subsidies granted to the poorest strata of the population for their residential public service bills are funded principally from charges levied on the remaining users; this mechanism is provided for by the Household Public Service Law, which governs these activities. It is clear that in Colombia, this second mechanism grants a higher guarantee for keeping these subsidies whereas in Argentina this permanence is subject to draft budgets submitted by the executive branch of government and is therefore also subject to reiterated processes of fiscal adjustment.

when setting this price on the basis of the cost of the last thermoelectric turbine that enters the load dispatch, it is inevitable that some players in generation activities will take hydraulic revenues and/or quasi revenues (extraordinary profits) to the detriment of the end-users.

The magnitude of these revenues and their distribution among the above-mentioned players depend on how the charge for power capacity, which has a high degree of discretionality, is regulated. Thus, in some cases, market competition exerts pressure for the modification of regulatory conditions and not on the basis of a real supply price, in conditions of productive efficiency.

In other cases (Chile),⁶⁶ the remunerations for power capacity based on an outage risk hypothesis did not end up by providing the incentives that would have attracted investments for expanding backup capacity but rather led to severe supply problems, without the players involved in generation accepting responsibility for the consequences stemming from the surcharge that had been paid for such a long period of time.

Furthermore, the issue of the consequences of the variability of hourly prices downriver needs to be examined. In some cases (Argentina), this problem is avoided by using seasonal prices for purchase of distributors on the spot market and a stabilization fund to ensure the compatibility between dispatch prices in real time and those coming from the seasonal programming (forecasting). In other cases (Colombia), this stabilization is not envisaged and spot prices are therefore highly volatile, owing to the sharp seasonal variations in hydraulicity, given the scarce hydraulic regulation capacity; this situation introduces a marked uncertainty in prices.

In any case, although generally there are contract markets, the role of the spot price is

important due to the strong adherence of the values established in the contracts (usually shortterm) to this reference price.

Finally, on distribution markets, tariff setting involves the well-known problem of requlating natural monopolies under asymmetrical information conditions. Despite the very widespread idea of rejecting the "old style" of requlation for the earning rate, resorting to formulas such as that of PRI – X or that of standard costs to determine the gross margin (own costs of this activity plus a profit margin), it is inevitable that the same type of problem be addressed again: ignorance about the economic costs of the distributor in conditions of production efficiency and, therefore, the effective rate of return. In fact, in those cases where the wholesale price has shown a downward trend, the tariffs of the regulated market segment in distribution have not shown similar changes alongside this trend.67

In the natural gas chain, in the countries where an attempt was made to promote a market scheme such as Argentina and Colombia⁶⁸ based on the vertical breakup scheme used for the electric power model, it is expected that it will lead to a rise of the well head price (Argentina)⁶⁹ or at the gate of the trunk gas line (Colombia). In natural gas bulk markets, the possibility of atomized competition is virtually impossible because of the small size of the markets and the lack of density of the trunk gas lines. In fact, supply is characterized as a nondisputable oligopoly and will remain as such until transport of liquefied natural gas by sea becomes a competitive alternative. In reality, the only type of relevant competition in this case appears in the end-use where natural gas has to dispute the caloric use markets. Nevertheless, this potential competition enables supply players (producers, carriers, and distributors) to take large portions of the gas earnings.⁷⁰

⁶⁶ The Subsystem of the Central Region. See G. Moguillansky and H. Altomonte, "La crisis eléctrica chilena: De la reforma a imitar en los 90 a la reforma a evitar en el 2000?" [Chile's electric power crisis: from the reform to be imitated in the nineties to the reform to be avoided in the year 2000?] (mimeographed), Santiago, June 2000.

⁶⁷ See, for example, H. Pistonesi, "El sistema eléctrico argentino: desempeño a partir de la reforma" [Argentina's electric power system: performance since the reform], OLADE-ECLAC-GTZ Project, March 2000.

⁶⁸ In the central subsystem.

⁶⁹ H. Pistonesi, op. cit., March 2000.

The marketable character of crude oil and products has led most countries to adopt the scheme of opportunity costs based on border prices. As for importing countries, these prices are, in addition, the effective costs of supply. In the producing countries, especially those that are self-suppliers or net exporters, however, effective economic costs for society as a whole come from production costs. In these cases, using border prices (microeconomic opportunity costs), as a reference to set domestic supply prices, involves setting up a very special way of taking oil earnings. In other words, rather than an efficient allocation of resources, what we have here is the taking of these earnings.

In any case, crude oil markets are contestable since imports were totally liberalized; therefore, in this case, regulatory intervention to discipline the players of domestic supply is not necessary other than as a mechanism to take part of the earnings (royalties, taxes). As already indicated,⁷¹ the possibility of introducing contestability turns out to be highly unlikely, especially in small markets. As a result, to protect consumers from the power of oligopolistic companies, some regulatory mechanisms need to be established.

4.2.4 Reforms, business strategies and reintegration of energy chains

As indicated in earlier chapters, restructuring of the energy systems of the region's countries meant, among other things, a new coordination of decision-making, as a result of the participation, to a certain extent, ranging from limited openness to market coordination. Because of this new situation and because of the players' use of their decision-making capacity, business strategies in the energy sector should be a focus of attention for those in charge of designing the energy policy of the region's countries.

The new players are companies that were already operating in the corresponding activities outside the countries or extra-sector players, oftentimes as subsidiaries or consortiums, which were created for specific business opportunities that arose. For the most part, the new actors are actually players that have past experience working in the energy systems or related activities. In some cases, there was the entry of companies with speculative approaches, taking advantage of situations where governments had urgent financial imperatives and/or of decision-making processes that were not very transparent. Nevertheless, this type of player has transferred its right to participate to the consortiums that were set up at the moment of the privatization of energy system assets.

Among the external players, in addition to the wider presence of transnational companies normally present in the oil sector, other U.S. and European companies, which in their own countries had worked as public or private companies in the electricity or natural gas production chains, came onto the Latin American stage.⁷²

These new players have a behavior that is significantly different from the one of traditional sector companies. This new rationality is not the only feature of these players; the state companies themselves have also changed their behavior after having undergone major transformations.

In the world, there is a wide range of new strategies used by energy companies. Over the last few years, the companies that were traditionally confined to a subsector or to certain links of the energy chains inside a country have adopted strategies of diversification and transnationalization.⁷³

⁷⁰ In the case of Argentina, the net profit margin on the billing of carriers is over 40% (H. Pistonesi, March 2000, op. cit).

⁷¹ See last section of the previous section 3.1.6.

⁷² The private companies of the region, which before carried out activities in more restricted areas such as the exploitation of marginal fields or oil services or else worked in production or equipment manufacturing, penetrated core energy business activities. Yet other players have been the "new national players", descendants of the state-owned enterprises after partial or total breakup/divestiture.

⁷³ The first step, in the framework of these new strategies, is transnationalization inside the same environment of the sector. Another type of strategy involves vertical integration in other energy sector chain activities. Forward integration of the companies that build power stations and manufacture equipment and forward integration of technology and natural gas transport companies that progressively encompass power generation; forward integration of energy suppliers that extend their activities to service delivery (service companies) or to marketing; and intra-sector integration and extra-sector diversification.

4.2.4.1 Some strategies of electric power utili ties

The formation of consortiums, preferably between local companies and foreign ones, has been the customary way to enter into new projects and to participate in the purchase of utility companies that were privatized in the electricity and natural gas subsectors. Indeed, the establishment of alliances and consortiums, as well as the different forms of integration and the positioning of these companies in different energy markets, is a priority issue owing to their potential interference with the guidelines provided by energy policymakers.

Intersector integration seems to be an interesting strategic option for power utilities. Just as in the rest of the world, some countries of the region, after having consolidated the subsector of their country, have started to diversify their activities toward the natural gas production chain, with development plans on the world stage. Inter-sector integration forces governments to take a stand when it threatens to interfere with their own strategies and with their intention to promote contestability in markets wherever this is possible.

It has already been stated that, in the activities that require the use of fixed networks for transport and distribution, the breakup of processes and the incompatibility of functions constitute conditions that are necessary for the existence of contestability on the markets. As a result, the partial breakup of processes and/or the reintegration of these processes constitute major challenges for the objectives being sought by the restructuring policies, especially in those cases where total liberalization and a greater role for market mechanisms is promoted.

The phenomena observed lead us to expect even greater reintegration after reform processes that promoted the vertical breakup of the production activities in the electric power (or natural gas) chain are completed. The debate between those who advocate the advisability and/or necessity of maintaining a vertical integration and those who appreciate the advantages of competition over the short term, which arose at the moment when reform processes were started, continues unabated. This debate is no doubt relevant to reorganize electric power systems. Nevertheless, it is clear that the reform processes that fostered vertical breakup, as an instrument to promote competition (via the regulatory construction of market environments), should not lead to a new integration of energy business with advantages for only a limited group of private interests.

In addition to the problems stemming from vertical integration or reintegration (incompatible with the application of regulatory frameworks that assume the prevalence of competition), there is also a growing concern about the technical and functional concentration in the different energy production chains and in the realm of the energy systems as a whole.⁷⁴

Vertical and intersector reintegration that is being projected on energy markets of the region,⁷⁵ combined with internationalization, can lead to the establishment of economic conglomerates of such magnitude and power that they would leave the government with little possibility of achieving its objectives, in case they come into conflict with the interests of the companies, as can occur with the issue of redistribution of rises in productivity, environmental impacts, and others.

Finally, the internationalization strategy carried out by the power utilities of Chile in the region should be emphasized. Either alone or with the establishment of consortiums with other regional or extra-regional players, this type of strategy intends to enlarge their scope of action beyond the limits that could be expect-

⁷⁴ One example of this is the effort made by the Chilean Government to increase the number of suppliers in electric power generation in order to counteract the ranking of the holding company ENERSIS, which, in addition to vertical integration, is characterized by a strong share of the generation market in the Central Integrated System. In this system, ENDESA and CHILGENER account for more than 80% of installed capacity and energy generated.

⁷⁵ The linkages between some consortiums that hold positions in the different links and production chains of Argentina's energy system provide an example of this type of situation.

ed from national market growth. These strategies have also been a vehicle for the transnationalization of energy activities in the region, to the extent that the capital quotas of the transregionalized companies are transferred.

4.2.4.2 Business strategies in the oil sector

In the framework of the reforms in upstream and downstream activities, the countries of the region have redefined the strategies of their public enterprises, aimed at reaching different objectives depending on factors such as: endowment of proven reserves, production capacity, company size, degree of technological progress, as well as variables linked to the country's economic situation.

Furthermore, the companies that have major proven oil reserves strive to intensify their exploration and production inside the national territory and internationalize their operations in the downstream sector. This is what has occurred in PEMEX and PDVSA. From the start of the eighties, PDVSA outlined the following objectives: guaranteeing markets for their exportable oil surpluses and, at the same time, generating greater value added by exporting refined products and/or purchasing refineries abroad. At present, the majority of the crude oil produced by PDVSA is sold as a refined product. For this purpose, the state company carried out the following type of actions:

- It forged strategic alliances with foreign companies.
- It enlarged its refining capacity, both at home and abroad.
- It started to work in different countries of Latin America in the areas of refining and marketing of oil and products. PDVSA's objective consisted essentially of developing mar-

kets where it can safely place its production of crude oil and oil products.

 It has designated its subsidiary MARAVEN to conduct this participation in the region's markets. For the time being, its interest is concentrated in Colombia, Ecuador, and Peru.

PEMEX of Mexico has a national refining capacity that is larger than that of PDVSA in its own territory but it is basically aimed at meeting domestic market needs. The majority of PEMEX's exports consist of crude oil and they are for the United States. The willingness to forge strategic alliances has been evident in the following examples: the purchase of 3.5% of REP-SOL of Spain; the establishment of a company for conversion projects and oil supply contracts, which has opened up new prospects inside the European Union; and the establishment of MEX-PETROL, in association with private-sector capital, in order to export services and goods in oil operation projects. PEMEX set up a strategic alliance to enlarge its refining capacity, purchasing 50% of the Deer Park Refinery in Texas, owned by SHELL, with a capacity of 220 MBD.

In addition, the strategy applied by PETRO-BRAS, which is facing the need to secure proven reserves that will enable it to meet domestic consumption needs for oil products, consists of granting priority to oil production development activities in the national territory and become involved in reserve exploration activities outside Brazil.⁷⁶ The latter type of strategy is also adopted by those countries that, like Chile, do not have enough domestic resources.⁷⁷

Other countries of the region that have significant reserves but do not have enough capital and/or whose state-owned companies do not have access to modern exploration and development technologies are considering the promotion of private-sector investment under different partnership schemes with their state oil

PETROBRAS of Brazil, through its subsidiary BRASPETRO, conducts exploratory and production activities abroad. BRASPETRO carries out operations in Angola, Argentina, Colombia, Ecuador, United States, and the United Kingdom. In addition, BRASPETRO markets products coming from its own production in Colombia, the United States and the United Kingdom. Likewise, it has become involved in the distribution of LUBRAX lubricants through PETROBRAS in Argentina.

⁷⁷ Chile imports about US\$800 million per year worth of crude oil, which is for the refineries of ENAP. The establishment of SIPETROL, as a subsidiary of ENAP, is aimed at finding oil abroad. For this purpose, it has set up joint ventures with Bridas and YPF in Argentina, REPSOL in Spain, and BRASPETRO in Brazil.

companies, discarding any possibility whatsoever of internationalizing either the upstream or the downstream sector.

Among the countries that opted for the privatization strategy, such as Argentina, Peru, and Bolivia, highly different approaches to the development of the industry have been observed. In Argentina, the private companies' own strategies are what set the course for the industry; the main companies are showing a clear trend toward internationalization.⁷⁸ In Bolivia, in view of the singular privatization scheme that was adopted, the strategy consisted of strengthening the business units of YPFB on the basis of a private bidding process to expand rather than to transfer assets. In Peru, there does not seem to be any clear national strategy as yet.

As part of the internationalization trend that was indicated above, it is important to underscore the strategic alliances that were established between the regional companies, since they can exert a significant impact on the energy and economic integration process, at least at the subregional level. Among these alliances, the ones between YPF and PETRO-BRAS,⁷⁹ PETROBRAS and PDVSA,⁸⁰ and YPF and ENAP⁸¹ are noteworthy.

4.2.5 The role of the State in reform processes

It is clear that the reform processes of the region's energy systems, as part of the general

restructuring of national economies, have been and/or are being promoted by the political institutions of the State. As indicated earlier, these processes of change are an attempt to adapt to new conditions prevailing in the world, although starting from situations of more or less sharp macroeconomic imbalances and heavy constraints weighing on the countries as a result of their huge external debt.

It has also been said that the depth, scope, and pace of implementation of the reforms carried out in the energy systems of the region have led to a wide variety of situations; nevertheless, as a rule, they have been determined by common patterns: redesigning the regulatory frameworks for the purpose of expanding the action of market mechanisms (change in coordination schemes); modification of the role of the State, which has dropped its business functions (and as a result direct control over resource allocation in the sector) to focus on regulatory matters and eventually reserving the right to carry out subsidiary actions; and sale of the assets of the sector's state-owned enterprises and decentralization of the decision making, now in the hands of private-sector players, which are for the most part multinational in origin.

Responding to these predominant orientations, the changes that were made have not always taken into account the specific characteristics of each socioeconomic and/or energy system,⁸² or the purposes and aspirations of society.

⁷⁸ In Argentina, private companies, among which YPF, Pérez Companc, and Pluspetrol, are promoting activities in the domestic upstream sector, but are also aggressively penetrating foreign markets (Peru, Venezuela, and Bolivia). YPF is internationalizing its operations in both the upstream and downstream sector (refining and marketing of fuels). The strategies are governed by different objectives. In 1995, YPF purchased the oil company Maxus for US\$750 million; since this company operates in the United States, YPF has been transformed by this purchase into an international oil and gas company. This purchase has enabled it to operate not only in the United States, but also in Indonesia, Bolivia, Ecuador, and Venezuela and also to acquire various technologies for its offshore operations. In May 1995, the Refiners of Peru consortium, comprised of YPF, along with REPSOL, Mobil, and three Peruvian companies, acquired 60% of the shares of the La Pampilla Refinery in the framework of the privatization of PETROPERU.

⁷⁹ It involves a strategic alliance to conduct joint operations in both exploration and production and refining and marketing, taking full advantage of the technological advantages of each. The joint activities in exploration between PETROBRAS and YPF take place in the Gulf of Mexico as indicated earlier and also in offshore deposits in southern Argentina.

⁸⁰ In November 1995, PETROBRAS and PDVSA signed a letter of intent to set up the partnership called PETROAMERICA. The projects that could be carried out by this company include the construction of a 100 MBD refinery in Brazil to process Venezuelan oil. Nevertheless, it is planning to become involved in all upstream and downstream phases.

⁸¹ This strategic alliance is aimed at selling crude oil from YPF to ENAP.

⁸² Size of the systems, natural resource endowment, level of development and structure of energy industries, degree of coverage of basic energy requirements, importance of the presence of economies of scale, sequence, and scope.

Some conflicts that have emerged in the course of the transformation process are basically linked to the dichotomy between the growth of social product and its distribution. Changes in ownership rights and the important participation of private-sector players in decision making for the allocation of resources have been proposed as necessary instruments to give impetus to the process of economic accumulation. But this redistribution of ownership and economic power has led to conflicts. The sum amount of the aspirations of a country's different social groups generally exceeds the possibility of meeting them over the short and medium term. There are doubts as to whether, even within a broader horizon, the economic momentum will be sufficient and the redistribution mechanisms able to function so as to respond to general social aspirations and, most especially, to the aspirations of those groups that have been most severely affected by the changes.

These conflicts are not specific to the energy sector; nevertheless, they can gather considerable magnitude in this sector owing to the profound changes that are implied by the reforms with respect to ownership rights, participation in decision making, the level and function of prices, and the rationale orienting the new players who control the allocation of resources at the heart of energy industry, which are viewed by many as public services or as strategic sectors.

On occasion, these claims have concealed the interests of certain groups whose main goal is to keep economic privileges and to continue using their control over sector companies as the stronghold for their political power. In any case, it is essential for the formulation of energy policies aimed at ensuring sustainable development to recognize the nature of this type of conflict, which could eventually affect their viability.

4.2.6 Different visions of reform processes as potential sources of conflict

In the energy sector reform process, a diversity of visions and interests, expectations or aspirations of different social groups converges, burdening these processes with conflicts.

The orientation and fundamental aspects of the reforms are almost always based on changes in the legal framework, whose definitive adoption would not have been possible without the support of legislative majorities, which in general means relying on the support of a part of the opposition political parties, unless the government has its own majority.

The promotion of a complete opening up, with sale of assets, came up against much opposition but of different intensity from the different groups that were affected. The driving force behind this opposition and its intensity depended on the following factors, among others:

- Depth of the macroeconomic disequilibria being borne by society.
- General situation of public enterprises and the quality of the services they provided, deemed acceptable in some cases but unbearable in others.
- The perception regarding the scope of change.
- Degree of liberty with which the affected could manifest their opposition and the resources and means they had at their disposal to do so.
- Degree of involvement in the debates aimed at defining the structure of the reform process.

Among the interests or social groups affected by the transformation processes of the energy systems, the following can be emphasized:

a. Political establishment

In a paternalistic political culture and in the light of the rapid deterioration of the State's apparatus in the eighties, the political players had, within their reach, the action of state enterprises as an instrument to acquire and guarantee power. These companies, even before the reforms, constituted a political power base, which was often viewed as an accessory benefit to the winner of any election. This power base provided political parties not only with economic resources and the possibility of appearing as the benefactors of society, but also as a way of securing special sinecures and privileges.

As executive and legislative institutions lost direct access to these companies because of legal and/or managerial decentralization and, above all, after the sale of assets, political players found themselves deprived of these sources of resources and power.

In any case, the processes that have been described have contributed to achieving a certain amount of transparency, to the extent that they have implied the stringent application of international bidding mechanisms and that it has been possible to have private international consultants usually involved in these processes to conduct their activities under the joint supervision and oversight of both the executive branch and parliament, to which can be added the attention of various international institutions.

b. Company employees

On the basis of an assessment of production efficiency criteria and focusing strictly on their specific microeconomic mission, it can be asserted that the state enterprises were in a prereform stage, with major overstaffing problems. One explanation for this situation has to do with the fact that, during the postwar transformation, public enterprises were assigned the far wider mission of being an instrument for regional socioeconomic development. Another possible explanation, linked to the more recent experience of public enterprises, involves the previously mentioned paternalistic culture prevailing in the region.

Since one of the objectives of transformation was to achieve higher efficiency in production, state company employees were affected by the downsizing stemming from the reforms, the change in labor conditions and other types of achievements. Because of this, in most cases, they were opposed to the reforms, even when they were offered hefty compensations and settlements for voluntary retirement.

Depending on the options they had to express their discontent and the importance that could be given to their aspirations, the workers protested differently and tried to influence the decisions that were being made. The most important step taken to address their aspirations was to allow them to participate as shareholders in the companies that had been divested and rebuilt.

c. The consumers

In the majority of the countries of LAC, energy prices were below long-term economic costs. The situation was even more severe when the prices were not even able to cover the cost of outlays and the State was unable to resolve the absence of income by using funds from the public treasury to cover resulting deficits. It was evident that, to ensure a business approach and conditions of financial sustainability, the companies needed a pricing policy more closely tied to costs. The adjustment of these costs and their adaptation to conditions of productive efficiency necessarily implied that improvements in the financial equation of the companies would lead to a price hike for many consumer groups.

In some countries, the fear of having to face higher energy prices led to an upsurge in the opposition to modernization processes. This opposition, already heightened by that of the employees of public enterprises, gathered momentum among political sectors, which tended to hamper even further the divestiture process. As a result, the search for ways to lessen the resistance of trade unions and employees became a key element to neutralize, at the same time, the opposition of consumers and political groups.

As for the technical aspects of modernization, the tariff structures were revised so that subsidies, formerly widespread, could be dismantled or concentrated only in the neediest social groups. This affected mostly the middleclass and lower middle-class strata of the population, who had to bear the brunt of the price hikes because, in some cases, these adjustments involved at the same time shifting from average rates or growing tariff structures by consumer blocks to others characterized lower, subsidized rates.

During energy sector reforms, these social groups have seen their economic options decline considerably, especially since they have had to withstand similar impacts stemming from reforms in various sectors: telecommunications, water supply, health, education, and the pension system. The hope of receiving, over time, better treatment and higher-quality service, as well as an eventual drop in prices owing to a more efficient energy sector, was not enough to counteract the negative impacts.

A relatively recent phenomenon in LAC involves the appearance of consumer associations and consumer defense organizations. Both types of organizations can contribute to striking a balance between the interests of the energy sector in general and between energy suppliers and consumers in particular.

The large users of energy started organizing themselves effectively to defend their interests in the face of the large suppliers, State institutions, independent regulatory entities or policymakers. In contrast, for small captive users, this balance is still far from being achieved. With the limited presence of consumer defense organizations, public hearings that are convened by regulatory agencies to arbitrate conflicts between this type of customer and the suppliers, are characterized by an imbalance in economic and technical resources available to argue in favor or against one or the other. This may become severe in the framework of democracies that are still burgeoning, with a judicial branch of government that still depends on the executive branch that promoted the reforms.

d. Certain strata of the population

Finally, the sale of State assets involves the trading of assets for values expressed differently, which in itself implies a redistributive impact. To the extent that the two counterposed values are not related, this redistributive effect will be favoring only a limited group of buyers or bid winners to the detriment of the State, which supposedly represents society as a whole. It is clear that other types of redistributive impacts occur as a result of the destination of the income stemming from the sale of the above-mentioned assets.

The risk of incurring a redistributive impact that is significantly adverse to the interests of society can be avoided by the use of certain forms of divestiture, especially the one known as capitalization. In this scheme, the population has a significant share in the ownership of the assets of the divested company, where the new players enter as strategic partners, contributing capital and technology and receiving specific rights in the management of the company.

The mechanism of setting up a general social fund with the income stemming from the sale of State assets that would be aimed at funding energy supply for lower-income social groups could help not only to counteract the regressive redistributive impacts of the divestiture, but also to correct the bias of neglecting nonprofitable markets, which is typical of the market coordination scheme.

The broad and detailed discussion of the advantages and drawbacks of the solutions that were examined is beyond the scope of the present work. In some cases, ways have been found to meet aspirations, many of which are indeed quite fair, but the result has not always been satisfactory. Overall, it can be said that, in terms of redistribution, the outcome has been negative for middle-class and lower-middle class social groups, who previously enjoyed more favorable conditions in some countries. This is one of the undesirable impacts of the transformations, and solutions must continue to be sought to address them.

Furthermore, beyond the conflicts that have appeared as a result of the implementation of the reforms, it is clear that, from the macroeconomic standpoint, the privatizing approach to the energy sector and other infrastructure sectors has prevailed or is prevailing. Regarding this, it cannot be ignored that there is a risk that an approach of this kind will neglect more complex needs and broader sector policy options, as well as other social and environmental dimensions.⁸³

It is therefore necessary that transformation policies find balanced solutions that consider all relevant objectives and take into account sector conditions, as well as the different options in the specific situations of each country. The identification of typical problems, deficits, absence of definitions, vulnerabilities or dangers that have emerged as a result of the transformation processes constitutes the inevitable groundwork on which an energy policy that strives to ensure sustainable development can be based.

⁸³ Suffice it to say that the critical spirit that can be deduced from this assertion does not in any way constitute a rejection of the reform processes or a vain return to previous schemes. Quite the contrary, while recognizing the need for this kind of process, this statement is aimed at identifying the tasks that have yet to be carried out for a more effective intervention of the State in energy systems through its policy instruments.

V. The International Stage: Reforms and Integration Processes

5.1 The new international environment

The technical and economic processes of industrial relocation which took place at the start of the seventies, as a result of the economic crisis that started after the Second World War, began to organize a new international division of labor, associated to the progressive coming of age of the new technological paradigm. These processes involved major changes in the orientation of international trade flows, in the framework of growing globalization of the commodity and financial capital markets.

The international economic panorama at the end of the eighties and the early nineties was characterized by: lesser impetus of the economies of the industrialized countries; a reordering of the principal markets (with a preponderance of the Asian region in world dynamics);⁸⁴ the growing trend of globalization (increase in trade volume compared to world production); change of technology; and a strong expansion of flows and international capital mobility.⁸⁵

For the countries of Latin America, the reversal of financial flows stemming from the heavy debt service along with the changes in the international context required them to redefine how they would be inserted in world markets and in particular how they would intensify their export activities to mitigate external imbalances. The structural adjustments, conditioned to a large extent by the renegotiation of the external debt, implied in general terms a greater liberalization of the economies and the definitive abandonment of the import substitution strategy.

On the basis of this approach, it can be asserted that recent integration processes in LAC

are not the result of a predetermined will on the part of the governments of a set of countries, as occurred in the European Union, nor are they the result of a model involving the transfer of technology in series, as in the Asian case, but rather the consequence of a set of practical relationships where civil society and governments interacted to generate an impetus toward integration, whose form and intensity depended on the way and depth of the internal restructuring process of the countries, leading to a multiplication of the intervening factors (and players).⁸⁶

One of the principal factors triggering the reforms and integration in the region has been the influence of the new international order characterized by three major components:

- Globalization, implying a trend to an integrated international market, where the countries and companies are favored by foreign direct investment, the transfer of technology, and rising international trade.
- Transnationalization driven by the most influential companies in the new international industrial order which, under company partnership schemes, enables the companies to finance new integrated production, distribution, and marketing systems in order to broaden their shares of the market and remain on the leading edge of technology. The advantages stemming from technological breakthroughs turn out to be more decisive for international competitiveness than geographical location or endowment of natural resources; it is noteworthy that technology-intensive exports have been the most dynamic.⁸⁷

⁸⁴ The greater impetus of the Southeast Asia area comes from the greater horizontal division of labor in the area, which has enhanced the export of manufactured products from recently industrialized countries, especially with the incorporation of China into the region's manufactured goods trade.

⁸⁵ ECLAC, Latin America and the Caribbean: Policies to improvement insertion in the world economy, Santiago de Chile, March 1994.

⁸⁶ See A. Guerra-Borges, "Regionalization and economic blocs: World trends from the Latin American perspective," INTAL, No. 200, Buenos Aires, May 1994.

⁸⁷ See Michael Mortimore, "La inversión extranjera directa, el cambio técnico y la competitividad internacional de los países en desarrollo" [Foreign direct investment, technological change and international competitiveness of developing countries], *Desarrollo endógeno: Comercio, cambio técnico e inversión extranjera directa* [Endogenous development: Trade, technical change and foreign direct investment], CRESET, Colombia, 1995.

• A reformulation of the development model and strategies in the region, induced to a large extent by the previously mentioned factors and as a result of the reorientation of financing by traditional credit agencies and the conditions imposed for the renegotiation of the external debt.

In the face of this situation, the countries of the region are reformulating the national development model and strategy and implementing reforms that involve more or less deep changes in structure and functions of the State. To a lesser or greater extent, the traditional inward-looking development processes driven, among other instruments, by investments in large infrastructure projects, are no longer valid, as a result of the low generation of domestic saving and the scarcity of external financing.

The transition toward the establishment of a new development pattern involves severe difficulties owing to the low efficiency of domestic production and the limited business negotiating capacity of the region's countries, in the new context of international competitiveness. Likewise, the change of economic development model is taking place at a time of political and social crisis.

In this context, the argument that national security is at stake is no longer convincing. These evident factors have led many countries of the region to take radical measures to implement reforms. The deeper the crisis they have to tackle, the more intense are the changes that can be observed in the countries of the region.

As indicated, the reforms that have been promoted imply in general terms:

 a) A more or less thorough deregulation of the functioning of the markets, with the dismantling of barriers and the promotion of opening up to private capital, not only inside but also between neighboring countries.

- b) The withdrawal of the State from industrial and trade activities for the benefit of more private-sector participation. This situation creates new responsibilities for the governments that have to adopt different regulatory schemes, either to build up competitive schemes in those activities where these schemes do not arise spontaneously or to control the monopolies, which by their very nature cannot function as self-regulated systems.⁸⁸
- c) The growth of private-sector participation pressuring governments to extend even further the reforms to enable this sector to benefit from more new business opportunities.

On the basis of these changes, the governments of the region's countries, in addition to looking for a way of ensuring a cautious insertion in the process of globalization, intend to pave the road toward modernization for the domestic industrial structure. In this process, it is possible to see a complementation between national and foreign investments, economies stemming from the large size of the markets, and greater competitiveness that seeks to close the gap that can be observed regarding the other players on international markets and, whenever possible, that tries to find a place on these markets.

5.2 The new thrust of subregional economic integration processes

The new integration initiatives were launched not only on the basis of bilateral agreements but also with the revitalization and renovation of already existing subregional integration treaties (Central American Common Market, Andean Pact, and the Caribbean Community) or the creation of new subregional blocs (MERCO-SUR). Trade liberalization commitments were made between some countries and the abovementioned subregional groups.

⁸⁸ See ECLAC, *Productive transformation with equity*, Santiago de Chile, 1990.

The subscription of bilateral agreements gathered considerable momentum toward the end of the eighties. As a rule, these agreements constitute more superficial forms of integration than what is established inside the subregional blocs. Nevertheless, the most recent agreements of this kind tend to enlarge the universe of products subject to duty-free status, focusing more on exceptions, and including some sector commitments (especially those referring to motor vehicles and air transport).

There is no doubt that the region's greater macroeconomic stability at the start of the nineties and the policies of unilateral openness applied in a large part of the countries were factors that have facilitated the extension and proliferation of trade liberalization agreements, both bilateral and subregional.

The subregional agreements have a wider scope not only with respect to trade liberalization commitments but also with respect to the intention of progressively setting up a customs union (external customs duties and common trade policies) aimed at establishing a common market (free circulation of persons and productive resources).

Nevertheless, inside some subregional blocs (Central America, Andean Pact), there has been some fragmentation because of the existence of agreements between subgroups of countries that proposed even more extensive liberalization processes.

Regarding the liberalization of intra-regional trade, the Asunción Treaty (Mercosur) is the one that has made the most ambitious commitments, since it has provided for the total elimination of customs and noncustoms barriers by the end of 1994, with some exceptions for goods considered sensitive for the economies of Paraguay and Uruguay.

In addition, at the heart of Mercosur, the rapid adoption of the common external customs (arancel externo común—AEC) was proposed in

order to set up a Customs Union, as a transitional step prior to the establishment of a Common Market. The adoption of the AEC started functioning as of January 1995 with rates fluctuating between 0% and 20% for the minimum level and between 4% and 20% for the maximum level, with the average being 11.3%. Nevertheless, each one of the countries has an important list of exceptions. In addition, the macroeconomic problems that emerged in Brazil and Argentina since mid-1998 are jeopardizing fulfillment of the commitments that were made.

In other subregional integration agreements, the adoption of the AEC was also proposed, but the different paces of unilateral liberalization and the difficulties of ensuring the compatibility of trade and macroeconomic policies have led to setbacks in achieving this objective.

In the case of the Andean Community (formerly the Andean Pact), in March 1993, Decision 335 of the Commission was approved; it provides for an AEC with four levels of customs duties,⁸⁹ depending on the type of goods, even when exceptions are also included.

In the Central American Common Market (MCCA), there has been a renewal of the integration process on the basis of the Antigua Declaration (July 1990) where greater external openness and productive modernization have been proposed. Despite this, there continue to be differences with respect to the adoption of given integration commitments and third-party relations. Because of this, in reality different paces were proposed for the integration process inside the subregion. Thus, for example, there was the establishment of the CA-4 Group (Guatemala, El Salvador, Honduras, and Nicaragua), which provides mechanisms to move ahead in fine-tuning a free trade area and adopting measures for the establishment of a trade union as fast as possible.

In CARICOM, much progress has been achieved in both the liberalization of intra-

⁸⁹ Between 5% and 20%.

regional trade and the adoption of the AEC; nevertheless, there still are severe implementation difficulties at both levels.

Among the joint or partial relations of subregional groups and third countries, the following are noteworthy: those that have been established between the countries of the Andean Pact (Colombia and Venezuela) with Mexico (referred to as the Group of Three); between the Central American countries with Mexico, on the one hand, and with Venezuela and Colombia, on the other; and CARICOM with Venezuela. This type of agreement provides for either the establishment of a free trade zone (Group of Three), the consolidation of mutual trade and its diversification (Central America-Mexico), economic and trade complementation as a step prior to the establishment of a free trade area (Central America with Venezuela and Colombia), or the search for preferential unilateral treatment (Venezuela with respect to the countries of the Caribbean Community).

Although this renewed political will for integration processes has been promoted in order to mitigate the biases of globalization, unilateral trade liberalization policies have contributed decisively to the viability of agreements.

It is precisely the convergence between the greater interdependence that is fostered by market mechanisms incorporating the advantages of geographical proximity, in a context of greater openness, and the interdependence stemming from trade liberalization agreements by means of bilateral and subregional preferences, that has led ECLAC to refer to these new integration processes as "open regionalism."⁹⁰ Nevertheless, the different paces of application of these liberalization policies continue to offer obstacles to fuller trade integration. Furthermore, the lack

of fine-tuning for the adoption of the AEC makes the norms on the origin of imported merchandise in each subregion especially important. These provisions may involve concealed protectionism and/or discrimination against regional trade.

At the same time, the proliferation of bilateral agreements overlapping subregional blocs or the fragmentation of these blocs by means of partial agreements provide a more flexible approach than the one provided by the former agreements, but at the same time they involve a far more disorderly process that is difficult to administer.

Economic and political reforms are reactivating the aspirations of previous subregional institutions, introducing a new business impetus and fostering greater cohesiveness between the blocs. In particular, Mercosur is acquiring greater importance as a result of agreements with its neighboring countries, Chile and Bolivia.

Inside the Western Hemisphere, after NAFTA and then the Summit of the Americas (December 1994), progress is being made to fulfill the aspirations of the United States of setting up a Free Trade Agreement of the Americas (FTAA) by the year 2005. In this context and in view of the strategic needs of striking a balance in the negotiating process inside the FTAA, the countries of the Andean Community started, in April 1998, to negotiate a framework agreement with Mercosur.⁹¹

The development of blocs in the region has also aroused the interest of the European Union in establishing free trade agreements. Agreements have been drawn up with MERCOSUR aimed at formally setting up a free trade agreement by the year 2008;⁹² an Interim Agreement has also been drawn up with Mexico⁹³ and the

⁹⁰ ECLAC, El regionalismo abierto en América Latina y el Caribe [Open regionalism in Latin America and the Caribbean], Santiago de Chile, 1994

⁹¹ Already in June 1996, Bolivia and Mercosur had agreed on the basic guidelines for a free trade agreement.

⁹² In December 1994, a joint statement between the European Union Council and the countries of Mercosur was issued, indicating their interest in establishing an inter-regional economic and political association. The negotiations culminated in December 1995 with the signature of an Inter-regional Cooperation Framework Agreement, that provides joint cooperation mechanisms in customs matters for inter-regional trade, with the intention of liberalizing it fully by the year 2008.

⁹³ It provides for mechanisms and areas in which negotiations will take place to liberalize trade, capital transfers, public contracting, competition, and intellectual property.

Andean Community (CAN). Furthermore, some of the countries on the Pacific seaboard are actively participating in APEC and opening up their economies to Southeast Asia.

In addition, as indicated earlier, the renewed impetus of integration processes in the area involves the risk that the establishment of blocs in extra-regional economic spaces might lead to a fragmentation of world trade, with the resulting adverse repercussions for the region's countries. In a wider world trade liberalization scenario, integration could provide sector and intra-sector complementation mechanisms that will contribute to improving the competitiveness of regional exports.

Nevertheless, with respect to sector agreements and especially intra-sector integration, the achievements are still sparse and highly preliminary. The majority of the actions aimed at ensuring greater intra-sector complementation come from the change of strategies for multinational companies, which have respond to the liberalization policies implemented by the region's countries by spatially reorganizing their production in accordance with the relative advantages being offered by each country for the different processes of the production chains in which they are involved.

The dismantling of constraints affecting foreign investments, which was done at the same time as the application of unilateral trade liberalization policies, is aimed at promoting the inflow of production capital that can enhance growth and favor the incorporation of new technologies. Nevertheless, the competition between the region's countries to take this type of investment tends to hamper the establishment of common policies and curtails their negotiating capacity with respect to investors from outside the region.

The privatization of state-owned companies, especially in the area of public services, and the deregulation of the corresponding markets, have facilitated the participation of companies (private or public) from some of the region's countries in the consortiums that have been awarded the companies privatized in other countries of the area, along with local private groups and/or extra-regional companies or groups (mainly U.S. or European). To date, the most noteworthy example is the participation of Chilean companies in the privatization of electric power systems in other countries.

It is likely that the extension of the reform process in some countries will favor the growth of certain economic groups of the region that can extend their scope of activities. But even in these cases, it is likely that it would involve indirect schemes of transnationalization, owing to the power being exerted by transregional capital on these players.

The large inflow of short-term capital to the countries of the region⁹⁴ facilitated macroeconomic stabilization and the growth of consumption and imports. This inflow of financial capital, along with the trade liberalization measures that were unilaterally applied, has been one of the most important factors for the growth of inter-regional trade.

In view of the instability that is observed on the international financial market and the volatility characterizing the large amounts of short-term financial flows, this unconstrained liberalization in financial terms involves major risks for the success of renewed integration processes. The repercussions of the Mexican crisis, unleashed at the end of 1994, on the countries of the region, followed by similar episodes in Southeast Asian countries, Russia, and Brazil, provide ample testimony of this risk. It is clear that a reversal of financial inflows of the magnitude that was indicated may very deeply affect the precarious macroeconomic stability that was reached at the expense of major social sacrifices.95

⁹⁴ The net inflow of capital in the period from 1990 to 1998 amounted to about US\$460 billion, that is, a bit under US\$50 billion per year, on average. Nevertheless, the net transfer of financial resources to the region during this period amounted to about US\$170 billion.

⁹⁵ For a discussion of the policies aimed at reducing the risks stemming from the massive entry of short-term capital, see ECLAC, "Latin America and the Caribbean: Policies to improve insertion in the world economy," 1994.

In short, new integration initiatives have made considerable progress, in more flexible schemes, facilitated by unilateral liberalization policies implemented by the region's countries and by greater macroeconomic and political stability. Nevertheless, the most important achievements seem to have been concentrated in trade liberalization, but for the time being with only very partial success with respect to production cooperation and complementation. At the same time, these achievements are seriously threatened by the macroeconomic precariousness stemming from the commotion on the international financial market.

5.3 New energy integration schemes

The most outstanding characteristics of current integration processes is the abandonment of previous approaches, which sought to reach ambitious objectives in the search of harmonization in economic policies but actually functioned on the basis of a wide variety of specific bilateral agreements. The new processes are more pragmatic and are aimed at consolidating, above all, tangible commercial benefits in a framework of flexible policies.

Energy integration processes in the past were characterized by many trade and investment agreements, either bilateral or multilateral, coordinated between the States. This is the case of the large shared hydropower projects between Argentina, Brazil, Paraguay, and Uruguay (Salto Grande, Itaipú, Yacyretá) or the pipelines (oil and gas) between Argentina and Bolivia or the power interconnections between Colombia and Venezuela or between the majority of the Central American countries, as well as the commitment of both Venezuela and Mexico to supply hydrocarbons to Central America in the framework of the San José Accord.

These energy integration processes in LAC had as background the former multilateral⁹⁶ and subregional⁹⁷ integration agreements, in whose framework trade was promoted but in which private-sector activities played a virtually passive role. It should be recalled that, at that time, the CC coordination scheme prevailed and that, as a result, energy sector decisions were taken exclusively by the governments.

As indicated in the previous section, during the eighties, integration schemes were reactivated;98 nevertheless, it is only at the start of the nineties that integration schemes began to be differentiated from previous patterns and that subregional agreements began to acquire importance. Integration started gathering momentum in those subregions where the governments created conditions to allow private-sector activities on the basis of domestic reforms and, at the same time, intensified their relations with partner countries with the adjustment of agreements. Private-sector activities started performing a more active role, as a result of their broader participation in transactions inside the countries and the business opportunities stemming from the liberalization of foreign trade.

5.3.1 Nature of the reforms and the energy integration process

As indicated in Table 3, as part of the previous development approach, energy integration processes were limited to large-scale projects aimed at developing shared resources or mar-

⁹⁶ Such as the Latin American Free Trade Association (Asociación Latinoamericana de Libre Comercio—ALALC), created in 1960 with the Montevideo Treaty.

⁹⁷ Central American Common Market (Mercado Común Centroamericano—MCCA), established on the basis of the Managua Charter in 1960; the Caribbean Community (CARICOM) created as a result of the Chaguaramas Treaty in 1973; the Andean Group (Grupo Andino—GRAN), created by means of the Cartagena Agreement in 1969 in order to facilitate the integration process of the Montevideo Treaty that created ALAC.

⁹⁸ Latin American Integration Association (ALADI), agreement signed in Montevideo by Argentina, Brazil, Colombia, Chile, Ecuador, Mexico, Paraguay, Peru, Uruguay, and Venezuela. ALADI provides a more flexible and balanced scheme for the commitments made by the countries of the regions, which were further consolidated by the widespread implementation of democratic process in LAC. Its principal objective to set up a Latin American common market, through a gradual process of "coordination and convergence" of subregional integration initiatives. The Group of Three (G3) and the Southern Common Market (Mercosur). One novel and unprecedented scheme was the integration of LAC countries with those of North America, which started with the incorporation of Mexico to the North American Free Trade Agreement (NAFTA).
ginal electric power interconnections (except in the case of Central America), but with highly limited trade flows between the countries. These integration schemes, however, started changing substantially with the implementation of reforms, especially in the Southern Cone of the region.

As a result, in addition to other factors, among which there are those involving the endowment of natural resources, the progress of integration is closely linked to the scope and depth of the reforms implemented in the countries of the different subregions.

The subregions show a greater or lesser participation in the different coordination schemes for economic transactions, especially those for energy industry. In the Southern Cone of the region, the open market scheme prevails, whereas in northern South America and Mexico, large parts of the economy and also of the energy sector continue to use the centralized command and control coordination scheme or have implemented partial liberalization. Nevertheless, either because of a similar endowment of resources or because of the differences in the depth of the reform processes and/or in the pace of implementation of these reforms, the progress achieved in energy integration actions is as yet quite limited.

As for the Caribbean subregion, energy reforms have exerted a comparatively lesser impact either because the predominantly state scheme has been kept (centralized command and control, single buyer, regulated integrated)⁹⁹ or because there already were integrated quasimonopolistic private companies.¹⁰⁰ Integration processes in this space did not record the progress or drive observed in other areas of the region. Even the initiatives of bilateral agreements with extra-regional countries (Venezuela and Central America) have shown greater impetus. These general observations are also applicable to the specific situation of energy systems. It is clear that the island geography of the subregion considerably hampers the possibility of concretizing integration projects that require physical infrastructure. Although there are some electric power interconnection projects being studied and assessed, their actual implementation is highly unlikely for the time being. In the case of natural gas, there is an interesting potential for the supply of liquefied natural gas (LNG) and/or compressed natural gas (CNG) from Trinidad and Tobago to the remaining countries of the subregion (Brazil) or outside the region.

In the Central American countries, there have been processes aimed at allowing the wider participation of private-sector players, and the growing role of market mechanisms inside the countries has been proposed. Nevertheless, the differences observed in the institutional organization of energy industry and in its regulatory approaches constitute major barriers preventing potential benefits from the integration of markets for oil products and electricity from materializing. In the case of this subregion, the reduction of energy supply costs and environmental preservation are very closely linked to the enlargement of the market through fuller integration. The constraints of small domestic markets and how they affect the actual functioning of competitive mechanisms have already been mentioned. It is therefore very likely that the processes for liberalizing energy industry will lead to very strong oligopolistic situations to the detriment of the motivations that were stated at the time of implementing the reforms. In any case, the Electric Power Interconnection System of the Central American Countries (Sistema de Interconexión Eléctrica de los Países de América Central—SIEPAC) continues to the most ambitious energy integration project in the area, although it has reoriented its objectives toward the establishment of a subregional electric power market, based on the consolidation/upgrading of the electric power interconnections that already exist between the countries.¹⁰¹

⁹⁹ Regarding this, the cases of Cuba and Trinidad and Tobago could be mentioned with respect to all energy subsectors, whereas Haiti and Dominican Republic could be indicated in the case of electricity.

 $^{^{\}rm 100}\,$ Barbados and Grenada in the electric power subsector.

¹⁰¹ See OLADE, Energy integration and regional integration in Latin America and the Caribbean, Quito, 1999, pages 25-26.

Phases	Characteristics	Political Strategy
Pre-Reform	Trade focusing on tapping comparative advantages and eventually joint public projects. Constraints on foreign direct investment	Agreements/treaties between States. Partial dismantling of barriers. Passive private-sector participation.
Reform	Trade liberalization and opening up to foreign direct investment	General dismantling of customs and noncustoms barriers. Withdrawal of the State. Common external customs duties. Insertion of private-sector activities.
Transition	Intensification of trade. Strong physical linkages by means of infrastructure projects.	Active participation of private sector. Induction to the elimination of barriers. Common external negotiations in bloc.
Post-Reform	Unification of goods/services and labor markets	Elimination of barriers. Common macroeconomic and financial policy.

Table 3 Reforms and changes in the integration schemes

There are also other ambitious electric power and gas integration projects (the latter type of project either based on the G3 agreements or from the southern zone of Mexico) that have proven to be profitable. The implementation of these projects requires conditions of equity for all the countries of the Isthmus and corresponding agreements involving the management of markets.

In 1994, the Andean Energy Coordination Committee (Comité Andino de Coordinación Energética—CACE) was approved in the region in order to coordinate, complement, and integrate the area's energy systems. To date, "... electric power interconnections are the only ones that have materialized in the subregion, although there is a large number of intra-regional and inter-regional gas projects, especially in Mercosur."¹⁰² "In the electric power subsector alone, there have been international exchanges between Venezuela, Colombia, and Ecuador and they have involved magnitudes that were far smaller than expected. The interconnections that have been built were addressing very specific situations and were developed in order to provide backup between border electric power systems, without looking for any optimization in the joint use of resources."¹⁰³ Over the shortand medium-term, the most important electric power interconnection projects are concentrated in Ecuador: with Colombia to the north¹⁰⁴ and Peru to the south.¹⁰⁵

As for natural gas, there are no interconnections between the countries of the area. The majority of the countries that have large gas resources (Venezuela, Colombia, Peru) have maintained " ... a self-sufficient scheme with potential surpluses that could find vast markets in Mercosur and Central America."¹⁰⁶ Only Bolivia has a long tradition of exporting natural

¹⁰² OLADE (1999), op. cit., page 43.

¹⁰³ Ibid., page 43.

¹⁰⁴ Interconnection line between Pasto (Colombia) and Quito (Ecuador).

¹⁰⁵ Linkage between Milagro or Machala (Ecuador) and Piura or Talara (Peru).

¹⁰⁶ OLADE (1999), op. cit., page 50.

gas to Argentina. Despite this, there is an important group of subregional and inter-regional gas interconnection projects, with prefeasibility studies available or in the process of being assessed.¹⁰⁷

In the Southern Cone,¹⁰⁸ the new privatesector players have shown, as indicated earlier, strong impetus for taking advantage of the business opportunities being offered by the physical and trade integration of energy markets. Various gas and electric power interconnection projects between Argentina and Chile¹⁰⁹ and the gas interconnection between Argentina and Uruguay have been or are being implemented.¹¹⁰ The first gas line between Santa Cruz (Bolivia) and São Paulo (Brazil)¹¹¹ is already operating, and there are other advanced projects for supplying natural gas to the southern zone of Brazil from Bolivia and Argentina, including in the latter case the demand for this fuel in the most populated area of Paraguay.¹¹²

In addition, the reforms in Argentina's electric power sector have led to major investments in electric power generation,¹¹³ which in turn have led to an excessive provision of facilities. In this situation, the thermoelectric generators

- Cartagena (Colombia)-Colón (Panama), with a prefeasibility study.
- Colombia-Ecuador, aimed at supplying the southwestern area of Colombia and demand in Ecuador, mainly for electric
 power generation, with a prefeasibility study.
- Ule (Venezuela)-Maicao/Tibu (Colombia), although this project was suspended owing to the discovery of gas reserves in Colombia (Llanos Orientales), it would be aimed at complementing these resources in view of the expansion of the Colombia market toward the future.
- Camisea (Peru)-Santa Cruz (Bolivia), which would be aimed at provided a backup for Bolivian supplies for export to Brazil.
- Central American Isthmus Gas Pipelines, Venezuela-Colombia-Nicaragua, with a prefeasibility study.
- Pan-American Pipeline between Morón (Venezuela) and Cactus (Mexico), whose layout would also interconnect Colombia and Central America, with a prefeasibility study.
- Puerto Ordaz (Venezuela)-Manaos (Brazil), simply an idea.
- ¹⁰⁸ Argentina, Bolivia, southern Brazil, Chile, Paraguay, and Uruguay.
- ¹⁰⁹ The gas pipeline linking Argentina to Chile in the Central Zone (Mendoza-Santiago de Chile), as well as two other lines in the Northern Zone (one of which, GASATACAMA, started up in May 1999), are already operating. In addition, in the latter zone, a 345-kV transmission line (Interandes) has been operating since April 1999 in order to carry to the Interconnected System of Greater Northern Chile (SING) energy generated in the proximity of the gas reservoirs located in northeastern Argentina (see OLADE, 1999, op. cit., page 63). Nevertheless, in the latter case, there is not electric power interconnection between the systems of the two countries because this generation is not linked to the electric power system of Argentina and therefore is not part of the Bulk Electric Power Market (Mercado Eléctrico Mayorista—MEM).
 - In addition, there are other gas pipelines between Argentina and Chile:
 - Norandino Gas Pipeline, Pichanal (Argentina)-Tocopilla/Mejillones/Coloso (Chile).
 - Pacific Gas Pipeline, Neuquén (Argentina)-Concepción (Chile).
 - Gas Pipeline between Cóndor and Posesión, which is aimed at supplying natural gas to the third methanol production train in the METHANEX plant at the southernmost tip of Chile.
- ¹¹⁰ Buenos Aires-Montevideo Gas Pipeline already being built and another operating on the Argentina seaboard toward Paysandú, aimed especially at supplying feedstock to a thermoelectric plant in Uruguay.
- ¹¹¹ It was inaugurate in 1999 and involved an investment of about US\$2 billion. The principal members of the consortium are PETROBRAS, ENRON, Shell, and British Gas (OLADE, 1999, op. cit., page 77).
- ¹¹² The following projects are already being built:
 - Cuiabá Gas Pipeline (Bolivia-Brazil), which is a branch of the gas line from Santa Cruz to São Paulo
 - Uruguayana Gas Pipeline (Argentina-Brazil), which starts at Entre Ríos, goes through Uruguayana and ends up in Porto Alegre.

In the list of additional projects, aimed at supplying the south and southeast of Brazil (and Paraguay), the following are noteworthy:

- Mercosur Gas Pipeline, Salta (Argentina)-Asunción (Paraguay)-São Paulo (Brazil)
- Austral Gas Pipeline, Cuenca Austral (Argentina)-Montevideo (Uruguay)-Porto Alegre (Brazil).
- Trans-Chaco, Chuquisaca (Bolivia)-Asunción (Paraguay).
- Camisea Gas Pipeline (Peru)-São Paulo (Brazil).

Ibid., pages 78 and 80. In this publication, some additional details on the characteristics of these projects can be consulted (length, diameter, capacity).

¹¹³ With the investors' clear intent to achieve a position on the market. These investments, along with the access to low-cost natural gas, were decisive factors to improve competitive conditions compared to other players.

¹⁰⁷ Among these projects, the following are noteworthy:

of the country have exerted pressure to be able to penetrate the markets of southern Brazil and have already drawn up export contracts on the order of 1000 MW; there is a request for permits to draw up additional contracts for 4000 MW.

Liquid fuel trade between the countries of Mercosur and Chile has increased substantially, as a result of oil exports from Argentina to the remaining countries, stemming from the fast recovery of reserves being made by the privatesector players in the latter country.

All of these actions were taken as a result of private-sector player initiatives (especially in Argentina and Chile) and they have been implemented or are in an advanced stage of implemented, regardless of the differences that can be observed in the schemes adopted by the reforms in the area's countries. The profound restructuring of Argentina's energy system has a major influence on the advance of these integration actions; however, the full integration of markets is still a far distant goal, despite the existence of Mercosur.

5.3.2 Some salient features of interaction between reforms and integration

On the basis of the different evolution of the integration processes in the different subregions of LAC, briefly described in the previous section, several patterns of linkage between the nature of the reforms and the integration schemes can be deduced:

First of all, it is clear that the full integration of energy markets is hardly compatible with the centralized command and control scheme. The economic integration of centralized systems requires the transfer of a large part of national control either to a multilateral or to a supranational entity, in other words, the abandonment of one of the essential elements of this scheme. The other forms of integration (physical, political, and business) seem to be viable and feasible and, as a result, compatible with both coordination schemes.

Nevertheless, whereas certain forms of physical integration are more easily associated

to a centralized command and control scheme, others are more feasible with the market scheme. An international interconnection system that provides for the open access to networks would result compatible with the free play of market forces (within the framework set by the regulations) inside the countries; if a centralized command and control scheme prevailed in the countries, however, a regulation governing the quotas and the compensation would be required.

The greater impetus stemming from the possibility of taking advantage of business opportunities in an open market system is in contrast with the complex difficulties that emerge when implementing large-scale physical integration projects that ultimately need some type of government backing. Nevertheless, it would be difficult for the private sector to promote a multilateral interconnection project owing to the high degree of political and economic complexity that would be involved. This type of initiative requires the existence of multilateral agreements, which can be drawn up more easily in the framework of a multilateral institution, where the participants are the governments of the countries.

Political integration is feasible in both coordination schemes. Nevertheless, it could be more feasible under a centralized scheme owing to the higher capacity for negotiating and financing, as well as the availability of technical staff that the State can provide because of its close ties to the companies it controls. When the modernization process undermines the financial capacity of the State, the options for these types of economic integration are also limited. This weakness can be heightened even further when there is a conceptual confusion of associating the change of scheme inward with the intensification of the political integration process. This association would have highly undesirable consequences even in the framework of the new market-dominated paradigm.

Furthermore, the open market scheme leads to a considerable expansion of business opportunities for private-sector players and, therefore, to a wider range of business integration initiatives. As a result, to the extent that outward and inward liberalization is ensured, the conditions for regional companies will improve, as well as the conditions for them to extend their operations to areas outside the region.

Nevertheless, business integration is not compatible with certain variants of the centralized command and control scheme. Indeed, the strategic alliances of the region's state enterprises, aimed at improving their access to resources and to intra-regional and extra-regional markets, are also compatible with this scheme.

5.4 Impact of energy integration on energy prices

In the case of tradable energy sources, market integration necessarily implies a convergence of their prices. The contraband trade of this type of energy source in the border zones of countries with very different price levels and limited customs clearance controls in place is tangible proof that it is not viable to maintain differential pricing policies in open trade areas.

For the energy sources that are carried and distributed through fixed networks (and therefore are not marketable), the situation is quite different. In this section, special attention will be focused on electricity, where the degrees of integration that are possible are highly variable and where the regulatory frameworks installed by the reforms are diverse.

It is clear that the integration of the electric power systems, even when they do not involve interconnections that permit bulk trade and keep dispatch at the national level, can provide major benefits to all the countries of the integration area that is considered, either because of the hydropower complementariness between countries with different hydrographic characteristics and basins (reducing water spillage and optimizing its water storage), or because of hydrothermal support between national systems (reducing hydrological risks tapping the variety of availability and cost of fuels, principally gas) or because of the potential differences in hourly load between systems, as well as seasonal complementation.

In a recent paper by the CIER, different alternatives for electric power interconnection corridors in the subregion of South America were analyzed and overall benefits for the subregions and each country were calculated.¹¹⁴ "Regarding the savings from interconnections, the impacts on the players show considerable differences, with high earnings for some and steep losses for others, despite the overall benefit stemming from them. Indeed, in most cases, these adverse impacts are, in absolute terms, significantly higher than the benefits, many times over the value of the latter. Such asymmetries and, in particular, the damage caused can generate resistance and barriers opposed to integration."115

"Indeed, this large disparity between the losses incurred by some players and the benefits made by others, as well as the disproportionate amounts in terms of absolute value, regarding the real benefits of integration (savings of operating costs of the whole), may trigger undesirable consequences, such as:

¹¹⁴ "A group of corridors were selected for economic analysis and quantification of their impacts, keeping in mind three year break (2000, 2005, and 2010) and various carrying capacity variants. The interconnections that were selected and the resulting flows were the following:

[•] Andean Community: Peru-Ecuador-Colombia-Venezuela, mostly exports from Venezuela and Peru to Colombia and Ecuador.

[•] Mercosur as a whole and specific segments, mainly Argentina-Brazil, Argentina-Uruguay, and Brazil-Uruguay, secondary energy exports from Brazil, and thermal energy from Argentina and Uruguay, in hydrologically scarce years in Brazil.

[•] Chile-Peru, exports from Chile to Peru.

Chile-Argentina, exports from Argentina to Chile.

Bolivia-Brazil. A flexible dispatch of well-head thermoelectric plants in Bolivia was estimated versus Brazilian generation on the basis of take-or-pay contracts for gas. The flexible plants enable secondary hydropower energy to be tapped even more fully, facilitating less gas consumption for the same amount of generation." CIER, "CIER 02 Project: Bulk Markets and Interconnections, Phase II," December 1999.

¹¹⁵ CIER, op. cit.

- Opposition to electric power integration on the part of those players that have been adversely affected (consumers, generators, and eventually public authorities) by this integration, with the eventual neutralization of its benefits.
- Crisis and/or eventual elimination of generators owing to the negative impacts coinciding with periods of hydrological abundance, despite their future needs in inverse situations with marked dry periods, in which their participation might be required critically.

The impacts vary according to the configuration of each corridor, with the direction of the flow, whether in one direction or both directions, also exerting an influence, among other factors. In the case of a single direction, in the exporting country the generators record earnings and the consumers losses, whereas in the importing countries, the generators record losses and the consumers earnings. In the case of both directions, the generators of both countries have losses and the consumers earnings, as a result of the lower payment for the same energy."¹¹⁶

"Another important aspect is the impact of the interconnection on the volatility of the spot markets of the countries. For example, the spot price in Argentina is much more stable than the one in Brazil. This characteristic is reflected in the respective regulatory frameworks: in Argentina's system the competition between generators is based on the spot remuneration; in Brazil's system, demands are obliged to sign contracts and thus mitigate the earnings of the generators. Nevertheless, an interconnection of 3,000 MW, for example, between the countries can lead to an increase in the volatility of Argentina's system and thus disrupt the economic balance of its market. In other words, the same generator supporting the construction of

¹¹⁶ Ibid.

the interconnection for export purposes, is opposed to it for import reasons."¹¹⁷

In order to prevent this type of impact from becoming a barrier for the implementation of advantageous integration projects, it is necessary to provide some criteria for the determination of domestic bulk prices of electricity. Thus, for example, in the above-mentioned paper issued by CIER, some formulas are proposed to separate, totally or partially, the determination of the domestic bulk price from the impact that the export or import stemming from the interconnection exerts on the system.¹¹⁸

The first mechanism that is analyzed is aimed at protecting local consumers from eventual price hikes as a result of electricity exports, either on a permanent basis of comparative advantages and from mutual assistance in critical supply situations.

This mechanism consists of breaking the ties between domestic prices and export prices, as provided for in the Colombian regulations after the last changes were made to the regulations. Therefore, it is considered that the sales on the local market will have to be made using local prices, which are set by the marginal cost of the exporting system for the local demand level. In other words:

Local price = CMg_{LAE}

Where CMg_{LAE} is the marginal cost of the local system (exporter) before considering exports.

Even though no regulations in the South American system have provisions regarding this, the possibility of establishing some mechanism that would reduce the risk of the generators of importing systems when facing steep drops in prices as a result of electricity imports have been considered.

¹¹⁷ Ibid.

¹¹⁸ Ibid., pages 121-122.

Because of this, it was considered that the consumers of the importing system would buy energy supplied by local generators at a intermediate price between the marginal cost of the importing system before the import and the marginal cost for the local demand level after the import. It should be said that, when an import does occur, the local price would be determined as follows:

Local price = $CMg_{LAM} + (1 -) CMg_{LDM}$

Where:

- **CMg**_{LAM}: Marginal cost of the local system (of the importing country) before considering the import.
- **CMg**_{LDM}: Marginal cost of the local system (of the importing country) after taking the import into account.
- : Parameter whose value can fluctuate between *0* and *1*.

Of course, the preceding analysis would be meaningless if a full integration of the systems were to take place with a single dispatch.

5.5 Role of financing institutions

In the formulation and implementation of economic and infrastructure restructuring processes, the governments of the region's countries oftentimes relied on the work of national institutions that were especially created for this purpose or on the recommendations of international consultants. Nevertheless, the technical and financial support of multilateral institutions also played a major role.

The multinational financial agencies have assumed the role of "guiding light" of modernization and have provided a series of loans under highly favorable conditions for the preparation and implementation of these reforms.

Regarding the infrastructure sectors, this orientation involved two specific guidelines. On the one hand, multilateral credit agencies considerably limited the possibility of gaining access to financing for the investment projects of public enterprises, especially those of the energy sector. The principal argument that was set forth to substantiate this type of decision was that there was private capital available to tackle these investment projects, whereas the financing of multilateral origin aimed at the public sector was supposed to focus on the specific purposes of the State.

In addition and in keeping with this argument, multilateral institutions showed a strong willingness to finance the implementation of transformation processes that were to lead to this change in the State's role in the economy as a whole and in energy industries in particular.

Thus, in view of the fact that the renegotiation of the external debt was imposed as a condition for permitting the countries of the region to gain access to international financial markets, this approach adopted by the multilateral credit agencies became a decisive factor to promote reform processes. Part B: Elements for Energy Policymaking

VI. Policymaking Process

6.1 Nature of energy policy

6.1.1 Energy policy comes from the national development policy

Development policy focuses on the system's structural aspects; it therefore has to do with a long-term socioeconomic policy. Its components can be classified into two closely linked groups: general or transversal policies (prices and income, employment and human resource training, financial, commercial, institutional, technological, and environmental policies, etc., cutting across and affecting all sectors) and specific sector poli cies (mining, agriculture and livestock, forestry, industry, energy, transportation, etc.). These policies are aimed at designing and promoting a course for national development and, as a result, they are subject to external conditions and must evolve in situations of shared power. Building up their viability is therefore an essential part of their implementation strategy.

Ideally, the short-term macroeconomic policy (fiscal, monetary, exchange rate) should be subordinate to a country's or region's overall development policy, so that it can be in line with the course laid out by this latter policy. Nevertheless, the complexities of specific situations in time frequently alter, albeit at different degrees of intensity, this ideal coherence or convergence of policies. This type of distancing or rift that may occur is generally the result of abrupt changes not envisaged in the framework conditions (international level) and/or is due to pressures exerted by different social groups on those in charge of specific policies at the heart of the government. Political and electoral considerations also tend to introduce distortions in this regard. But whatever the cause, it is clear that, in the presence of sharp contradictions, the specific policies are the ones that set the course taken by the country.

Viewed as such, energy policy is a specific sector policy of the long-term socioeconomic policy. Nevertheless, among those countries where energy exports are an essential determinant of macroeconomic performance, the decisions or objectives involved in these export activities go far beyond mere energy sector policy.

Furthermore, in order to address the existence of different production chains inside the energy system, the corresponding policy can be broken down just as development policy can be broken down: *general or transversal policies* (supply, prices, financing, institutions, technology, environment, rational use of energy, human resources training, etc., cutting across and affecting all activities) and *specific subsector policies* (oil, gas, electricity, nuclear energy, coal, new and renewable sources of energy). It is clear that general or transversal policies inherent to the energy sector in general constitute a particular specification of those policies that pertain to the general development policy.

6.1.2 Energy policy is a responsibility of the State

The responsibility of designing and applying the energy policy corresponds to the State. There are various reasons for this attribution:

- In view of the possibilities of ensuring those benefits that have a global social purpose aimed at improving sustainable development and bearing in mind that the rationale of the individual decisions taken by the players does not necessarily incorporate objectives that have a preeminently global character, the State's intervention is not only desirable but also mandatory.
- The characteristics inherent to energy systems fully justify the need for the abovementioned intervention of the State. Indeed, among these characteristics, the following are noteworthy: production of basic commodities for the functioning of the production system and the welfare of the population; the production of strategic natural

resources; the use of public assets; the existence of markets that are clearly noncontestable oligopolistic or monopolistic markets, as well as the production of economic revenues, and the existence of socio-environmental externalities, especially abundant when decisions are decentralized and market mechanisms prevail.

- The subsidiary intervention of the State is necessary. The introduction of market mechanisms can improve the productive efficiency of companies, but it is far from ensuring compliance with other important objectives of sustainable human development. The insufficient coverage of basic energy needs, in terms of quantity and quality, is another especially important problem on the agenda of the countries of LAC, which is far from being resolved spontaneously by means of mechanisms introduced by the reforms.
- The State has unavoidable responsibilities. Social domain over natural resources, in the tradition typical of Latin American countries, implies an inevitable responsibility of the State in the supervision of resource management on behalf of society, especially in the case of nonrenewable sources of energy. Likewise, the divergence between private costs and social costs associated to the neqative impacts on the environment requires state intervention, which cannot be delegated to any other sector. The forces stemming from the process of globalization and domestic structural changes should not be considered as forces that are above and beyond those of the State itself.

The formal processes for designing socioeconomic policies are developed in the legal and institutional framework that assigns jurisdictions and attributions to the different branches of government, especially the executive branch. Energy policy therefore has to be developed in this fundamental framework. 6.1.3 Designing an energy policy requires the participation of all stakeholders

Keeping in mind the importance of the interactions between the energy system and the economy, society, the natural environment and politics, it is quite evident that energy policymaking aimed at promoting sustainable development should necessarily be systemic. "... this approach requires the involvement of players that are both the protagonists and target of sustainable development, such as the powers of the State (executive, legislative, and judicial branches) at different levels (central, provincial, and municipal), as well as company representatives, workers, and the rest of society because sustainable development is a shared responsibility that is unavoidable and is compatible with a democratic system. While the latter establishes a political mechanism for social coexistence, sustainable development promotes equilibrium in meeting social needs, which ensures this coexistence."119

6.2 Principles, criteria and framework conditions

6.2.1 The new framework conditions for energy policy

The transformations introduced in the production and institutional structure and in the operational schemes of the region's energy systems involve, as a rule, a profound change in energy policy formulation and implementation conditions.

As indicated in the previous chapter, the evolution of the reforms applied to energy industries generally involve a shift from the centralized command and control scheme (CC), with absolute predominance of public enterprises, toward a diversity of situations, characterized by a greater role for market mechanisms and the growing presence of private-sector players. Even in those cases where control of energy activities has remained in the hands of public enterprises, efforts have been made to promote greater

¹¹⁹ See OLADE-ECLAC-GTZ, Energy and Sustainable Development in Latin America and the Caribbean: Approaches to energy policy, Quito, May 1997, page 69.

autonomy of management and a more businesslike orientation.

As part of the CC scheme, prevailing before transformation processes, energy policy was implemented by means of decisions directly taken by the State with respect to prices and the allocation of resources, since state-owned enterprises were simply an extension of the central government administrative apparatus. In this situation, the actions of companies were part of the general goals of socioeconomic policy and energy planning, which had clear standard-setting purposes and were the preferred instrument used to define resource allocations in keeping with sector policy objectives.

The inter-relation between the State and public enterprises was not without its fair share of conflicts and contradictions with respect to the formulation and implementation of energy policy. It is clear that, when referring to the State, it is not possible to view it as a single player that is internally homogeneous, but rather it is a group players that oftentimes defend visions or interests that are partially divergent or contradictory. Normally, when defining policies, to these differences at the very heart of the State's own apparatus can be added pressures from political parties and different social groups.

Even the entities at the head of large public enterprises had the power to use their economic leverage to ensure that some of their own objectives prevailed over those of the centralized political administrative power. Nevertheless, as part of the new situations indicated previously, the conditions for implementing energy policy have become far more complex.

On the one hand, liberalization aimed at ensuring the free play of market forces implies the need to use policy instruments that are much more indirect to affect supply and demand players.

In addition, the decentralization of decisions regarding the allocation of resources in the sector has given rise to new challenges to achieve compatibility between microeconomic rationality and the global and subsector purposes of energy policies. It is clear that a business approach to the management of the business units of the sector will not always coincide with the interests and aspirations of society as a whole.

In short, although it can be asserted that the situations in which policymaking and implementation have normally evolved have never been characterized by absolute power or total consensus, the context stemming from the reform processes is at present noteworthy for the sharing of power. In this situation, it is far more important to focus on aspects involved in ensuring the viability of the objectives and instruments proposed than was apparent in the prior situation.

6.2.2 International conditions

Part A outlined some of the principal characteristics of the evolution of the international economic context and its influence on socioeconomic and energy reforms and integration processes in the region.

The present section only intends to highlight a set of international aspects that should be considered as external or framework conditions for the formulation of national energy policy. Among these aspects, the following can be mentioned:¹²⁰

- In the framework of market globalization, the countries of the region compete between each other and with those of other regions to attract investments. The need to lure investment has required the almost total deregulation of capital movements.
- Local capital markets, whose expansion was partially linked to reforms in the infrastructure sectors, have a very incipient development and are extremely vulnerable to the instability of international financial flows.

¹²⁰ See OLADE-ECLAC-GTZ, Energy and Sustainable Development in Latin America and the Caribbean: Approaches to energy policy, Quito, May 1997.

- As a result of the redefinition of the mission of international and multilateral organizations, less priority has been granted to the financing of public energy projects and pressure has been exerted for sector activities to be transferred to private-sector players.
- The consolidation of regional economic blocs has contributed to an authentic scenario to cope with the risks that are emerging from the globalization of markets. This means that, for the countries of the region, special attention must be focused on integration processes.
- Energy issues no longer have the priority they once had on the agenda of industrialized countries and multilateral organizations. At present, their interest is focusing much more on environmental considerations linked to the sector, especially greenhouse gas emissions.
- Sustainable development concerns, which have also been biased by environmental issues, have become part of the objectives driving the actions of international organizations and cooperation agencies. Nevertheless, the problems of equity have been the subject of less attention to date.
- In the management of natural energy resources, a vision questioning State control and proposing the elimination of interventionist policies in favor of market mechanisms and the openness to new private-sector players permitting the incorporation of technological breakthroughs has prevailed.
- 6.2.3 Some principles orienting energy policymaking

Taking into account the new national and international context in which the State must develop and in view of pending challenges that have been indicated in the previous section, a set of general principles that will serve to orient the energy policymaking process toward more sustainable development is provided below:¹²¹

- The diversity of situations with respect to the endowment of natural resources and the disparity of economic and social conditions presented by the countries of the region make it advisable that energy policymaking be based on options that are inherent to each specific reality, rather than on doctrinaire approaches supposedly applicable to all situations.
- The experiences emerging from other realities can serve as references. Nevertheless, the point of departure for policymaking requires a careful study of specific situations aimed at identifying objectives and selecting instruments that will enable the options that have been chosen to be implemented, as well as analyzing their possible impacts on the different relevant dimensions.
- The spheres of action of market mechanisms, established on the basis of the regulatory change in energy industries, along with the opening up to permit private-sector participation, require special attention to promote a balance of power and to prevent anti-competitive behavior. Thus, the frameworks and regulatory entities that were formerly established can turn out to be insufficient to prevent this type of situation.
- The introduction of reforms may have improved the performance of energy activities with respect to business management and the efficiency of production. Nevertheless, this does not mean that other important sustainable human development objectives have automatically been achieved. As a result, the complementary action of energy policy turns out to be indispensable. The insufficient coverage of basic energy needs, in terms of quantity and quality, is an especially important problem on the agenda of the region's countries that cannot be

¹²¹ Ibid., pages 63-64.

resolved spontaneously by the mechanisms introduced by the reforms.

- The conditions that can come from supranational organizations, of which the countries have voluntarily become members (for example, OPEC, OECD, APEC).
- Social domain over natural energy resources in the tradition of the region's countries inevitably requires that the state oversee their management on the behalf of society. This is especially applicable in the case of nonrenewable resources. Likewise, the divergence of private and social costs stemming from adverse environmental impacts also means that energy policy has an ineluctable responsibility in promoting sustainable development.
- As part of these guidelines orienting energy policymaking, the support to supra-national organizations that are aimed at expressing and representing the region's common interests in international forums, as in the case of industrialized countries, should not be neglected either.

Finally, it should be underscored that the orientation that has been given to reform processes to set up coordination schemes involving the open market has led to the prevalence of approaches focusing mostly on the short term and to a certain extent neglecting the need for long-term strategies from a public perspective. It is clear that, in the case of energy, which involves goods, services, and basic infrastructure for society, the State cannot ignore the need to outline strategies aimed at improving sustainable development and formulating policies that orient the system in that direction.

6.3 Formal bases for energy policy

Formal socioeconomic policy processes are based on fundamental norms that govern the Constitution of the State itself, the distribution of functions of their different powers, and the system of laws and decrees that define the jurisdictions in all areas of the executive branch. It is clear that energy policy, as part of this, has to develop formally in this fundamental legal and institutional framework. In fact, the restructuring processes themselves in some countries have required, for their formulation and implementation, changes in this legal and institutional framework, whether on the basis of amendments to the constitution or the enactment of general State reform laws.

Reform processes in turn have required specific legal instruments that have led to a new productive and institutional structure and a change in regulatory standards. These actions added framework conditions for energy policy to the extent that they introduced long-term structural changes and modified more or less thoroughly the functions of the system's players, including the role of the State itself and the nature of its intervention in the sector's production activities.

Chapter III provides a brief description of transformation processes and, among a wide variety of situations in terms of pace, depth, and scope that these processes have had and/or have, the most characteristic courses/pathways (evolution) are indicated.

The prevailing orientation, however, indicates that, in most cases, the above-mentioned modification of functions is important and that it will tend to deepen in the near future. The institutional organization that is induced by the reforms involves not only a redefinition of preexisting roles but also the creation of new functions, other players and rationales.

6.4 The role of players in the new coordination schemes

In the CC scheme, the State was simultaneously in charge of business administration, policymaking, regulation, and oversight for energy sector activities. These activities were therefore, to some extent, a continuity of the central administrative apparatus of the State, and energy policy actions in the supply system were carried out directly (resource allocation, price management, setting and monitoring of standards, etc.). With the change of coordination schemes, these functions have been separated. First of all, the State now has a tendency to drop its former business functions, while keeping policymaking activities (using other ways of intervening) and taking over new responsibilities in terms of regulation and oversight.

The nature of the changes in the intervention schemes using policy instruments, as part of the new productive and institutional organization situations and on the basis of different regulatory principles, has already been discussed. The unavoidable responsibility of the State in the implementation of policies that promote sustainable development has also been underscored. What now has to be examined is the way of organizing regulatory functions that have been set up with the progress achieved in reform processes.

The concept of regulation (in accordance with the Anglo-Saxon tradition¹²²) involves basically three types of functions (see Chart 4):

- Policymaking and standard-setting functions.
- Monitoring and oversight functions (legal and administrative).
- Operational coordination functions.

All of these functions involve political, legal-institutional, economic, and technical dimensions, which is what gives them their highly complex nature.

The political dimension focuses especially on the first group of functions. In this case, the political power establishes the basic regulatory principles (generally through the enactment of laws) depending on the orientation of its socioeconomic and energy policies and regulatory norms (by means of decrees and resolutions).

This type of function remains in the specialized agencies of the executive branch, which drafts bills and regulatory decrees and issues resolutions aimed at specifying more extensively all regulatory frameworks. In this policymaking and administrative area, the State also usually has the power to grant concessions (to private or public enterprises governed by private law) for undertaking of activities in certain links of energy production chains (exploration and production of hydrocarbons, transport and distribution by networks, development of hydropower resources). The concession contracts specify the rights and obligations of the concession holders and the penalties that are imposed for failure to comply with these obligations.

The oversight functions are aimed essentially at supervising and monitoring compliance with regulatory norms and the provisions contained in the concession contracts by the system's players. Sanctions will therefore have to be applied on the basis of the norms that have been established for those situations where norms have not been complied with.

Also included in these functions is the mission to resolve conflicts that might emerge among the players. Therefore, these functions must also include the interpretation of norms, the organization of public hearings if necessary, and the issuance of decisions. Depending on their nature, these functions essentially have a legal character. In fact, the appeals that can made to question decisions made by those entities in charge of these functions are first handled by administrative proceedings before being transferred, if necessary, to purely judicial proceedings.

In view of these characteristics, the decisions taken by the entity in charge of this type of function constitute, to some extent, a legal framework capable of filling in gaps or adding a more specific character to regulatory norms. In addition to determining which functions corre-

¹²² In this tradition, the concept of regulation is closely linked to microeconomic activities, where regulatory interference actions focus on "market flaws" (the existence of barriers and/or externalities) or, according to more recent visions, on the lack of contestability or on the presence of "missing markets" (see, for example, D.F. Spulber, "Regulation and markets," MIT Press, Massachusetts, 1989). According to the French regulationist school of thought, the concept of regulation, however, is linked to the dynamics of accumulation of the capital system (see, for example, GRREC, "Crise et régulation," Grenoble, 1983).



Chart 4 The role of energy system players

spond to each level, the basic regulatory frameworks must define the institutional characteristics of the entity(ies) that will be responsible for implementing them. It is clear that, given the nature of these functions, the agency that has jurisdiction must belong to the public sector, regardless of the degree of autonomy and/or autarky it is granted.

In the concrete experience of the region's countries, there has not always been a clear institutional boundary between these two groups of functions (policymaking/standard-setting and oversight/monitoring). Nevertheless, as a rule, the policymaking/standard-setting role has remained in the ministries of energy and mines or in the energy secretariats or commissions, while public service superintendences or entities, whether specialized or not, have been set up to take over the functions of oversight and monitoring.

The operational coordination functions have been relevant exclusively in the case of the electric power production chain (and eventually in the case of natural gas). Essentially they involve economical load dispatch and management of power generation bulk market transactions. It is clear that these functions should be clearly established and specified in the corresponding regulatory norms.

Regarding the third type of functions, the concrete institutional solutions that have been observed in the new structure prevailing in the region's electric power systems are highly diverse. In some cases, an independent entity has been created to carry out the specific activities of each chain of the electric power chain, but including in the conduction of its activities representatives of the players that are recognized as such on the bulk market.¹²³ In other cases, these functions have remained associated to the high-voltage transport link, with the creation of an entity in charge of dispatch, where certain forms of representation of the

players, especially those from generation, have been formulated.

In the sector of the system's own production activities, different degrees of opening up to private-sector investors have been proposed (depending on the countries and links of the energy chains) and under different schemes of insertion (sale of assets, concessions, associations with public enterprises, capitalization in the form of mixed enterprises).¹²⁴ Likewise, greater managerial autonomy has been given to the public enterprises that have remained in the system, some of which have been converted into companies governed by private law.

Thus, when the change of scheme has been profound and the CC coordination scheme has been completely dropped, energy supply players tend to use a business approach, in other words, a rationale where the primary objective is earning a profit, in the framework established by the regulation (including the obligations of the concession contracts). In this case, the investment decision has remained in the hands of the players (except for the commitments made in these contracts), in response to this rationale.

Nevertheless, objectives such as long-term security supply require that, even in the OM coordination scheme, the State must play a subsidiary role with respect to the action of players involved in production. In addition, the objectives related to environmental concerns or equity issues with respect to the rural sector, may also require some direct actions taken by the State.

Finally, it should be underscored that the actions of different entities or levels of government (national or federal; state, regional or departmental and municipal) are usually asymmetrical, in other words, they do not have the same functions, attributions, and activities in terms of energy. The importance of each one of them will depend on the specific legal system of

¹²³ This is clearly the case of the joint stock company of Argentina's electric power system, the Bulk Power Market Management Company (Compañía Administradora de Mercado Mayorista Eléctrico Sociedad Anónima—CAMMESA).

¹²⁴ See Chapter III.

each country. It should be recalled that each State has its own structure, which is comprised of a series of elements that interact in a complex system of attributions and jurisdictions to delimit their sphere of action in terms of subject, degree, territory, and amount. This structure has been set up in order to ensure that its components do not interfere with each other; that responsibilities be duly distributed in terms of the organization itself and for the purpose of responding to third parties; and that authority be granted in keeping with their responsibility so that they can carry out their activities on the basis of their skills and the training of the persons in charge of these activities. Since energy has been viewed historically by the countries of LAC as a strategic or essential commodity, the functions carried out by the State to duly achieve its goals in terms of energy have been largely concentrated at the highest government level.

VII. Energy Policy Objectives and Instruments

7.1 General aspects

Energy policymaking started with the observation that there is a discrepancy between what is available and what one wants (see Chart 5). Designing an energy policy therefore focuses on three closely interconnected questions: What is the starting point? What are the aspirations? What actions should be taken?

Starting from an initial situation, efforts are made to reach a given situation that corresponds to what one wishes (vision), passing by a series of intermediate points that are increasingly close to the ideal situation. Progress is being made thanks to a series of actions (strategies) that are revised and adjusted as the objectives of each stage are reached and according to the availability of resources and risks. All of this takes place keeping in mind the national and international context inside and outside the energy sector, as well as the changes that can be observed and forecast.

7.2 Energy policy objectives

As indicated earlier, energy policies, whether general or transversal, in general constitute a specification of national development policy. On the basis of this way of viewing the nature of energy policy, it is clear that it is heavily involved in promoting sustainable development. The impacts of the energy systems on economic growth (whether as a widespread input for production activities or as a sector requiring huge amounts of investment), on the quality of living of the population, and on the country's environment (owing to supply and consumption) are extremely important for sustainable development (Chart 6).

In addition, the relevance of this type of interaction also explains the special attention that is usually given to the energy sector in development policies, apart from any other considerations of sustainability.

The relevance of the concerns regarding the dimensions of development as objectives for energy policy is clearly tied to the real intensity of the impacts indicated in Chart 6, in all of their multiplicity and to the extent that part of the components of this wide range is visualized by society as a source of problems. In some cases, the awareness of part of society about certain problems regarding sustainable development should be drawn upon by the policymaking authorities themselves if these aspects are to become part of the corresponding policy project.







Chart 6 Energy system impacts and energy policy objectives for sustainable development

When reference is made to promoting sustainability using energy policy, it is clear that what is being meant is the contribution that can be made to a general sustainable development policy by those aspects involved in the energy system.

In addition, keeping in mind the abovementioned importance of the energy system's interactions with the economy, society, the natural environment, and even politics, it is evident that, as indicated in the previous chapter, any energy policymaking aimed at promoting sustainable development should necessarily have a systemic approach. "[T]his approach requires the involvement of players that are both the protagonists and targets of sustainable development, such as the powers of the State (executive, legislative, and judicial branches) at different levels (central, provincial, and municipal), as well as the company representatives, workers, and the rest of society because sustainable development is a shared responsibility that is unavoidable and is compatible with a democratic system. While the latter establishes a political mechanism for social coexistence, sustainable

Table 4Energy policy objectives for sustainable development

Political dimension	
Sovereignty and national independence	
Broad maneuverability/leverage for politics	
Country's international influence	
Security of energy sector facilities in the face of conflicts	
Political and economic balance of power (state and private)	
Economic dimension	
Economic efficiency	
Production efficiency	
Structural efficiency	
Energy supply security	
External: continuity in imports	
Domestic: continuity in supply	
Quality of energy products	
Favorable macroeconomic impact	
On GDP	
On inflation	
On the balance of trade	
On employment	
On gross fixed capital formation	
On public finance	
Stable inflow of tax revenues	
Reasonable energy self-sufficiency	
Taking of economic earnings by the State	
Ground resources	
Water resources	
Rational use of earnings stemming from energy sources	
Greater added value in the energy chains	
More finished products	
Diversified supply of services	
Trust of the players in regulations and the regulatory entity	
Social dimension	
Total coverage of basic energy needs of the population	
Minimum cost for households	
Diversified energy supply	
Continuity of supply	
Access to higher-guality sources	
Availabilty of financing sources to buy equipment/appliances	
Environmental dimension	
Pollution-free air, water and ground	
Biodiversity without danger in its natural environment	
Ecosystems that are not disrupted	
Sustainable use of firewood	
Rational production of fossil energy resources	
Rational management of water basins	

development promotes equilibrium in meeting social needs, which ensures this coexistence."¹²⁵

Table 4 provides a descriptive listing of the potential objectives of an energy policy that intends to promote sustainable development.

The importance of these objectives can only be determined on the basis of the concrete energy, economic, social, environmental, and political situations of each country. To do this, the task of defining objectives should be based on a careful assessment of these situations in order to

¹²⁵ OLADE-ECLAC-GTZ, Energy and Sustainable Development in Latin America and the Caribbean: Approaches to energy policy, Quito, May 1997, page 69.

identify the principal problems presented in each, taking as a reference the policy approach adopted.

As a rule, the selection of a wide number of objectives has the inconvenience of highlighting the possible contradictions that might appear between them. For example, the search for lowcost electric power supply can be opposed to the objective of promoting the use of clean technologies in power generation. This type of contradiction is normally multiplied when the number of objectives proposed is enlarged, especially when they correspond to different linked dimensions.

Because of this, it is preferable to limit the selection of objectives to that group of objec-

tives that is the most important from the perspective of the energy policy approach that has been adopted. This involves the need to establish priorities in the set of problems and objectives that were initially identified. To establish this order of priority, criteria stemming from the "function of preferences" of the policy decisionmaker are required. A final criterion to choose the limited set of objectives to be used is the degree of contribution to sustainable development (see Chart 7).

7.2.1 Sector and subsector objectives

As expressed in the previous section, energy policy includes both general sector objectives and specific subsector objectives pertaining to each production chain. Usually, the subsector



objectives are a specification of the first and therefore they are usually subordinate to them.

Nevertheless, the specification of general objectives at the subsector level does not have the same character as all energy production chains at the sector level. For example, if in the institutional energy policy there is the objective of granting a greater role to market forces, this objective will be specified differently in the oil chain than how it is specified in the electric power chain. Something similar is occurring with objectives that are being proposed with respect to supply security or the coverage of basic energy requirements.

It is also certain that the subsector specification of general energy policy objectives directly involves the identification of instruments inherent to each production chain, rather than subordinate subsector objectives.

7.2.2 Supra-sector and transversal objectives

Likewise, the suprasector objectives for sustainable development have greater importance than energy policy objectives and can be particularly specified in these objectives. In reality, this type of objective belongs to the continent sets of the energy system, according to the representation showed in Chart 6 (sets a, b, and c).

For example, if socioeconomic policy sets the objective of reducing the degree of social asymmetries (own objective of sets b and c of Chart 6), on the energy policy level, this can imply providing greater energy requirement coverage (in terms of quantity and quality) to the lower-income population, which in turn could involve certain goals in the different chains of energy production (subsector objectives).

Another example, of a similar nature, involves the economic policy's objective of improving competitiveness in production activities in the face of imports or potential exports (corresponding to set c of Chart 6). This objective could be specified in the energy sector as follows: improvement in production efficiency in the principal energy chains (which in turn could imply the need for some institutional and regulatory reforms) or the promotion of energy efficiency.

As for the natural environment, as part of a sustainable development policy, there could be the objective of preserving forest resources (corresponding to group a of Chart 6). For energy policy, this objective could involve supplying energy to the rural sector using commercial sources. But it is clear that this objective would also have to lead to objectives in the agricultural and livestock sector, for example, the rational expansion of the farming frontier.

These examples, especially the second and third, also show that suprasectoral policies oftentimes propose objectives that have a *trans versal* character, of a lesser or greater scope, in the sense of being translated into more specific objectives for a set of sectors of the economic system. In the second example (objective of improving competitiveness), the implications for the public services sectors, as well as the energy sector, are clear.

7.2.3 Economic, social, and environmental objectives

It has been expressly reiterated that policymaking that promotes the sustainable development of a socio-environmental system necessarily requires the explicit specification of the objectives in the dimensions indicated in Table 4 (political, economic, social, and environmental dimensions). It is clear that the emphasis given to each one of them will depend on the concrete situation being faced by each country.

In addition, as indicated in the examples of the preceding section, a large part of the objectives that have been proposed for these dimensions determines to a certain extent the specification of energy policy objectives. As indicated in Chart 6, the definition of policies on these dimensions provided an indispensable framework of reference for identifying and choosing energy policy objectives.

Table 4 provides a descriptive listing of the potential objectives of energy policy with

respect to the four dimensions of sustainable development. The principal axes stemming from these dimensions are: governability (political dimension), growth and development of produc-tion (economic dimension), equity (social dimension), and impact mitigation (environmental dimension).

7.3 Principal guidelines and minimum conditions

In the majority of cases, it is very unrealistic to expect that the problems identified in the analysis of concrete energy situations of each country can be fully resolved on the basis of a policy action. In general, achievement of the objectives that define the principal guidelines or the strategic direction of energy policy constitutes a process that requires passing through a series of phases, that is, to move ahead gradually in the directions indicated by the objectives that have been defined as priorities.

Thus, when formulating the energy policy corresponding to a given government administration, it is also necessary to establish the goals to be reached in this phase or period, with respect to each one of the objectives proposed.

The best point of departure to put this type of approach into practice consists of examining in greater detail the concrete characteristics of the policies in force, trying to identify perverse impacts and obstacles linked to one or more inter-related objective, either directly or indirectly, with the principal guidelines set forth by the new policy.

Frequently, the perverse effects are tied to the use of instruments that are not the most suitable to reach certain objectives in given situations. For example, using cross subsidies, charging tariffs that are higher than those that would correspond (on the basis of cost criteria) to the production activities in order to promote greater fairness. The use of this type of cross subsidy might indirectly raise the costs of other products or services for the same families that are supposed to be the beneficiaries of the subsidy and/or might trigger a loss of competitiveness of some of the above-mentioned production activities, when the magnitude of the energy that is subsidized is considerable.

The obstacles are directly tied to the objectives themselves. One example is the exclusion of small generation, based frequently on the use of renewable sources of energy or cogeneration, in the form of discrimination in the access to networks or in the conditions of participation on the bulk markets. These kinds of discrimination constitute obstacles for the concretization of the objectives that seek to promote the use of clean sources of energy and energy efficiency.

Although political objectives are generally expressed in qualitative terms, it is possible to associate each one of them with one or more quantitative indicators. Thus, the goals corresponding to each objective could be translated in terms of these indicators, establishing minimum conditions for achieving them.

7.4 Energy policymaking instruments

The changes of situation that have been triggered by energy restructuring processes, in terms of policymaking in this sector, basically affect the instruments available for reaching these objectives.

Indeed, the changes introduced in the role of the State have implied very deep modifications in the implementation schemes of these energy policies. According to the orientations prevailing in the processes of reform, the State no longer is responsible for business functions nor does it have direct control over sector activities.

Once the new structure for production and institutional organization has been consolidated and the basic regulatory frameworks have been established, the instruments that remain for the intervention of the State are essentially indirect.

In addition, the new situations prevailing in energy supply systems of the region's countries are characterized by a growing multiplicity of private players (national or extra-national) and public players (legally broken up), whose approach when making decision will not necessarily be coinciding with the orientations implicitly or explicitly set forth in the objectives of energy policy, therefore leading to a series of contradictions and/or conflicts with respect to the instruments used to achieve the corresponding goals.

This new configuration of energy supply systems is added to the preexisting presence, in energy end-use, of a wide number of decision makers who may adopt an approach that is different from the one that energy policy intends to promote.

Furthermore, it should be recalled that the framework conditions (international situation) impose additional constraints on policy implementation.

As part of these new situations, designing an energy policy cannot be limited to the building of a matrix of objectives and instruments, as assumed by the highly criticized policy normsetting approach, whose actions in this phase immediately proved to be of no further validity. As will be indicated further on, in this phase of designing, which includes the identification of instruments whereby public intervention will have to be concretized in the system, special attention must be focused on issues involving viability. Concerning this, the strategic guidelines referring to the *construction of viability* are essential (Chart 8).

In other words, in addition to the matrix linking objectives to instruments, it should faciliate a thorough examination of the degree of consistency between each other and the undesired effects of the instruments on other objectives (the arrows in the area of consistency), as well as policying designing, which would require that the degree of opposition to the use of certain instruments and the objectives themselves on the part of the remaining social players be investigated (including other areas of the public sector itself). From the conceptual standpoint, this implies identifying the impact functions, for the most important players, with respect to the proposed instruments.

Energy policy instruments can be grouped into different types, according to the nature of the intervention that they assume or in view of the relations of hierarchy that can be established between them.

The differences in hierarchical importance have much to do with some of the energy policy actions, aimed at establishing structural conditions for the functioning of the system which are assumed to be essentially stable for a long period of time and which, therefore, serve as framework for the other actions aimed at intervening on the modalities of this functioning. In turn, when the nature of the intervention is referred to, one means whether direct interventions are being dealt with or promotion actions or negotiated commitments established with different types of formality.

7.4.1 Policy instruments that establish structures

As indicated in Chart 9, the policy instruments aimed at establishing the structure and functioning of the sector are related to the production and institutional organization of the different production chains that constitute it and with the regulatory frameworks that are establishing the essential rules of the functioning of these production subsystems.

As for *productive organization*, we are basically dealing with actions aimed at determining the size and number of production units that comprise the different links of the production chains and their degree of vertical and horizontal integration. With the intention of promoting competition or contestability on energy markets, the reform processes have taken the predominant orientation of breaking up vertically the production chains (electricity and natural gas)¹²⁶ and

¹²⁶ As already expressed, only in the case of Peru and Bolivia did this type of action also affect the oil production chain.



Chart 8 Aspects of energy policy designing in situations of shared power

Chart 9 Areas of action of an energy policy for sustainable development



the horizontal partition in its links. When an energy company was in charge of supplying other public services (telephones, clean water, etc.), the horizontal breakup could also mean the separation of supply of these services under different business units.

As indicated in the previous chapter, in the design of these actions, the form in which the corresponding cost functions are affected should be kept in mind, in terms of economies of scale (size), sequence (vertical integration), and scope (horizontal integration). If the potential benefits of competition do not manage to compensate the eventual losses of structural efficiency,¹²⁷ these actions will imply a lower performance of the system. These questions are of the utmost importance in small energy systems.

Generally, the changes in production structure of the energy chains are accompanied by actions aimed at modifying the *institutional organization* and *regulatory principles*, including the role of the State in the sector. When the transformations implied by this set of actions are important, there is a change in the *coordi nation scheme*, as indicated throughout Chapter III.

The actions linked to the institutional organization focus on aspects such as:

- Legal framework and degree of autonomy (public enterprises) of the business units.
- Nature of the ownership of the assets of these business units (public, private, mixed).
- Market organization.
- Degree of jurisdictional decentralization (business management and/or control).
- Regulatory entities (for regulatory, oversight, and operating functions).

With respect to the regulatory principles, the following types of concerns are addressed:

• Conditions of access to the different activities of the sector.

- Constraints imposed on the players.
- Market operation rules.
- Obligations imposed on the players and penalties for failure to comply.
- Subsidiary spheres of action of the State.

On the basis of the details of the types of actions involved in the previously listed aspects, the functions that are in the hands of the State are implicitly defined and therefore the sphere of intervention for energy policy instruments within this framework is also defined.

7.4.2 Policy instruments involved in functioning

Depending on the type of activity being developed by the State in the sector, energy policy instruments can be classified into two major groups: direct intervention and development/promotion.

7.4.2.1 Direct intervention

The spheres of direct action can be highly diverse, but it is clear that their breadth or their range depend on the spaces that framework conditions established by the energy policy itself have left through the type of instrument specified in the preceding section.

To the extent that, within the institutional organization established in the transformation process, there are companies that continue to be state-owned and therefore, owing to their legal status and degree of autonomy, permit the participation of policymaking entities in their administration, the State can promote direct measures (for example, the construction of a station, transmission line, oil and gas exploration in certain areas, etc.). In some countries, the possibility of implementing this type of action has been expressly excluded¹²⁸ and in others it is limited by external conditions (constraints in gaining access to financing) or by macroeconomic constraints.

¹²⁷ Notion tied to the structure that reduces supply cost to a minimum.

¹²⁸ This is the case of Argentina.

Nevertheless, the State cannot drop altogether its subsidiary functions of actions of business players that manage activities that are characterized as public services, as has occurred in a large part of the links of the energy chains. A clear example of this is the issue of rural electrification, where the State can directly make investments or induce, by means of promotional instruments, other players to carry out these actions.

Direct action measures can also be envisaged for emergency conditions or when a privatesector player, in its failure to comply with its obligations has committed a severe violation; but this type of action usually is highly transitory.

7.4.2.2 Inductive or development instruments

In the case of the countries where the State has been removed from its business functions and preeminence has been given to market mechanisms (OM coordination scheme), the majority of the energy policy instruments can be included in this category.

These instruments are much more indirect because in general they tend to affect the rationale of the players who operate directly in the system. A clear example of this is the use of *taxes and subsidies* that affect energy prices. The use of this type of instrument can be aimed at different objectives of energy policy for sustainable development.

In those situations where it has been verified that there is a high correlation between the electric power consumption level in the residential sector and the level of household income, a tax on high consumption will not only collect revenues to subsidize basic consumption, thus promoting the objective of equity, but also favor the objective of ensuring the rational use of energy and environmental conservation.

The same type of approach can be used to promote the substitution between sources and/or the penetration of those that are cleaner in order to promote the rational use of energy (RUE) and environmental objectives.

Nevertheless, there are some cases in which the taxes are not aimed principally at affecting the conduct of energy production and consumption players but rather at appropriating a part of the production surplus. Of course, what is being referred to here is the specific-type taxes, since all the other indirect taxes, which are general, have this objective. One example of this is the taxes applied to liquid fuels to ensure the taking of revenues from the resource.

The establishment of royalties or the modification of the percentage of these royalties on the value of hydrocarbons has similar purposes; nevertheless, it is certain that, in the latter case, beyond certain limits, this type of action can affect the conduct of investors, as well as production activities. This is a clear example of how an instrument geared to reaching a certain objective can exert an undesired impact on other objectives.

In the case of subsidies, those aimed at lowering the cost of financing of certain types of investment, as is the case for those that are linked to promoting energy efficiency, are also included.

It is clear that the taxes and subsidies are privileged inductive or promotional instruments because they act on the pricing system;¹²⁹ nevertheless, there are other indirect instruments that could turn out to be essential for reaching certain energy policy objectives.

One of these instruments is without a doubt that of facilitating access of sector players to *information* about the different aspects involved in energy production and consumption. For example, the information on energy-saving opportunities and on equipment and/or technologies that are suitable for taking advantage of these opportunities, although it may not be sufficient, is a necessary condition to improve energy efficiency. The absence of this informa-

¹²⁹ In some cases, the subsidies do not act directly on prices. For example, the subsidies for the establishment and part of the operation of NGOs that have as their objective the promotion of rational use of energy (RUE) actions.

tion is considered to be a barrier for the potential energy-saving market.

Another instrument of this kind is the *dis* - *semination or awareness-raising campaigns* or also the *education* and technical training actions that can be aimed at reaching RUE objectives or environmental conservation.

7.4.2.3 Commitments and negotiated norms

In some situations, especially where reforms meant partial liberalization (for the participation of private players and market mechanisms), in the context imposed by a new production and institutional organization framework and general regulatory principles, certain objectives can be reached with the establishment of specific commitments with some players of the system and the specific regulatory norms that are negotiated with them.

An example of this type of instruments is the entry of a private-sector player in power generation within a single buyer scheme, in the electric power production chain. This energy policy action, which is aimed essentially at addressing the problem of financing the expansion of power generation capacity, has been used in various countries of the region.

VIII. Approaches and Tools in the Energy Policymaking Process

8.1 Tools for policymaking

According to what was said in Chapter VI, energy policy is a sectoral specification of the socioeconomic policy, which provides the strategic guideline framework for energy policymaking. Bearing in mind this global policy outlook, energy policymaking should be based on an assessment of the situation of the energy system as a point of departure. The approach that provides the overall project for socioeconomic policy turns out to be necessary to orient the assessment analysis.

8.1.1 Assessment and analysis

The assessment should be based on a systemic approach similar to the one required for policymaking. In other words, special attention must be focused on the interactions of the energy system with the economy, society, and the natural environment.

The analysis of the situation should be aimed essentially at identifying the problems that affect the structure and functioning of the sector and that constrains the contribution of the sector to sustainable development.¹³⁰ These problems can be linked to the following:¹³¹

- Energy supply system: Inadequate use of natural resources, a production and institutional organization of the energy chains that does not favor structural efficiency and promotes productive inefficiency, difficulties in securing financing for expansion investments, negative impacts on the natural environment.
- Structure and functioning of markets: Anticompetitive practices, inadequate regulation of natural monopolies, prices that are not

clearly linked to costs, distortions in relative prices, inadequate subsidy schemes.

 Consumption: Insufficient coverage of basic requirements, low efficiency in energy use, heavy impacts of energy consumption on the urban environment, slow penetration of higher-quality sources.

In addition, the assessment should at the same time be *synchronic and diachronic*, that is, there must be a cross-section analysis (current status) of the structure and functioning of the energy system and a study of the evolution of this system over time, in order to highlight the characteristics of its dynamics, heavy trends, and indications of change. The latter two aspects are especially important for any forecasting analysis that is to be used as an instrument for policymaking.

It is clear that, in these two types of analysis, the consideration of all *relevant interactions* between the energy system and the economic, social, and environmental systems should be included, as indicated earlier (Chart 10).

The situation analysis of the current status of the energy system should encompass all production chains as a whole (corresponding to both commercial and noncommercial sources). For this purpose, in the *supply sector*, each production chain should examine the following:¹³²

- Physical aspects:
 - Reserves and potential.
 - Flow system (balances)
 - Principal environmental impacts (global and local) in each one of the links of the production chains.

¹³⁰ It is assumed here that this is the general orientation of socioeconomic policy: the search for the sustainability of the development process.

¹³¹ The listing of problems at each level is solely for the purpose of providing examples and does not intend to be exhaustive.

¹³² Only the principal aspects are listed here.



Chart 10¹³³ Energy assessment: set of relevant interactions

- The production structure of the different chains:
 - Production technologies.
 - Losses.
 - Costs.
 - Degree of efficiency in production (indicators).
 - Investment financing scheme.
 - Concentration levels (economic concentration, business coordination).
- Institutional and functional organization:
 - Legal and institutional nature of the companies.
 - Outstanding features of the rationale of the players.
 - Organization of intermediate markets.
 - Operation coordination entities.
 - Oversight and monitoring entities (characteristics and functions).

- Principal characteristics of regulatory norms.
- Sector policy organizations.
- Supply price structure (producer prices):
 - Supply price formation mechanisms (price regulation schemes).
 - Linkages between prices and costs (or gross margins between successive prices).
 - Royalties (percentages of supply prices).
 - Principal features of norms for regulating bulk markets.

In the *supply-consumption interface* (final markets), special attention must be focused on the following levels:

- Absolute and relative final prices.
- Taxes and subsidies.
- Principal characteristics of final market regulation.

¹³³ The impacts between the natural environment, the social system and the economic system that are not linked directly or indirectly to the energy system are not considered. The indicated impact of the environment on society is one direct consequence of energy impacts on the environment. The impacts of households and production activities on the natural environment are not exerted exclusively as a result of their energy consumption.

Finally, in the *consumption subsystem*, the assessment analysis should focus on the following:

- Consumption structure by sector (residential, mining, rural production, industry, trade, and services) and by source.
- Source and use matrix in each sector (or at least structure by sources).
- Degree of coverage of basic energy needs for the residential sector (level and quality).
- Energy-saving potential in the different consumption sectors.
- Environmental impacts of energy consumption (by consumption sector).

In addition, as part of the analysis of the system's evolution, the following are especially important: analysis of structure changes in the three previously mentioned areas and the evolution of certain relations between variables (historical series) of the energy system and the economic, social, and environmental systems, as well as the trends of certain purely energy variables or indicators.

The most important structural changes have to do with the following:

- Structure of reserves and potential.
- Structure of primary and secondary source production.
- Organization of production.
- Institutional organization.
- Coordination schemes.
- Basic regulatory principles.
- Relative price structure.
- Investment financing schemes.
- Consumption structure by sector and source.
- Principal substitution process between sources.
- Structure of foreign trade in energy.
- Energy integration schemes

In the relations between socioeconomic and energy variables, the following is noteworthy:

Energy course: $(E/P)_t = (E/GDP)_t (GDP/P)_t$

Where E is the total consumption of energy, P the population, and GDP the gross domestic product.

This linkage includes among its most important indicators: *energy content, consumption per* inhabitant, and gross domestic product per inhab itant (Chart 11a). It is usually considered that energy content is an indicator of energy efficiency; nevertheless, this interpretation must be handled carefully because this indicator can be modified without there being any important changes in energy efficiency. Some factors affecting this indicator are the variations in the production structure of the economy, in urbanization, and in the energy supply structure. It is clear that none of them have anything to do, strictly speaking, with energy efficiency. Despite these inconveniences, the energy course (pathway) provides a preliminary approximation to the analysis of the linkages between energy consumption and macroeconomic aggregates over time:



- Relations between energy consumption in the production sectors with economic variables linked to each sector:
 - Relations between total energy consumption and levels of sector activity.
 - Relations between sector consumption by source, the corresponding prices, and the level of sector activity (application of econometric models for estimating elasticities).
- Relations between energy consumption in the residential sector and income indicators, income distribution, and demographic vari-

ables (use of econometric models to estimate income elasticity).

 Pathway of the ratio of consumption per inhabitant in the residential sector in terms of final energy and useful energy (useful energy can be estimated on the basis of average efficiency per source) (Chart 11b).

Chart 11b: Pathway for useful and final energy per inhabitant



Final energy per Inhabitant

With respect to the impacts on the environment, in terms of historical analysis, the following are noteworthy: the evolution of global emissions (tons of gas or particulates) and specific emissions (Type-X emissions/energy consumed), at the aggregate level and by consumption sector, as well as those that have their origin in the transformation centers and in mining production. In this case the pathway scheme can also be used.

Finally, regarding purely energy variables or indicators, classical variables focusing on production, foreign trade, etc. and some indicators, such as the evolution of electric power coverage and transmission and distribution system losses are noteworthy.

Table 5 provides, as an example, a possible alternative for presenting the energy assessment.

As expressed at the start of the present sector, the analysis of the assessment should conclude with the identification of the problems with a perspective of the general guidelines of the policy project that is to be promoted. The problem identification matrix (see Table 6) can be a useful tool regarding this.

8.1.2 Energy information systems

On the basis of the listing of variables and indicators included in the previous section, it is possible to appreciate the importance of being able to rely on systematized energy information systems that include the most relevant economic, social, and environmental variables.¹³⁴

8.1.3 The role of planning and forecasting

The changes in the coordination schemes prevailing in the energy sector, especially in those cases where the changes have been profound, have very especially affected the role performed by planning as a privileged instrument of energy planning.

Inside the centralized command and control scheme, the State directly managed (manages) the decisions for the allocation of resources and planning consisted (consists) of an instrument that gave (gives) coherency to these decisions. As a rule, it involved (involves) the standard-saving type of planning, regardless of its subsequent effective compliance.

With the decentralization of decision making as a result of reform processes, whether total or partial liberalization permitting the involvement of private players and giving greater administrative autonomy to state-owned enterprises, the nature of planning must necessarily change. Thus, in many cases, planning is given a merely referential or indicative role to play. In those cases where the OM scheme has been fully introduced, the practice of planning has totally lost its validity and has been replaced by energy forecasting exercises.

8.1.3.1 Energy planning

In the past planning practices involved a largely standard-setting approach and usually ended up in one single action, which led to a "Planning Document." As a rule, there was no follow-up or monitoring of the compliance with the actions contained in the plan or an analysis of the reasons why there were discrepancies

¹³⁴ A minimum reference that can be consulted is the Energy-Economic Information System (SIEE) of OLADE.

Table 5

National energy system assessment structure and elements

International and national context

International

Political, economic, social, and environmental outlook

Energy sector transformations (industry, markets, players, technology...)

National

Political, economic, social, and environmental outlook Global development policy (objetives, general guidelines of action...)

Physical characteristics of the national energy sector

Energy resources

(resources, reserves, energy saving and cogeneration potential, development rate...)

Energy map

(location of production, consumption, transformation infrastructure, transportation infrastructure, interconnections ...)

Energy balance

Supply

Structure by source (oil, gas coal, nuclear energy, solar energy...), structure by products (for example, gasoline, LPG, kerosene...), self-sufficiency rate (autarky), quality of products (oil, coal, electricity...), substitution of certain energy sources for others

Consumption

Structure by energy source (coal, gas, oil, electricity...), structure by consumer sector (industrial, residential, commercial...), penetration rate of commercial energy sources; coverage rate (quality and amount), matrix of sources and uses by sector

Losses

Overall efficiency rate, transformation, transport, distribution, and end-use losses Foreign trade

Exports and imports by energy source (coal, gas, oil, electricity...)

Organization and regulation of energy industry

For each energy industry (coal, oil, natural gas, electricity and renewable sources of energy), the following will have to be analyzed:

Baseline conditions, to detect specific characteristics and individual situations

Supply: reserves, production, technology, infrastructure, production capacity...

Demand: elasticities, substitutes, growth rate...

Structures, to assess the competitive level of industry

Number of producers, ownership scheme, barriers to entry, cost structure and vertical integration, degree of concentration...

<u>Performance</u>, to learn about the strategies of the companies

Prices, production, investment, financing, research, and technological development Efficiency, to see the results obtained by the firms

Efficiency in production (short and long term), efficiency in allocation, full employment Public policies that affect the structures and performance, in order to assess their impact

Regulation (economic, environmental and technical):

Economic: pricing policies, subsidies, foreign trade...

Environmental: norms for emissions, inflows, and waste

Technical: security measures

Fiscal regime

On energy supply On energy demand

Information requirements

(continued)
Institutional organization

Entities and organizations (characteristics and functions) Public institutions for oversight, monitoring, regulation **Public enterprises** Private-sector organization Research and technological development institutions Basic legal framework Constitution, laws, regulations, directives, norms Institutional history

Structural reform over the last few years

Describing and analyzing the changes taking place at the following levels: **Coordination schemes** Organization of production Regulation Markets Public policies (prices, subsidies, the environment, security...) Institutional organization

Energy and sustainable development

Energy and economy

Contribution of the energy sector to economic growth

Gross domestic product, gross capital formation, stabilization of the economy (inflation), foreign trade, tax revenues, employment, added value of the economy, investment, debt, competitiveness, public finance

Energy pathway (energy, economy, society)

Energy intensity, per capita consumption, per capita income

Energy and equity

Dynamics of energy-consuming population

Energy and income distribution

Household equipment/appliances and specific consumption

Energy pathway II (commercial energy)

Energy and environmental care

Environmental impacts by subsector (biomass, hydrocarbons, electricity...) Environmental impacts by affected resource (water, air, land, biodiversity) Emission rate, global and by sector Sustainable development indicators Energy autarky

Soundness in the face of external changes Energy productivity

Electric power coverage

Coverage of basic energy needs (quantity and quality)

Environmental purity in energy use

Use of renewble sources of energy

Durability (scope) of fossil resources and firewood

Domestic energy policy

Development policy and energy policy National development plan National energy program Fundamental aspects of energy policy Objectives, lines of action...

Subsector policy

Oil, gas, electricity, coal, renewable sources of energy... Energy policy in accordance with the use of tools and instruments Prices, taxes, subsidies, public enterprises, information, education... Environmental policy and energy sector Laws and regulations, norms, waste disposal, reforestation

External energy policy

Regional integration, international agreements, participation in organizations

Summary of results

Principal problems detected (operational and development) Establishment of priorities in tackling problems

Table 6 Problem identification matrix

Elements of the Problem Sphere or Dimension	Definition of the problem	Manifestation of the problem	Causes	Players involved
Strictly energy				
Economic				
Social				
Environmental				
In stitution al polic y				

between what was planned and what actually occurred. The divergences in the system's evolution, in concrete terms, with respect to what was planned in the forecasting exercise, the changes in the framework conditions, the performance itself of the domestic players and the State frequently rendered this planning approach ineffective.

In the majority of cases, subsector planning is what is provided. In only a few countries have comprehensive plans for the energy system as a whole been elaborated. The electric power sector is the sector with the most extensive planning tradition; this planning was conducted by means of optimization models, generally built for other situations, which used a least-cost scalar objective function. In a very few cases, the use of the multi-objective approach has been observed.

It is therefore clear that it is more appropriate to view planning as an *ongoing process* that is *systemic* and based on a *multi-objective approach*. In addition, bearing in mind that planners must almost always cope with situations of shared power, this process must also include the *construction of viability*. Nevertheless, this last aspect, that is, viability, becomes a stumbling block that is virtually impossible to overcome if the decision-making process for investments has been decentralized almost completely and if the energy policy instruments that remain in the hands of the State are, for the most part, inductive and/or promotional in nature. As indicated earlier, in these situations, there is only the possibility of elaborating a referential or indicative type of planning.

In any case, this type of exercise tends to show to the players a kind of preference on the part of the energy policymaker, in other words, a course that is desired for the energy system which the policymaking entity intends to induce by means of the instruments it handles. But if the rationale of the players is oriented by profit-earning goals, these instruments should manage to ensure that the projects contained in this type of plan will become attractive from this perspective.

Nevertheless, although planning has a referential or indicative character, if it is conceived as a process (rather than an single action) and responds to a systemic vision of the energy sector, it can become a useful tool to elaborate policy strategies, for which viability in any case has to be built up.

8.1.3.2 Forecasting: Scenario techniques

Whatever the nature of the planning process, it is indispensable to have some sort of forecasting exercise. In reality, forecasting has turned out to be a necessary instrument for decision-making processes. It should therefore be underscored that large private companies generally use forecasting for their medium- and long-term decision-making processes.

Essentially, decisions must be taken under conditions of uncertainty. This uncertainty refers to conditions that will be prevailing in the future. It is evident that there cannot be any certainty about the future, but moreover it is important to clarify that uncertainty cannot be reduced or confused with the concept of risk that is managed in the neoclassical economic theory.

This conception of risk assumes that all possible future situations of a system can be known and that there is a probability distribution function that enables a probability value to be assigned to each one of them. Thus, the risk of committing errors can be measured in probabilistic terms.

Other schools of economic thought assert that uncertainty regarding the future is essential and that therefore it cannot be confused with the notion of risk. It is stated that not only is it impossible to rely on an objective distribution of probability regarding the possible situations that a system can reach in the future, but also that it is not even possible to learn about all the situations that are possible. That is to say, "surprise" situations can arise; therefore, pretensions about "guessing the future correctly" are absolutely vain. Viewed from this angle, the terms "forecast" or "predict" are inconsistent.

What is therefore the meaning of forecasting? In reality it means "exploring the future" using an approach that postulates the question "what would happen if?" and uses the scenariomaking technique. This technique is a forecasting instrument that helps to reduce the degree of uncertainty in decision-making.

The scenarios provide a coherent image of the status of a determined system at certain moments in the future. The coherence refers, on the one hand, to the internal compatibility that the different elements or hypotheses that define or constitute a scenario must maintain between each other, in keeping with a theoretical and conceptual framework of reference. In addition, this coherence requires the capability of specifying the courses that bring together the different conditions of the system that are included in the scenario.

Keeping in mind the objective that is proposed, it is necessary to use various highly contrasted scenarios in order to "cover" adequately a wide range of possible future courses for a given system. That is, it is hoped that the real course of the system will be contained, with a high degree of credibility, by the diversity of pathways corresponding to the scenarios defined. This is outlined schematically in the diagram of Chart 12.

In this chart, the entire surface of the cone is comprised of a dense network of scenario pathways and it is assumed, as a probable hypothesis, that the real course of the system will take place inside this surface. As a result, it can be asserted that this surface is comprised of a set of *highly contrasted scenarios* that adequately cover the real course of the system considered.

Nevertheless, what is customary is to use a limited variety of scenarios, trying to maintain the quality with respect to a set of well-contrasted images of the future. One possibility to determine the scenarios to be used (number and type) is to identify the axes that are defined on the basis of certain problems qualified as important.

There are different procedures for building scenarios. Some approaches underscore the need to use mathematical models as a means of guar-



Chart 12 Diagrammatic presentation of the scenario technique

anteeing internal consistency; nevertheless, the formalized representation of complex systems, especially if a dynamic formulation is being sought, turns out to be virtually unfeasible. Although extremely simplified representations are being dealt with here, the mathematical tools are not capable of incorporating endogenous changes to the system's dynamics. Regarding this, it should be emphasized that the inclusion of this type of structural change in the dynamic evolution is a central element for building scenarios. Furthermore, even the formal representation of static system situations has the inconvenience of lacking flexibility.

In any case, the task of building scenarios should necessarily be based on a theoretical and explanatory scheme referring to the functioning of the system that is to be laid out in the scenario. This scheme is the one that permits making judgments about the internal consistency of a scenario; it is even possible that the scenario will be partially formalized. Nevertheless, in essence, what is being dealt with here is a theoretical-conceptual scheme that cannot be totally formalized unless one wishes to incur the risk of introducing too many simplifications.

The content of the scenarios should be based on the final objectives and characteristics of the forecasting exercise to be conducted. In

other words, the socioeconomic scenarios that are aimed at formulating policies for the agricultural/livestock or forestry sector will have a content that is significantly different from those scenarios that would be used to define a strategic plan for the transportation sector. This is due to the fact that, in each case and on the basis of the objective being sought, the socioeconomic scenarios should permit a characterization of the context situations that is sufficiently specified in the framework of which the alternatives should be chosen or examined for decision making. It is clear that the specification of the context situation that is required for the decision making in the transportation sector will have to be very different from the one that would be necessary for the formulation of strategies in the realm of energy supply. In short, scenario building should be guided by the objective that is being pursued with the forecasting analysis that one wishes to carry out.

In practice, it is customary to formulate a scenario that is called the *"reference scenario"* with one or more contrasted alternatives. In this case, the reference scenario will be a scenario of continuity (business as usual) with respect to the system's recent historical evolution, without focusing on specific spot movements. As a result, this type of exercise would generally lead to a scenario determined by current trends, in

the sense that the heavy trends of the system's structural aspects are maintained. It should be clarified that, when one speaks of trends, no reference is being made to an extension of the trends appearing in the evolution of the variables; what is meant is that there is a continuity in the structure and type of functioning that the system as a whole has had in the recent past or, eventually, a maintenance of the gradual changes that have been observed.

It is clear that this way of conceiving reference scenarios involves certain problems when the system that is to be set up has shown very sharp changes in the recent past, as is apparent in the socioeconomic systems of the region during the first five years of the nineties. In these cases, the reference scenario will have to differentiate a first period in which the most relevant changes in structure and operation that have already become quite evident will be completed from the second period, where the system would evolve as a scheme in the new situation.

If two scenarios are used, the second one would be called the *"alternative scenario"*, which in contrast to the reference scenario will have to incorporate hypotheses that are very different from those of the previous scenario. To do this, the alternative scenario will have to maximize all the relevant change indices that have become apparent at the different levels or in the different aspects of the socioeconomic and energy systems considered.

When the reference scenario incorporates large-scale structural and operational changes, the alternative scenario will have to be formulated with different hypotheses regarding the modifications that could take place in the future. It is possible that, in a medium-term horizon (four or five years), there might not be in these cases any major disparities between both scenarios, unless one refers to differences in the growth rates of the variables.

 a) Relevant systems for the formulation of socioeconomic scenarios

When trying to formulate socioeconomic scenarios for the region of a country, as a rule,

the consideration of various systemic levels in which the regional subsystem is included as a smaller element inside a family of nested sets, as indicated in Chart 13, cannot be avoided.

As a rule, the economic and sociopolitical events that have occur in the larger-scale systems (for example, the SEM) exert a major influence on the contained systems (for example, the SEIR or the SSN). When the affected systems are peripheral, the impacts of real importance have only one direction. For example, the changes taking place in the world economy will no doubt have significant impacts on the national socioeconomic systems, whereas it cannot be expected that there will be significant impacts in the opposition direction.

The identification of the interdependent or unidirectional causal nature (significant determination or incidence) of the impacts is of the utmost importance for building scenarios, because it helps to define a certain type of hierarchical importance in the formulation of the hypotheses contained in them. Thus, for example, it is considered that Argentina's economy has an interdependent relationship with Mercosur owing to the growing importance of regional trade and its relative weight in this area. As a result, if socioeconomic scenarios are built for Argentina, the hypotheses that are used for the SEIR space (in this case, Mercosur) cannot be formulated by totally disregarding those that are used to define the national scenario.

When building socioeconomic scenarios, however, for a regional space that is not a core part of the functional and spatial nucleus of accumulation at the domestic level, it can be assumed that there is a virtually unidirectional relationship of impacts of the national economy on this space.

The more open is a socioeconomic space the greater is the importance of the exogenous impacts stemming from larger-scale systems, as defined by the previously described terms. It is clear that the SSRP are in general far more open spaces than the SSN. The circulation of goods and production resources from and to the national space is very intense, with the SSRP subject

Chart 13 Relevant spheres for building socioeconomic scenarios



(*) It is assumed that the SSRP has the characteristics of a predominantly perfipheral space (it is not part of the country-scale core of accumulation).

to the direct influence of economic policy measures and the legal and institutional norms coming from domestic policy.

The process of globalization of the world economy means in essence a greater openness of national economies to the actions of large business conglomerates and to financial flow movements in a situation where markets are subject to very weak regulation. This enables these conglomerates to optimize their operations throughout the world with progressively less constraints, while regulations coming from international forces exert a growing impact on national socioeconomic systems. The formation of blocs, with free trade agreements, customs unions, or common markets, to a large extent set up in response to this process of globalization, is creating additional opportunities for expanding the liberalization of national socioeconomic systems.

As a result, the importance of exogenous impacts on systems of lesser importance has been increasing considerably, thus giving greater relevance to the hypotheses that have been proposed for the systems of greater hierarchical importance, as conditioning elements for the building of scenarios for the SSN and/or the SSRP. These circumstances are reflected in Chart 13 through the breadth of arrows that represent the directions of the determining or conditioning relationships.

It is clear that the evolution of the systems that is supposed to be set up in the scenarios not only responds and is adapted to the exogenous impacts that were mentioned but also to endogenous changes with different degrees of importance. It is precisely this type of change that can permit a certain degree of freedom in designing the hypotheses included in the scenarios for regional and/or national systems, compared to those that are international (regional or world). But even the evolution of the interactions between the different systems can be the target of hypotheses of change toward the future (generally different depending on whether it is the reference or the alternative scenario).135

b) Energy scenarios for policy actions

The socioeconomic scenarios will serve as the basis for the formulation of the corresponding energy scenarios to be used as tools for policymaking. The latter constitute the groundwork for the design and evaluation of strategies. The principal stages for designing a plan of action for energy policy, using scenarios, would be as follows:

- Identification of the system's key variables.
- Determining the relevant players on the basis of key variables.
- Staging the evolution of the system on the basis of consistent sets of hypotheses regarding the performance of key variables and players in the framework of the socioeconomic scenarios that were proposed.
- Establishing the expected evolution of the system on the basis of the different energy scenarios.
- Determining the set of possible strategies according to each scenario and bearing in

mind the reactions to these policy strategies that are expected from the players.

• Designing a plan of action.

8.2 Formulation by objectives

The central idea of formulation by objectives involves, first of all, the identification of the specific objectives that contribute to achieving a superior objective and, second, the identification of the actions of the most suitable energy policy for achieving these objectives. Chart 14 provides a scheme illustrating this chain of ideas.

The vision is what is sought after analyzing what there is available. An example of a vision is provided in Table 7.

Although it is expressed as a situation that has been reached, in reality it is a status that one wishes to attain by means of a series of ordered and consistent actions that will be gradually transforming the initial status.

Associated to the vision there is a set of general objectives that orient, to a lesser or greater extent, the development of virtually all national energy systems. Table 8 provides some examples of this.

Analyzing the situation of the energy sector in the light of what one wishes to attain for the sector helps to identify problems, estimate their magnitude and determine their urgency. In most cases, objectives are not achieved immediately. On the contrary, one must pass through successive stages. The rapidity of the process will depend on the attention and resources that are dedicated, as well as the technical and human capacity that is available.

The transformation of problems into specific objectives requires an analysis of external conditions and their possible evolution. Some examples of these conditions are provided in Table 9.

¹³⁵ For a presentation of the relevant aspects that should be incorporated into the scenarios in the above-mentioned levels or systems, see H. Pistonesi, "Métodos para la construcción de escenarios socioeconómicos" [Methods for socioeconomic scenario building], IDEE, 1998.



Chart 14 Structure of a system of objectives

_			-
11	1b	le	7





	General objectives
•	Ensure the sustainable feasibility of the energy system
•	Contribute to competitiveness and sustainability of the economy
•	Achieve coverage of the basic needs of the population and ensure equity in energy supply conditions
•	Reduce environmental impact
•	Induce the conservative use of natural nonrenewable energy resources
ŀ	Contribute to governability and political sustainability

Once the framework conditions have been reviewed, to each specific objective is assigned a set of tangible results to be pursued during a given period. These results will be expressed by means of typical indicators, as long as it is possible and pertinent to do so. Table 10 provides several examples of specific objectives and associated indicators. Once the concrete results that are to be achieved for each specific objective have been determined, then the actions that have to be taken to achieve these results are examined. To determine the directions in which efforts must be made, the magnitude of the effort required, and the margin of maneuverability in each case, one has to analyze both the favorable and unfavorable strategic forces to obtain the result that









is being looked for. In this sense, the matrix to identify the strategic lines is of the utmost use-fulness (see Table 11).

Addressing threats on the basis of weakness merely leads to the survival strategies; addressing these same threats with force leads to defensive strategies; likewise, addressing opportunities with weakness and strengths leads to adaptive and offensive strategies, respectively. Some strategies, such as the rational use of energy, are highly versatile and serve not only to defend and consolidate what has been achieved but also to move ahead toward even higher levels of sustainability.

The strategies, also referred to as "policies" and "lines of action," will depend on the concrete situation of each country. Table 12 provides some representative examples based on the four basic dimensions of sustainable development.

Once the strategic lines have been defined, various possibilities to implement them, that is,

to ensure their instrumentation are established. Regarding this, a matrix for the identification of instruments, as illustrated in Table 13, may be useful.

This process of identifying the instruments involves shifting from "what should be" to "what can be". This process assumes that other players can be linked or should participate in the action or activity that is proposed. It is clear that this analysis should also be adapted to the elements contained in the forecasting, so as to ensure a dynamic vision of situations; among these elements there are the variations in the framework conditions for the development of policy strategies and the predictable behavior of the players involved. On the basis of all of these elements, the possibility of achieving a consensus or the support of a high number of significant players should be reviewed. To examine the possible reactions of the players in the face of policy strategies, the use of matrices of the type indicated in Section 6.4 can be profitable (see Chart 4). The matrices could adopt the format shown in Tables 14 and 15.

	intermal Factors 🛶	We alk no sale s			Sengths		
External Fastors 🔱		Weakness1		Weakne ss n	Stength 1	2	Debilidad n
	The d 1	LE1,LE6		LE1	LE1, LE8		LE4
Threats			LE8			LE7, LE8, LE9	
	The at n	LE3,LE8	LE1, LE2,LE3	LE7			LE5
	Opport unity 1	LE6	LE4		LE2,LE3, LE4	LE9	
Opportunities	ł		LE4,LE3		LE5		LE6
	Opportunityn	LE5, LE4, LE6, LE12		LE3		LE12	

Table 11 Strategic line identification matrix

LE1 = strategic āre 1, LE2 = strategic āre 2... LEn = strategic āre n

The empty square scone spond to situations that do no require a any special intervention.

Table 12							
Examples	of strategic line	s of actions					

Coordination of liberalization policies with heighboring countries Participation in international organizations and energy forums Establishment of international coalitions Separation of sovereighty defense functions from business functions Consolidation and autonomy of oversight and monitoring entities Consolidation of democratic control over oversight and monitoring functions Deliberation with defense and domestic security authorities Economic dimension Diversification of energy imports and supply sources Drawing up long-term contracts with exporting and importing countries Building strategic storage to deal with short-term supply outages Promotion of the development native energy sources Diversification of energy exports and the destination of these exports Promoting energy integration with neighboring countries Creation of income stabilization funds (oil currencies, gas currencies) Reduction of risks by participating in futures markets Application of revenue-taking instruments Restructuring the government budget with an orientation toward investment in human or Development of the rational use of energy Promoting competitiveness of those production activities that use a large amount of ene Sponsorship of suitable self-financing margins in regulated companies Activation in the interaction with players on domestic financial markets Building up access to international capital markets Tapping the advantages of private business management methods Support for controlling technical and nontechnical losses Regulation of the transformation (services for the energy products and access conditions Promotion of suitable self-financing margins in the country Social dimension Promotion of the transformation of energy products and access conditions Promotion of the transformation of energy products and access conditions Promotion of the transformation of energy products in the rural sector (Reforestation and development of energy pathations Regulation of the use of forest resources for energy purposes Use of transpar	
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Use of transparent tax and subsidy systems to facilitate access by the needy	
Environmental dimension	
Internalization of externalities	
Promoting the penetration of clean energy sources	
Building up the environmental impact assessments of energy projects	
Definition of fossil energy production profiles and monitoring their compliance	
Slowdown of growth of emissions	
Creation and operation of effective, practical mechanisms for monitoring compliance will	
Creation or contingency systems for all facilities Promotion the development of suitable technologies for the mitigation of emissions and	standards

Table 13 Instrument identification matrix

	Specific objective 1	Specific objective 2	19	Specific objective n
Strategic line 1				
Strategic line 2				
Strategic line n				

It is of course a qualitative-type matrix (Table 14) that tends to highlight the nature of the reaction of the players to the objective itself and to the different instruments that are proposed. These reactions can be presented in terms of their nature and intensity: support, acceptance or indifference, weak opposition and strong opposition. In those cases where there is frontal opposition, policy analysts must examine the weaknesses and forces that are available to impose or induce this objective or the corresponding instruments.

The last matrix (Table 15) analyzes the attitudes between players with respect to an energy policy instrument; it is also qualitative, with indications of alliance, indifference, and conflict.

		Specific objective of energy policy							
	Instrument 1 Instrument 2 Instrument 3				Instrum	ento n			
Player 1									
Player 2									
Player 3									
Player s									

Table 14 Reaction matrix

	Instrument i							
	Player 1	Player 2	Player 3		Player n			
Player 1								
Player 2				•••••				
Player 3								
Player s								

Table 15 Matrix of conflicts

In addition to this analysis of feasibility, attention must also be focused on the degree of consistency of the set of actions, taking into consideration the possible undesired effects of each instrument with respect to the other objectives that are to be attained. If the intensity of these impacts is sufficiently strong, then that may be a reason to discard a certain set of actions, although they may have proven to be viable.

IX. Operational Feasibility of Policymaking

9.1 General considerations

On the basis of participatory planning experiences, the present chapter will attempt to give examples of the methodology proposed in the present guide in terms of energy policymaking for sustainable development.

In view of the conceptual and methodological complexity and depth described in the preceding chapters, the orientation that is being given to the present chapter strives to show, using examples, what operational courses could be adopted when formulating a modern energy policy.

In no way does the effort intend to provide a methodological "recipe" for planning; it only wishes to share similar experiences, with the manifest interest of paving the road for those teams that are in charge of formulating energy policy in each one of the different countries.¹³⁶ By the same token, it is not possible to establish one single course if one takes into account the diversity and complexity of the region's countries.

At a given time, the present chapter will stray from the methodological structure proposed previously and will only consider the operational possibility of tackling its resolution; obviously there is no intention here of breaking away from the conceptual or methodological consistency of the proposal.

9.2 Initial situation of the planning process

Owing to the complexity referred to above, it is possible to identify two clearly defined operating periods in the participatory planning process that is conducted when formulating energy policies: the first has to do with the technical elaboration of the proposal; and the second with the building of the social and political viability for the proposal.

Regarding the first operating period, it is advisable that the entity in charge of energy policymaking set up an interdisciplinary and multisector team whose responsibility is to elaborate an initial proposal, which could later be subject to the consensual agreement of all the other players involved.

This proposal is based on different considerations, among which the following are noteworthy:

- The planning proposal that is being built should be timely and feasible, in other words, the new conditions that have emerged as a result of the reforms, the external national and international conditions, the compatibility of an energy status that is desired and sustainable with the immediate situation of the specific government administration require that the proposal be timely and viable.
- The proposal should be flexible; under the conditions of globalization in which our relations and possibilities are being developed and the high mobility of the decision-making levels of the executive branch, the high sociopolitical sensitivity of our realities require a capacity to react and an effective and efficient response that enables the policy (in this case, energy policy) to match changing conditions, while remaining in line with the energy vision of each country.

The operating responsibility of this team in this first period will focus on the elaboration of an initial proposal that reaches what is referred to as the strategic lines (see Chart 14, Structure of a System of Objectives), excluding the analysis of forces for or against.

¹³⁶ Regarding this, since 1998, the OLADE-ECLAC-GTZ Project has organized four subregional workshops (Mercosur and Chile, Andean Community, Mexico and Central America, and the Caribbean), aimed at generating with the representatives of the 26 countries of the region, experiences as those described above.

Taking into consideration the aspects that were indicated, this team will be rather small, with a wide range of know-how and experience in the sector and the external conditions of the reality where they are acting, so that it can tackle suitably the set of issues that are indispensable for the process.¹³⁷

Regarding the second period, it is an open process involving all the players as a whole. In this phase, the political and social viability of the proposal elaborated in the first period is built.

It should be noted that, in Chart 4, there is a wide range of players involved in the process. As a result, it is indispensable to specify the condition of the player involved in this operating period. The person in charge of elaborating the proposal will be characterizing each one of the participating players, and therefore their involvement in this second phase entails decision making in the formulation of policy. It must be said that, to build the social and political viability of the proposal, the interests characterizing each player are affected or favored, so that this viability is of the utmost importance.

This is when a set of forces that unavoidably converge in the characterization of players emerges. This is all the more true if they will truly take decisions with respect to the formulation of energy policies. These will be decisions that ratify, rectify or incorporate elements to the initial proposal, from the specific objectives up to the actions which, in this second phase, will have to be defined.

Generically, the player is an individual, group, institution, or organization whose vital interests are linked to the formulation of a policy and which, in the give-and-take of the negotiations that take place to determine the viability of the proposal, offers and receives situations that consolidate their condition as players in this process.

As observed, both phases have their own level of operational complexity. In this chapter, through examples retrieved from real participatory planning processes, an attempt will be made to use the most suitable way to tackle each one and, at the same time, visualize the results that at each moment can be expected in the formulation of policies.

In addition, it must be reiterated that there are many instruments that facilitate the operativity of the process; here we are only taking some of them.¹³⁸ This leads to a final reflection, in the sense that the team should have sufficient operating versatility to adapt to both internal and external conditions and characteristics in its policymaking proposal.

Finally, the visualization technique of the Zielorientierte Projekplanung (ZOPP) method, otherwise known in English as the target-oriented project planning method, ¹³⁹ is very useful to facilitate participatory planning processes. It is understood that the working team that is set up for policymaking will develop processes for the collective construction of the proposal and that the visualization technique will facilitate this process. This method involves the use of cards as a means of communication between the participants. On these cards, they write their opinions and, after a brainstorming session, different methodological steps are carried out. The cards that are produced and brought to light after the brainstorming and that deal with a specific topic (for example, strictly energy or social, economic, and environmental problems, among others) are all placed on a board and then a debate is started to select the most significant regarding the topic that is being focused on; in other words, a group agreement is reached and, as a result, the rest of the process continues, with the procedure being repeated subsequently.

¹³⁷ Please see Tables 4 and 5.

¹³⁸ Instruments such as the FODA matrix, problem tree, fishbone, paper computer, etc.

¹³⁹ Planning methodology used by the German Technical Cooperation Agency (Deutsche Gesellschaft für Technische Zusammenarbeit—GTZ) in all of its cooperation projects with developing countries. Regarding this, the OLADE-ECLAC-GTZ Project has been applying this methodology since 1993 to plan its multi-objective activities in various dimensions.

9.3 Construction of initial proposal

9.3.1 Assessment

Once the vision has been defined and the external conditions recognized, the working team analyzes the current situation of the energy sector, identifying the problems that are affecting their development and which therefore are not fulfilling the purposes inherent to them.

9.3.1.1 Identification of problems

The most significant characteristics of the problems can be summarized as follows:

• Describe a situation: In operating terms, it is necessary to describe the situation that is considered negative. The fact of being stringent in the definition of the problems as a description of negative situations involves a substantial different a when switching to the construction of the proposal. For example:

Perception of subsidies in reform processes

In the sentence of the preceding inset, no negative situation is being described; it is ambiguous, because from the point of view of the different players, some will accept the statement as favorable and desirable (the community, some politicians) whereas other will consider it to be negative and undesirable (producers, financial entities). In this example, it is difficult to predict what proposal might emerge in terms of policymaking: If the proposal is:

Subsidies are factors that undermine or hamper reform processes.

At least it is understood what situation is being affected and on that basis it is possible to propose a set of measures.

• NO is the absence of a solution; it is a negative situation that exists. There is no environmental awareness in rural areas, indiscriminate use of firewood.

The absence of a solution as the definition of a problem inevitably leads to one single solution; in the example, it involves the formulation of activities aimed at raising environmental awareness among rural inhabitants alone. In other words:

The indiscriminate use of firewood in rural areas exerts an adverse impact on the environment.

In this case, it is possible to find more than one proposal reducing the problem; it can be the search for alternate sources of energy in the rural sector, increase in electric power distribution networks, environmental education, among others. It should be said that there is a range of alternatives that, in terms of planning and decision making, is much more advantageous.

• *Identify existing problems*. In this sense, it is not advisable to consider what is meant by a future or possible problem, since in general it is the consequence or the impact of a current problem. It is preferable to plan by reducing the degree of uncertainty inherent to the process. For example:

Proven oil reserves will not be able to meet demand estimated for the year 2010.

This example, although it can hold true, is the consequence of a current problem and that, in terms of setting an energy policy that addresses it, requires acting on the current problems so that the actions that are carried out to resolve it reduce or minimize this future problem. If the following holds true:

The investment budget for oil exploration activities is 60% lower than that for the preceding year.

Then in this example, it is possible to identify a range of possibilities for actions that contribute to increasing the budget, establishing a policy of alliances for exploration, industrial reconversion for the use of other existing

energy sources, etc. In other words, for the policymaking team, proposing to address current problems increases the viability of resolving them and, at the same time, addresses the impact or consequence of the trend that could stem from these problems.

9.3.1.2 Manifestation of the problem

It is recommended that the manifestation, consequence, impact or effect of the problem also be

described as a negative situation. In other words, it is also a problem whose resolution is tied to resolving the problem that gave origin to it. There is no doubt that each problem has many manifestations, and it is the duty of the team to identify the most significant for the process it is carrying out. For example:



problem and its manifestation is completed with the identification of the causes that led to this problem. The causes are also identified as problems.



This methodological step makes it possible to characterize each problem as a structure on which one has to intervene. In terms of planning, the cause-effect relationship is consistent with the means-end relationship. Thus the building of the proposal is present at each methodological moment.

9.3.1.4 Players involved

In each one of the problems identified and analyzed, there is a group of players that have to be recognized in order to highlight the social and political viability of the energy policy that has to be formulated. The status of player with respect to the problem is given by the form in which the vital interests of each players are related to the situation described as a problem.

Sometimes, the identification of the manifestation of a problem leads to the characterization of the other problem that had not been considered initially and whose importance in the formulation of energy policy is very significant.

9.3.1.3 Causes of the problem

Characterization of the problems that started with the identification of each



Elements of the Problem Sphere or Dimension	Causes	Definition of the Problem	Manifestation of the Problem	Players Involved
Strictly Energy				
Economic				
Social				
Environmental	Cultural patterns in energy use of firewcod that ignore adverse environmental impacts High dispersal of the rural population increases commercial energy distribution costs A large part of the rural population do not have the economic means to gain access to and buy commercial energy	The indiscriminate use of firewood in rural areas exerts an adverse environmental impact.	Reduction of biomass. Increase in erosion.	Environmental authority* Rural producers** Indigenous communities*** Energy companies**** *
Administrative Policy				

Table 16 Problem identification matrix

Saf eguarding the conservation of natural resources in response to the territorial dimension.

** Declining yields in production activity, depletion for the deterioration of resources (erosion, biomass reduction,

alteration of weather cycles and intensity of climate, reduction of water resources). *** Because their physical assets and cultural heritage are affected.

**** Be cause in our pay sical assets and causaral neurage are arrected.
**** Owing to their responsibility in energy supply and basin management.

The work is summarized in a planning instrument, which is called the problem identification matrix (Table 16).

It should be observed that precisely in this case there is a difference of order in the columns with respect to what is indicated in Table 6, where this order responds to a constructive sequence of the situation, whereas in Table 16 the succession of columns responds to a logical rationale adapted to operativeness.

9.3.2 Prioritization of problems

From the set of problems that are identified and analyzed, it is indispensable to establish priorities in order to order the intervention process. It is evident that all the problems that are identified are important, but it is nevertheless necessary to prioritize them. It is advisable to carry out this prioritization taking into consideration the following reasons:

- The level of complexity of energy problems, its transversal influence on other sectors, and the role it performs in the development of each country lead to the configuration of a highly complex process. As a result, it is indispensable to decide where the intervention process is oriented.
- Resource constraints, at both the public and private level, make it indispensable to rationalize the intervention process, identifying courses of action that will help to tackle adequately those problems whose structurality produces an impact on the rest of the system.

In practice, prioritization takes place taking into consideration two generic aspects; the first is political and the second is technical:

- Political: This is a very important criterion to ensure due prioritization of problems. In its operational resolution, it takes into account the guidelines and program proposals of the government currently in office, at the planning level that is being worked with. The political viability of the proposal is related to the focus of the program of the current administration; regarding this, it is the responsibility of the planning group to elaborate a proposal that matches this criterion with the development of the sector in particular and national development in general.
- *Technical:* The problems that have been screened through a preliminary filter will then be subject to a second filter, which properly speaking is technical; the set of arguments and technical situations of the sector, its structurality in national development welfare have to be taken into account to prioritize the problems subject to intervention.

Operationally speaking, there are many techniques that enable this procedure to be implemented. The following are noteworthy: for example, in the ZOPP method, when the route along which the problem tree will travel is defined, a prioritization is taking place, taking into consideration the cooperation areas agreed upon between governments, the impact of the actions, the durability of the effects and especially the replicability of the processes when cooperation has concluded. The paper computer establishes intervention priorities on the basis of the degree of influence that each one of the problems has with respect to the others, the valuation of this influence determines the location of the problems along ordinate axes, defining areas of intervention whose structuring in the system enables an impact to be exerted on the rest of the system. The fishbone establishes causal relationships searching for convergence in trunk or central problems on which actions are recommended.

9.3.3 Specific objectives

For the formulation of specific objectives, in addition to what was indicated in the assessment, it is necessary to have available synthetically the external conditions that exert an impact on the sector and the general objectives that are closely articulated with the government plans and the policy guidelines coming from the government currently in office. With these inputs, it is possible to tackle the formulation of specific objectives.

The areas that define the first column of the problem, sphere, or dimension identification matrix are the point of departure to start the formulation of specific objectives.

The objectives respond to the question: What does the policymaking intend to achieve? Regarding this, it indicates a change that is being sought in a problematic situation or in problems prioritized in the first part of the assessment. It is a positive and future reading of the problem in which intervention is being sought.

Operationally speaking, there are two ways of formulating specific objectives; the first is the one commonly used in our countries; whereas the second is the one used in the ZOPP methodology.

 With respect to the first, we normally write out objectives in the infinitive (to elaborate, to design, to raise awareness, etc.); nevertheless, this practice leads to confusion when the activities are drafted, because they are also written in the infinitive. It is necessary for the team to keep this difference clearly in mind. Further on, the difference between both will be seen; here it is necessary to point out that, in terms of planning, it is possible to differentiate action objectives (infinitive) when the first use soft verbs and the second use hard verbs. Verbs are soft when they express intentions or abstract proposals and they cannot be placed on a timetable, for example: to sensitize, to promote, to raise awareness, to exert an influence on, etc. By contrast, however, hard

verbs can be placed in a timetable, they have a start and end date and give an idea of action, for example: to elaborate, to meet, to carry out an inventory, etc. For example:



With respect to the second, in the ZOPP methodology, the writing of an objective ensures that there is one single idea per objective, that is, a subject, a verb and a predicate; thus it avoids using prepositions or phrase such as "through" or "for...", "by means of", etc. or gerunds (-ing) such as improving or reducing, because this type of writing mixes means and ends. Finally, the writing is in the present tense (benefits) or in the present perfect tense (has benefited) or the past tense (benefited). With this type writing, the idea that is imparted is that a situation has been obtained although it is in the future.



This second form of writing is even more advisable in terms of planning than the first

since it permits an accurate determination of the future status that is being sought with the implementation of action, and therefore it reduces the confusion between objectives and actions.

9.3.4 Strategic lines

The formulation of strategic lines or socalled lines of action, strategies, and/or policies materializes with the building of a highly complex matrix. In other words, to each one of the objectives that were defined strategic lines of intervention are identified by means of the construction of the above-mentioned matrix.

Once again here, the configuration of the planning team requires a high level of knowledge of the sector, the other sectors involved, the conditions of the national and international environment, including the policy decisions of the government in office. It is possible for other professionals who can replace absences or deficiencies in the principal team to be invited at this time to participate in the basic structure of the team that was set up. It should be kept in mind that the construction of the proposal is, at all times, a participatory construction.

First of all, the weaknesses and strengths in each reality are identified in order to achieve the specific objective; that is, it is the set of endogenous conditions of reality that are the subject of the planning that are converted into conditioning factors for reaching the specific objective. Afterwards, the threats and opportunities that attaining the specific objective will address are identified; in this case, they are the exogenous conditioning factors that the planning team envisages in the achievement of the specific objective (Table 17).

In the understanding that the strategic line includes HOW to achieve the specific objective, the second operating phase of building the matrix is to identify these strategic lines which define the concrete way to ensure compliance with the specific objective.

A program for the gradual elimination of subel dies in the framework of sector reform has been implemented	internal Factors ⊸	Weaknomee			Strengths		
Extermal Factors ↓		Weakness1	Political cost of the decision	Weak ness n	Sizength 1	Sector restructuring law	Strength n
	Theat 1	LE1,LE4		LE1	LE1, LE5		LE4
Threats	Passenger and fréght transportation strike		Pricel eveling/ I beralization			Democratic control over regulatory fundions	
	Theat n	LE3,LE5	LE1, LE2,LE3	LE 3			LE4
	Opportunity 1	LE2	LE4		LE2,LE3, LE4	LE 5	
Opportuniti es	increasein crude di expots		income stabiliz ali on fund		LE5	Democratic control over regulatory functione	LE3
	Opportunityn	LE5,LE4, LE3,LE1		LE 3		LE5	

Table 17 Strategic line identification matrix

LE1 = strategic line 1, LE2 = strategic line 2... LEn = strategic line n The empty square scone spond to situations that do not require any special intervention.

9.3.5 Characterization of the instruments

The instruments respond to the query: WITH WHAT did the strategic lines that were formulated to achieve this or that specific objective operate? In other words, the instrument is the means used to articulate the HOW (strategic line) with the WHAT (specific objective).

Operationally, the planning team builds an instrument identification matrix that facilitates the characterization of the instruments (Table 18).

The elaboration of the initial technical proposal that the team should formulate end here. It is important to reiterate that this elaboration will be consensually agreed upon with the other players involved; in this process, the trend observed is that the team that elaborates the proposal does not validate it but rather "defends" it because it feels it is being evaluated. It is important to underscore permanently in the team that its proposal can be ratified and/or rectified so that it can adopt an open attitude to the position of the other players. It should not be forgotten that the other players "look" at the proposal through their own vital interests, and therefore their attitude is highly critical. Nevertheless, that is the attitude that determines not only a technically viable proposal but also, above all, a socially and politically viable proposal.

9.4 Construction of social and political viability

In this second phase, participatory planning events, with the involvement of the players identified in each one of the objectives and lines of action when they are formulated, have to be developed.

Table 18 Instrument identification matrix

Specific Objective Strategic Line	Specific Objective 1	Specific Objective 1	A program for the gradual elimination of subsidies in the framework of sector reforms	Specific Objective n
Strategic Line 1				
Strategic Line 2				
Democratic control over regulatory functions			Consume r committees for ovensight and monitoring	
Strategic Line n				

Table 19 Reaction matrix

Specific Objective Strategic	The program for the gradual elimination of subsidies in the framework of sector reform has been implemented					
Line	Democratic control over regulatory functions					
in strument	Instrument 1	Instrument 2	Consumer committeesfor oversight and monitoring	hstrument n		
riayers						
Rayor 1						
Alayer 2						
Association of pivate-sector distributors of fuel and energy			Strong opposition			
Association/union of carriers			Support			
Rayer n						

The selection of participants in these events is highly important, in view of the transcendence of the process. Normally, representatives of players that have an affinity with the governing party, the technical expert, the institution leading the process are invited; this in itself is not inadequate. Nevertheless, it is also indispensable to invite players who are in contradiction or opposition with the government, the technical

expert or the institution in charge, because this contrast makes the proposal more real, feasible, and socially and politically viable.

In operational terms, the construction of this viability is done with the construction of two matrices: the first is a *reaction matrix* of the players and the second is a *conflict matrix* of the players.

Table 20 Matrix of conflicts

Strategic line	Democratic control over regulatory functions					
Player Player	Player 1	Association of private-sector distributors of fuel and energy	A secciation trade union of carriers	Player n		
Player 1						
Association of private-sector distributors of fuel and energy			Conflict			
Associati crittrade union of cani ers		Partnership				
Player n						

9.4.1 Player reaction matrix

This is a double-entry matrix (Table 19), which permits knowing the reaction of each one of the players involved with each one of the policy instruments identified by each strategic line and by each specific objective. Thus, there are essentially four scores that measure the reaction of each player with respect to each instrument identified: support, acceptance or indifference, weak opposition or strong opposition.

Although the score that is summarized in one or two words when filling the matrix may seem very dry, the wealth of the process can be found in the debate and discussion of the topics that will be carried out by the players invited to the event. Thus, it is necessary for some members of the team to systematize the reactions and attitudes of each player.

This participatory planning work has two functional purposes: the first is to contrast the proposal and enrich it, especially with respect to the identification of other instruments that the players can propose; and the second where in the initial debate and discussion the most suitable activities for the operationalization of the proposal will appear. This second phase is developed below in section 9.4.3.

9.4.2 Matrix of conflicts

This second instrument strives to identify which is the attitude between the players for each one of the strategic lines (Table 20).

In this matrix, the scoring is also qualitative. There are three possibilities: alliance, indifference, or conflict with respect to the proposal of the strategic line. The relationship is identified on the basis of the reading of a player with respect to all the others.

Once again, in this participatory work, some member of the team will have to systematize the reactions of the players. It should be kept in mind that what is really being tackled here is the interests of the player with respect to the interests of the other players, regarding a strategic line. One way of characterizing the abovementioned interests is to recognize which are the power references of each player.

It is not too much to indicate that two players in conflict along a strategic line in particular can change their position to that of indifference or alliance along another strategic line. It is very useful to recognize it, because this knowledge becomes a very effective means of negotiating between players.

The debate conducted in this part also clarifies the identification of the actions that have been formulated for the implementation of the policy.

9.4.3 Definition of activities

After having characterized the strategic lines and recognized the viability of the proposal, actions are identified whereby it is possible to ensure the operation of each strategic line.

For each line, the necessary and sufficient actions are identified to permit this operationalization. In this step, it is frequent to confuse the identification of subactivities. These should be envisaged in an operating plan and not in the formulation of the policy. To avoid this confusion, understanding the line of action as a good, product, or service that has to be elaborated in the implementation of the policy is simulated so that the activities are those that are absolutely necessary and sufficient permitting the building or manufacturing of this good or service.

The activities respond to the question: BY WHAT MEANS is it possible to operationalize the strategic line? Once again, it should be recalled that these are hard verbs written in the infinitive, because they can be placed in a timetable. Therefore, the identification of the activities should correspond to a logical and structured sequence, that is, a temporal structure; therefore they consist of successive steps.

Table 21 is provided below as an example. It can be observed that there are main sequential activities whose implementation will surely require the formulation of subactivities in the framework of a specific operating plan.



Table 21 Matrix of activities