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Organización Latinoamericana de Energía
Latin American Energy Organization
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Energy Policy

A Practical Guidebook

Foreign Affairs, Trade and Development Canada
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Canada

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Prologue

The Latin American Energy Organization (OLADE) views with great expectation the dissemination of this Energy Policy – A Practical Guidebook, designed primarily to offer its Member Countries a useful capacity-building tool on the approaches and assessments needed to foster consistencies in political decision making, supply needs, existing and potential energy resources, and national energy projections on a regional scale.

Going back to the '70s, when the Latin American and Caribbean governments signed the Lima Agreement—the treaty that created OLADE—they viewed the use of natural resources, particularly for energy, as a key factor in regional integration.

Aware of the importance of coordinating energy resource development in Latin America and the Caribbean by promoting efficient, rational use for independent socioeconomic development, the governments gathered at Lima decided to create this Latin American and Caribbean Organization to foster regional cooperation, coordination and assessment for the integration, protection, conservation, rational use, marketing and defense of energy resources in the region.

According to the provisions of the Lima Agreement, OLADE's primary roles and goals include "To promote the creation and implementation of common energy policies as a factor in regional integration."

Like all public policies, energy policies consist of government guidelines aimed to meet the needs of society. Planning, as a policy implementation tool, leads to government decisions that enable interventions designed further the evolution of the energy model used. Therefore, policies set the limits for planning to ensure consistent efforts and objectives according to domestic situations and needs.

With this in mind, we recognize that the scopes and types of energy policies and plans vary in relation to the type of State making them, and are strongly influenced by government values, priorities and approaches. Accordingly, we are fully convinced that in any State or government system, energy policies should focus on promoting the socioeconomic development of the country through strategies that balance energy supplies and demands, thereby avoiding major trade imbalances caused by high import prices for energy products and services.

With funding from the Canadian Government, OLADE has developed this Practical Guidebook on Energy Policy to help designers, regulators and planners in its Member Countries to make energy plans and policies, thus contributing to the development the regional energy industry.

In light of the above, and recognizing the sensitivity of discussing a matter that depends entirely on the sovereign decisions of our member countries' governments, this guidebook contains prototypes that hopefully will serve as additional references when setting objectives, formulating strategic lines and assessing recommendations in order to design proposals for a national energy policy or plan.

Consistent with energy's influence on all facets of national development, we agree that there are no linear solutions. All energy policy must be complemented with suitable strategies, established through energy planning in each of the sub-sectors. We are aware of the need for energy planning to fully reflect the specific situation of each country and to establish long, medium and short-term scenarios for concrete activities relating to the needs identified in each area.

In conclusion, we reaffirm the need to focus the energy policy guidelines on covering the people's energy demand at fair, competitive costs on the supply side and affordable prices on the demand side, in the interest of national economic development, while ensuring sustainable development by promoting the use of renewable sources and energy efficiency to ensure environmental preservation and emissions' reduction.

We thank the government authorities of our Member Countries, the consultant team and the entire staff of OLADE's Permanent Secretariat, who have helped prepare this reference document.

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Energy Policy - A Practical Guidebook

1 INTRODUCTION

1.1 Background for ˘the Practical Guidebook

OLADE has made several significant technical contributions to meeting the pressing needs of the Latin American and Caribbean energy ministries, in keeping with the institutional aims set out in the Lima Agreement in terms of promoting effective energy policies among its Member States and designing and developing common energy policies toward regional integration. As a background document, we should mention "Energy and Sustainable Development in Latin America and the Caribbean,"[1] prepared in the late '90s in a global context of designing sustainability criteria for energy development in line with the agreements of the Rio Earth Summit of 1992.[2] These global agreements defined requirements of varying degrees and scopes for each country. Due to their comparatively favorable conditions, the countries of this region were not directly affected by the commitments under the United Nations Framework Convention on Climate Change (one of the closest to the energy sector). However, access to the various international cooperation mechanisms and to loans from multilateral organizations was seriously affected by conditions in the environmental rules. Furthermore, several countries ratified other global environmental conventions, also related to the energy industry. This created the need for a guide to energy Policy with a sustainable development approach, which was met through that document by OLADE.

In recent years, other approaches have been added to public Policy in the region, such as: the need to share the benefits (including the services provided by access to energy) among the various segments of society, especially the most vulnerable, and to reduce social inequality through inclusive policies; the importance of promoting fairer distribution of the value created from the natural resources of Latin American and Caribbean countries and of correctly assessing the value of such resources; the relevance of intensifying the involvement of various stakeholders and social groups in public Policy and implementation; the advisability of strengthening a regional approach to expand overall infrastructure for economic growth and social progress; and the development of energy, energy services and natural resources, with a focus on regional integration for productivity. This view has not neglected sustainable development or the need for suitable access to capital through the region's own means, adjusted to the policies of each country. These approaches to the regional vision, plus others not addressed herein, have not materialized as yet, but they do highlight the need to update energy Policy methods and to strengthen the other inescapable activity of the State related to such policies—energy planning.

Indeed, energy planning the main enforcement tool available for implementing energy policies. Bear in mind that this activity was diminished by the down-sizing precepts of the Washington Consensus for Latin America and the Caribbean during the '80s and more so in the '90s, when State planning capabilities were dismantled or reduced. In some countries, this seriously hampered timely, effective public Policy and implementation, and in a few cases that institutional failure caused energy supply alerts and crises. In fact, it was often nece-ssary to

1 This document was the outcome of joint cooperation between the Latin American Energy Organization (OLADE), ECLAC and the German Agency for Technical Cooperation (known at the time of the project by the acronym GTZ).
2 The United Nations Conference on Environment and Development (UNCED)

revise and adjust the industry's policy and institutional framework periodically, including its legal and regulatory aspects. In the late '90s, the election of progressive administrations committed to the ideals of natural resource sovereignty and national energy security, but with a regional approach, this has favored the region with a pluralistic political model that, has made progress based on gradual consensus building.

In this context, seeking to build the energy planning capacities of energy ministries or secretariats, the Latin American Energy Organization (OLADE) developed the Energy Planning Manual with cooperation from the Canadian Government under the "Sustainable Energy for Latin American and Caribbean Countries" project. That document is a valuable tool to help designers, regulators and planners in the 27 Member Countries to formulate energy plans and policies.

This Practical Guidebook is one of the "Planning Capacity Building" activities of that cooperation between OLADE and the Canadian Government, and complements the work done through the Energy Planning Manual.

1.2 Rationale, Aims and Scope of this Practical Guidebook

The experience of assisting specific energy-planning activities has also demonstrated the need to strengthen the institutions charged with coordinating and directing the energy sector, through a transfer of knowledge on public Policy.

Accordingly, this Practical Guidebook suggests basic steps and procedures for energy Policy—in line with the Energy Planning Manual—but refrains from defining contents or directives for such policies. It does not even give exclusive methods and procedures, because governments obviously have the autonomy and sove-reignty to choose the best approaches and the most appropriate guidance for their countries' policies. Rather, it suggests some basic 'best practices' applied to Policy.

In light of the above, OLADE has seen fit to offer its Member Countries a Practical Guidebook on Energy Policy to serve as a procedural reference for governments. Its purpose is to propose procedures and tools that they might find useful in the process of energy Policy.

Despite its practical approach, this document does not disregard the advisability of outlining certain considerations regarding the contents and aspects addressed in the sectoral policies under study. It begins with a brief overview of the conceptual framework for energy policy with a view to contextualizing the field, exploring its relationship to energy planning and national development plans, and noting the complexity of elements to be considered in the process from a systemic approach. It also presents important aspects such as institutional /legal frameworks and regional cooperation/integration. This review of Chapter 2 does not exhaust the main points to be considered in an energy policy in terms of context and focus, but only highlights some of the sector's complexities. Chapter 3 describes the process of energy Policy with an overview that offers introductory considerations for understanding the following chapter. On this basis, Chapter 4 presents some steps to follow, including technical tools recommended in this Practical Guidebook. Chapter 5 reviews certain basic conditions to consider when starting the process of energy Policy.

Finally, we should mention that over the past decades, many of OLADE's Member Countries have not had explicit energy policies contained in specific documents for that purpose. In some cases, energy policy guidelines were contained in government plans, or certain policy features could be discerned from the actions or statements of authorities, and sometimes from guidance given in other public documents such as State plans. However, ha-ving an explicit energy policy not only strengthens the planning process and helps define more robust scenarios, but also gives clear signals regarding the path that a given country

or region has decided to follow. This Practical Guidebook can be a valuable tool to facilitate the task of formalizing such energy policies.

1.3 Who is this Practical Guidebook for?

This Practical Guidebook for Energy Policy targets primarily officials and general professionals related to government agencies, whether national or sub-national, who have duties or powers related to planning and designing public policies for the energy sector. We should clarify that, although focused on the specificities of the energy sector, this Guidebook refers to procedures and tools that could be applied to other economic sectors.

The main inputs for energy planning include reliable, detailed information on the sector. It would therefore be advisable for experts in energy information management to also enjoy direct access to the suggestions contained herein.

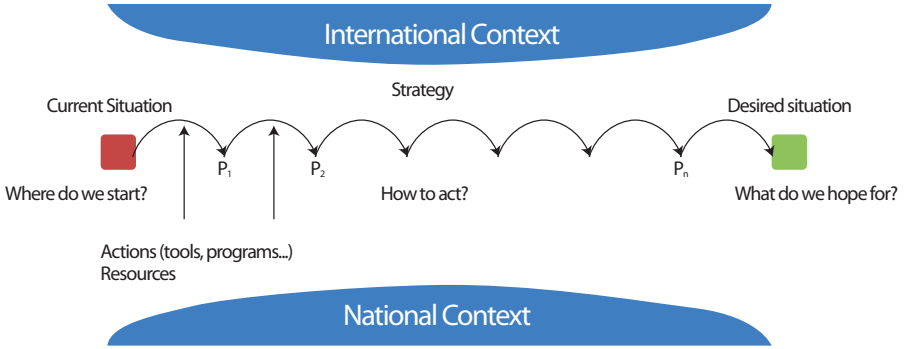
2 THE CONCEPTUAL FRAMEWORK FOR ENERGY Policy

2.1 Definitions and General Concepts

Public policies are meant to guide and organize efforts to achieve a desired state in all or part of a socioeconomic development sector, defined by its objectives. Policy starts with a baseline (status) and a set of strategies (how to achieve the desired situation) and traces a path toward achieving those aims. Action is taken by implementing various policy tools (various types of regulations, plans, programs, or others to organize activities) with the involvement of various stakeholders.

Figure 1 illustrates the relationships between the main factors involved in designing a policy.

Figure 1. Main elements for defining a public policy



Source: OLADE *et al.*, 2003, p. 145[3]

From a conceptual perspective, Policy can be seen as an epistemological process. On a social plane, it can be viewed in terms of its approach. It could also be seen as a continuous dialectical process, since the sector that the policy intervenes in (the policy target) must go through intermediate stages to reach the desired situation (or end state). A policy should define not only the end state for the sector, but also its intermediate states (or time horizons) and the actions planned, with objectives, targets and strategies to reach successive changes on the way toward the desired situation.

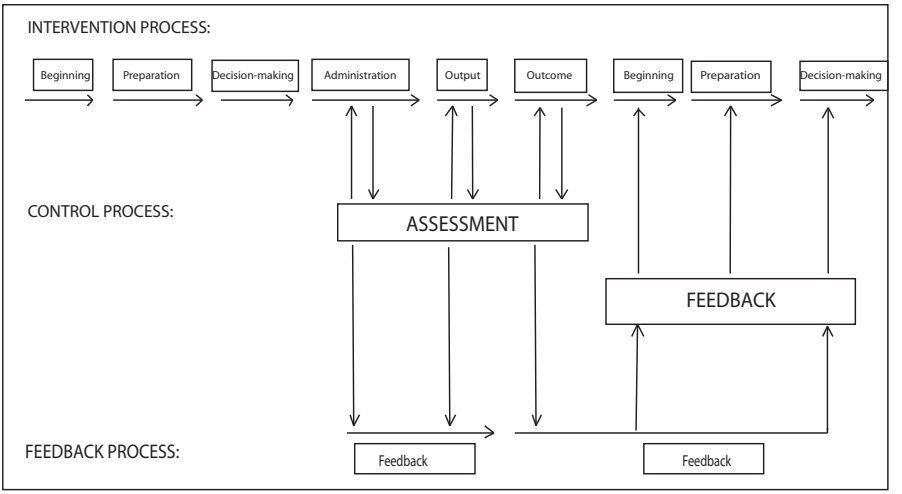
Implementing the actions requires handling many different stakeholders and social groups with varying degrees of interdependence (multidimensional social networks).[4] We cannot ignore the fact that the national context in which public policies are implemented is not isolated from an international context linked to global markets such as the petroleum market. Nor is it independent from a regional (or even bilateral) context when it comes to integration projects involving international agreements and infrastructure for harnessing energy resources or for interconnecting energy grids or systems.

3 Latin American Energy Organization (OLADE), United Nations Economic Commission for Latin America and the Caribbean (ECLAC) and *Deutsche Gesellschaft für Technische Zusammenarbeit* (GTZ) (2003). *Energía y desarrollo sustentable en América Latina y el Caribe: guía para la formulación de políticas energéticas* (Vol. 89). United Nations Publications.

4 The complexity of networks among elements of society when making and analyzing policies is described in studies such as Hajer Maarten A & Wagenaar, Hendrik (eds.) (2003). *Deliberative Policy Analysis: Understanding Governance in the Network Society*, Cambridge University Press.

For analysts of public Policy, these tools are developed through dynamic means of startup, decision preparation, decision making, and implementation (with their outputs and outcomes). Evaluation and feedback, then, are meta-processes closely linked to the public Policy process[5] (VEDUNG, 2009), as shown in Figure 2. They are needed in order to build lessons learned (primarily from implementing action plans) into the public policy cycle. Thus, public policies must have an increasing degree of flexibility as actions reach deeper levels of detail. In other words, objectives should have greater temporal consistency than actions.

Figure 2: Processes and meta-processes related to public policies



Source: The authors, based on Vedung (2009)

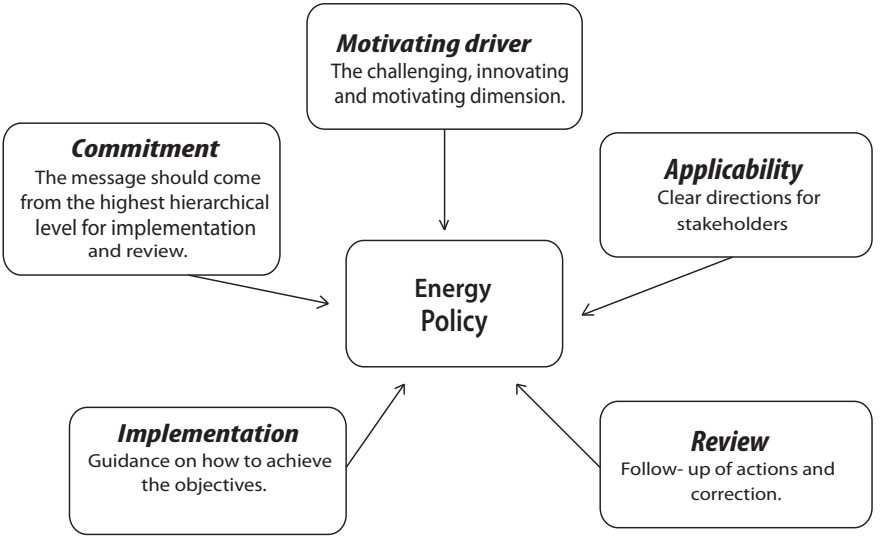
In line with the general outline of the public Policy cycle shown above, which takes place on a theoretical plane, we need to design and implement policies within a given institutional and regulatory environment under certain conditioning factors. For this real-life process, it is critical for policies to be effective, implemented and to produce the desired effects. The best practices found in policy guidelines[6] indicate that an effective energy policy must at least have the following five features (see diagram in Figure 3):

- Motivating driver
- Commitment
- Applicability
- Implementation
- Review

5 Vedung, E. (2009). *Public Policy and Program Evaluation*. Transaction Publisher, New Brunswick (USA).

6 Government of South Africa (2012), *Industrial Energy Management Training Course*, Module 4, "*Developing an Energy Policy.*" Text developed on the basis of: *Good Practice Guide 186 – Developing an Effective Energy Policy, UK Best Practice Program.*

Figure 3: Key features of an energy policy



Source: The authors, based on Government of South Africa, *Industrial Energy Management Training Course, Module 4, "Developing an Energy Policy"*.

The first feature is highly important because a policy should be challenging and motivating—an ideal or challenge that we hope to attain. This feature is directly related to the contents of the energy policy and is stated in what is referred to herein as the Energy Agenda. It is particularly linked to the strategic vision and the higher-order or general objectives.

The last two features are parts of the cyclical process described above. The second feature—Commitment—is directly related to the institutional dimension. Its starting point is the commitment shown at the highest institutional levels of government agencies, particularly the body governing the energy policy, which creates the necessary confidence, assurance that the policy will be followed through or that its action plans will be executed. This is why the institutional dimension, discussed below in this chapter, is so important.

The next feature—Applicability—puts the technical dimension into perspective and has to do with the feasibility of implementing the policy by creating and maintaining sufficiently favorable conditions to address and overcome any risks and achieve the objectives.

In practice, public policies act as guiding tools that enable the government to meet political, economic and social needs by establishing national rights and obligations and the means for interaction among domestic and foreign stakeholders based on a policy vision with a specific timeline. In this light, an energy policy can be defined as a shared set of strategic provisions and guidelines adopted by the competent government authorities, designed to address public situations and meet a society's energy needs. They are patterns norms or mandates that set priorities and lines of action to reflect the political will of the government to influence certain situations and achieve certain outcomes.

2.2 A Systemic Approach to the Energy Sector

It is hard to define energy in a precise, concise, complete manner that indicates its importance to the development of a society and all of its activities (productive or otherwise) and their inter-relatedness with regard to other aspects or elements of society, which has its own complexity due to socioeconomic differentiation, and also puts it in an historical perspective. This is because building a conceptual framework for energy as a key ingredient to meet the needs of a given society, including its production and way of life, is a highly complex socio-historical process. It is harder yet to operationalize the concept of energy to design and implement a policy within a particular social and physical environment and well-defined historical period.

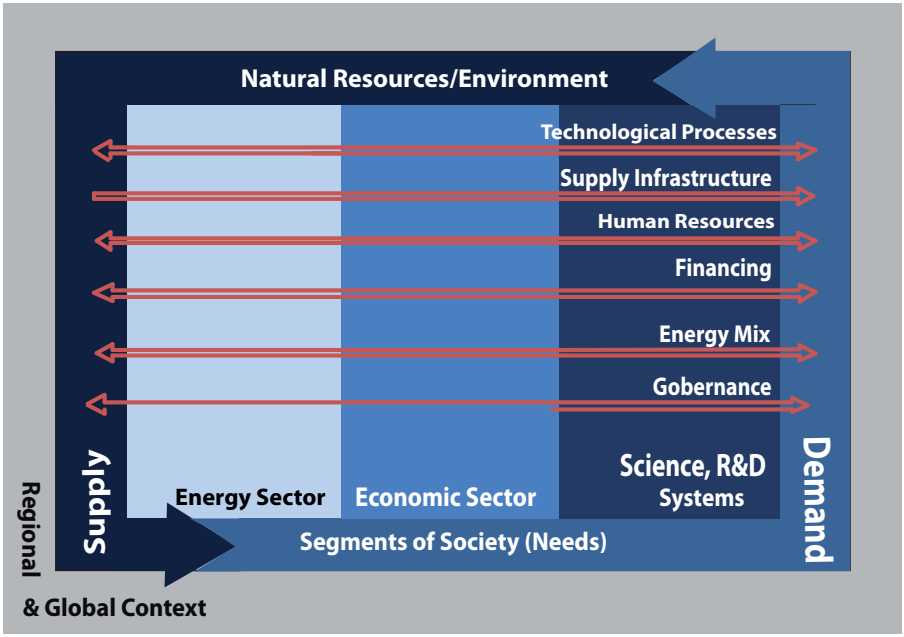
The numerous activities and factors involved in using natural resources for energy, treating, transforming and transporting them, and even the devices that use energy in its various forms to obtain goods and services, do not exhaust the definition of energy in a social, economic and historical context. On the contrary, this description, related to the concept of an energy matrix,[7] has to do basically with the conditions of natural resources in a given place (which may or may not be near their place of consumption, transformation and use) and to processes related to energy flows that enable a chain of energy supply and demand activities.

However, energy includes features that relate to other economic sectors. Energy supply, in its various forms, is essential to carrying out all production activities. Even the way a given society obtains, transforms and uses energy defines its ability to increase the productivity of human labor and diversify its outcomes. Industrial revolutions (driven by coal and later by hydrocarbons and electricity) were made possible through proper energy management linked to technological development and the availability of natural resources. This also shows how energy relates to scientific and technological knowledge.

Figure 4 illustrates the complexity of relationships linking energy and its environmental factors, natural resource management, economic sectors in general, and system of science, technology and innovation in a given society—which is not a homogeneous structure—to energy demands for economic production and to meet the various needs of modern life.

7 Energy matrices, when used to describe the energy status of a given territory, refer to the energy available to meet the total energy demands of that territory at a given time.

Figure 4: Conceptual framework for a systemic approach to the energy industry



Source: The authors

Bear in mind that energy is linked to other social systems or sectors within a given socioeconomic situation that has its own relationships of production. Therefore, it operates within a dynamic system that cannot be divorced from an historical perspective.

The energy industry itself includes several systemically interrelated elements. In other words, all of these aspects of energy management must be considered in relation to all the other factors combined to achieve the energy availability and energy use that society requires. A systemic approach, therefore, considers not only the energy chain from supply to end-use, but also its implications for the environment, infrastructure needs, technology use and development, human resources required for different energy-related activities, and the need for financial and natural resources. These factors should be organized within an institutional framework for the sector and a particular vision for energy system governance. This involves not only its organizational structure, but also its legal norms (at all levels), policies, technical standards and service models, the roles of the public and private spheres, and models for the distribution of the economic value generated in all energy-related processes.

Based on this systemic approach, we will now discuss certain aspects of energy and how they relate to some useful concepts for defining the energy sector as an object of public policy.

2.3 Energy Policies and National Development Policies

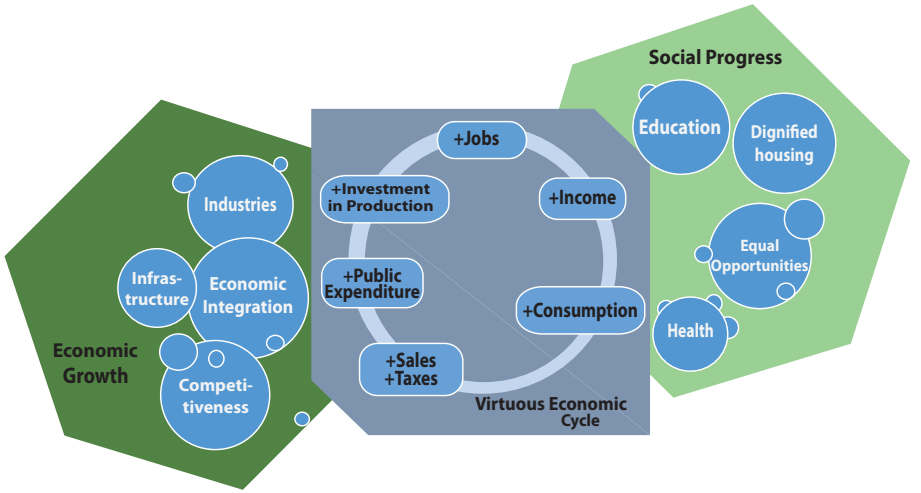
In terms of scope and outreach, policies can be classified as cross-cutting or sectoral. In terms of the time horizon for implementation, they can be short, medium or long-term policies. Long-term policies usually involve

structural aspects of the socio-environmental system and can be categorized as development policies, because they seek to meet the structural needs of the socio-environmental system in order to boost economic growth and social progress.

The aforementioned cyclical process can begin with public and/or private investments in infrastructure and industrial production, which can act as a trigger for job creation and have a direct, positive impact on the people's income and demand for goods and services (consumption). From a supply perspective, this increases sales and, in a given tax regime, brings tax revenue for the State, which hopefully will make it possible to expand public infrastructure further, thereby creating a positive investment climate in the country. This closes a virtuous cycle and restarts the process described above.

The illustration of the virtuous economic cycle (Figure 5) shows the sequencing and coordination of various socioeconomic variables taken into account in a development policy. Interactions among these variables must be such as to create a positive feedback loop and enable the sustainable development of a country or region.

Figure 5: Virtuous economic cycle and its relation to economic growth and social progress



Source: The authors

Accordingly, the upper part of this virtuous cycle, where "jobs, income and consumption" interact, is closely linked to social progress, because these variables create conditions that enhance the overall standard of social wellbeing and present opportunities to foster dynamics that meet human needs, and provide education and personal growth for individuals through the distribution of the value created in the virtuous cycle.

Similarly, the lower part of the virtuous cycle, with investment and sales opportunities, is where the conditions for sustainable economic growth are generated. This is because major infrastructure works are usually required to boost a country's economy by marketing products in domestic and foreign markets. This, in turn, improves sales opportunities and the emergence of new investments in production that feed the cycle.

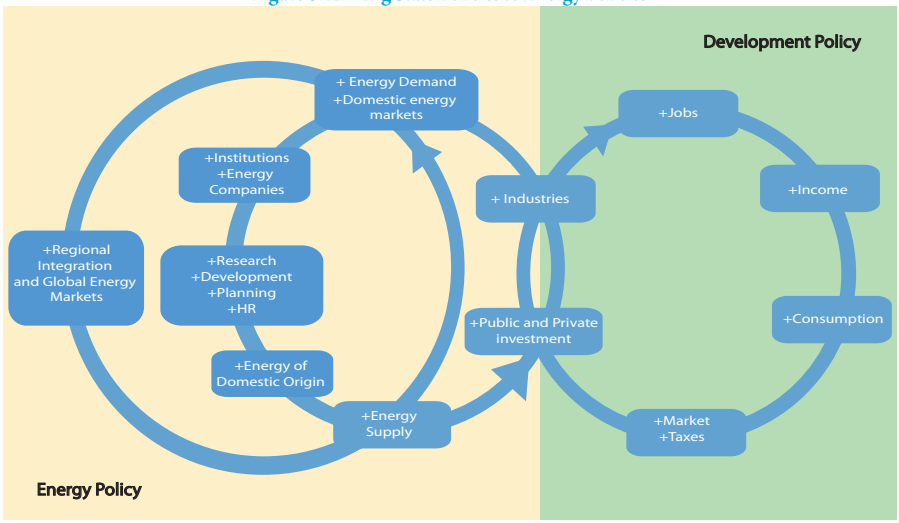
As stated above, development policies fall under two closely-related categories: general or cross-cutting policies (prices and incomes, jobs and human resources, institutional, social, environmental, technological, financial, commercial, etc.), and sectoral policies (mining, agriculture, forestry, industry, energy, transportation, etc.).

Thus, sectoral policies should aim to strengthen the cross-cutting virtuous cycle so as to contribute to meeting the aims of the development policy. In particular, since the energy industry is related to virtually all of a country's socioeconomic sectors, this sectoral policy will be closely linked to State development policies in terms of both economic growth and social progress.

Figure 6 illustrates the variables that generate a virtuous cycle for energy policies and position them as the drivers of development policies. Thus, domestic energy supplies can be seen as favoring the development of public and private infrastructure and the resulting growth of the industrial sector. In this same line of thought, a boom in the industrial sector generates energy demand, which favors the establishment and strengthening of national energy markets connected to the region and the world. The consolidation of these energy markets, in turn, contributes to the consolidation and feasibility of energy companies and the institutions that coordinate the energy industry. This ultimately creates a demand for human resources and technological development, which fosters efficient use of domestic energy resources. This, in turn, increases domestic energy supplies, which may even be reinforced by energy flows from regional or global markets. Thus the cycle is completed, making it po-ssible to start a new sequence.

In view of the above, development policies and energy policies should be geared toward generating the synergies and meeting the objectives that ensure their sustainability. It is therefore the State's non-transferable responsibility to delineate and implement energy policies actively.

Figure 6. Linking State Policies to Energy Policies



Source: The authors

2.4 Institutional Frameworks and Energy Policy

The process of energy Policy begins with the realization which is necessary to take action in the energy sector or system[8] to achieve the desired state. Its implementation should be entrusted to institutional players with specific roles in the sector and those decisive to Policy, given their vital role in making decisions that directly

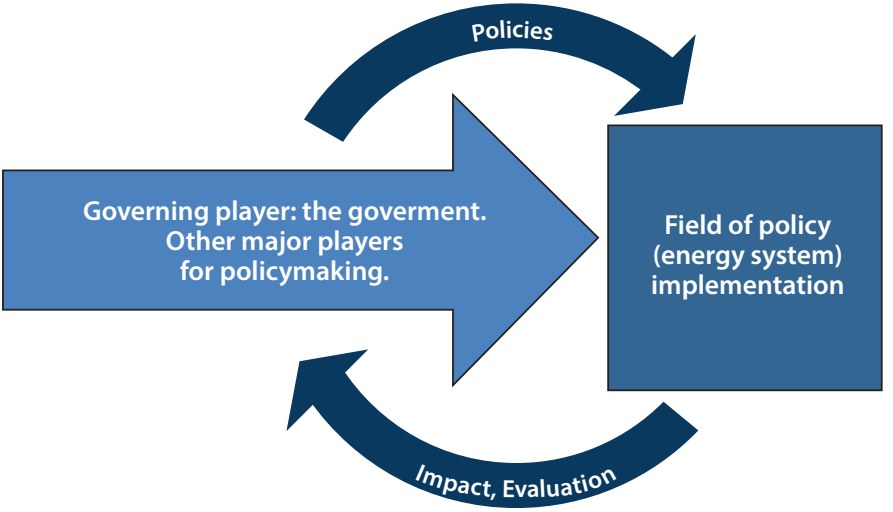
8 For the energy sector to be considered a system, it is necessary to consolidate its institutions, clarify their roles and strengthen them as stakeholders. This section will use the terms 'sector' and 'system' interchangeably.

impact the energy chain or governance of the sector.

First, a lead player must be identified within the government to coordinate and head the Policy process. Other major players, such as administrative agencies, organizations or companies, can be public, private or of the civil society, and are deemed important in designing the policies and defining the future responsibilities of each player. It falls to the main player in the government structure to decide who these major stakeholders will be.

We should clarify that the major players in Policy are part of the energy system but take on the task of seeing its other parts (those affected by the policy or its application) objectively, as components that can be modified through specific actions. Figure 7 outlines how the major stakeholders are linked to energy policies. This objectification of the energy system is possible by applying the analytical tools and decision-making processes detailed in Chapter 4 hereof.

Figure 7: General outline of major stakeholders for energy Policy



Source: The authors

The major players for Policy and other stakeholders in the sector are linked to each other by the powers granted in their bylaws and other legal instruments, and by a number of relations that are not necessarily formalized but are based on decisions that can be either policy-related or provisional (regional or national emergencies, ad hoc programs, etc.). These regulated relations and others less formalized ones make up an institutional network that, if well understood, can be a major strength for Policy and implementation. This institutional network is complemented by interest groups (segments of society affected by the policies but not directly involved in decision-making) that can play an important part in policy implementation and social communication strategies.

2.5 The Importance of Consistency between Current Regulatory Frameworks and the Energy Policy

The rules established by State branches, in their different hierarchical expressions and territorial dimensions, define the various aspects of any sector's planning, functioning and institutionalization, in this case the energy industry.

Notably, even when the energy industry operates under specific laws and regulations, it is not completely separate from the legal system and therefore from the laws of a given nation. Its operations are also governed by the Constitution, international treaties and other laws and basic principles of the State.

In principle, laws, decrees, resolutions and other regulations are enacted in order to:

I. Define the roles, responsibilities and scope of public entities,
II. Regulate relationships and roles among the parties involved in the activities making up the energy chain by establishing rights and obligations,
III. Establish the organizational model of each sub-sector (electricity, hydrocarbons, etc.), and
IV. Determine resource ownership/management and the distribution of economic value among internal and external economic stakeholders, other segments of society and the Government as an institution that promotes the common welfare of the entire population within a given territory and historical period.

Laws, regulations and standards are government instruments for the adoption and implementation of energy policies, programs and plans. They organize relations among operators and safeguard the interests of vulnerable segments of society, including the users of particular energy services.

In addition to generality, abstraction, impersonality, and its mandatory nature, one of the basic characteristics of law is permanence over time. The latter makes it indefinite for an undetermined number of hypotheses and keeps it in effect until major changes in the conditions that led to its adoption result in its abrogation, subrogation or repeal through subsequent formal instruments.

We should emphasize that legal security is a universal principle of law based on its certainty in terms of both enactment and enforcement. This ensures that what is provided, forbidden, ordered or allowed by the public political power is known or can be known. This, then, implies the firmness of law and its permanence in time, backed by the proper enforcement channels and mechanisms, and enables social, economic or political stakeholders to foresee the effects of their actions and interests to avoid being affected by sudden, unforeseen regulatory changes that would adversely affect their exercise of rights or assumption and fulfillment of agreed obligations.

Since the scope and types of energy policies vary according to the type of State that makes them, and are therefore strongly influenced by government values, priorities and approaches, before defining a State policy it is important to acknowledge the need for a comprehensive analysis of the current legal system seeking to adapt the policy to legislation. If implementing a policy involved a major transformation of the national legal system, there could be clashes between the dynamics of the energy sector and the complexity of the legal system of a particular nation, given the sensitivity and deep-rootedness of national law. If energy Policy were not grounded in the current legal system, it would be impossible to implement.

However, if legislative lacunae or contradictions hamper effective implementation of certain energy policies, all formal channels to change the applicable law, regulation or ruling should be exhausted and, if necessary, new legal frameworks adopted.

This applies to the universal principles of law, treaty undertakings, constitutional provisions, laws and legisla-

tive decrees. However, it is much less complicated to change and/or enact new executive orders, regulations and technical standards.

Therefore, a common error when making and implementing energy policies is to use or reproduce the energy policies of other countries them without a critical, analytical view, or the tendency to use the sole models of a group of countries or a region without first studying the specific conditions of each country. The marked differences among legal systems could disrupt the replication of a policy in a country with a different legal situation and a dissimilar energy sector. Therefore, it is advisable for governments to work continuously to make their own public policies for energy and other sectors using the country's own talent.

This does not mean complete rigidity, which would keep it from adapting existing legislation to new State guidelines when needed. In fact, when significant changes arise in the relations among parties involved in energy chain activities, the law can be amended without necessarily affecting national legal stability. In this case, it is a matter of achieving legislative innovation to link the energy situation of each country to its regulations and make it practical to apply the norms and remove any obstacles, repetitions, contradictions and unspoken exceptions, thereby adapting the law to the realities of the sector.

Importantly, since energy is deemed a strategic sector in the vast majority of OLADE's Member Countries, the State reserves the right to manage, regulate and control many of its activities. Therefore, this sector requires a strong, exclusive regulatory framework, in keeping with its economic and geopolitical importance, to serve as the basis for developing and implementing national energy policies.

2.6 Energy Policies and Plans

One essential prerequisite for a country's sustainable development is to define the underlying aims of its energy policy. However, these aims may not be achieved without suitable planning of resources, strategies and actions.

From this perspective, planning should not be confused with energy Policy, which is the framework within which energy planning must be carried out. These activities are complementary and closely related. Pla-nning can be described as a tool that supports energy Policy, which in turn helps to define future scenarios or desired situations to be achieved.

In this context, energy planning is a continuous, dynamic process, adaptable to the evolution of uncertain variables in the social system where it operates (changes in economic variables, technological advances, political changes, etc.). Energy plans are made using systematic, analytical methods that suitably process data on energy demands, transformation and supplies and, on this basis, generate action plans.[9] In this way, planning is ultimately the sphere in which strategies are designed to meet the objectives of the energy policy.

Both energy planning and Policy should follow the systemic approach mentioned above, which takes into account all of the energy production chains and all endogenous and exogenous interactions, whether upstream, in transformation centers or in final consumption sectors, with particular regard for contestability among sources at the intermediate and final consumption nodes (see ECLAC/OLADE/GTZ, 2003, pp. 146-148).

Therefore, planning should focus on the overall energy sector and specify actions at a sub-sector level, based on the strategic guidelines of the policy. This means taking into account general and specific objectives, targets, strategic lines for each specific objective, and the tools proposed to implement those strategies.

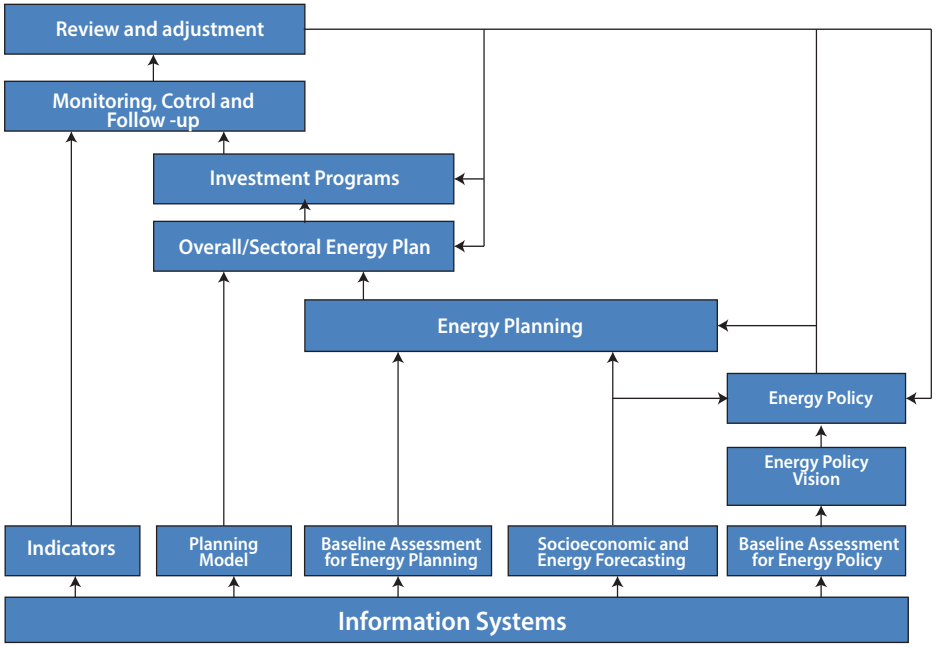
Therefore, the role of planning is to materialize and operationalize the guidelines of the energy policy in a

9 Ndaye B. (2009). Planificación Energética en los Países en Vías de Desarrollo. PhD thesis, Universidad Politécnica de Valencia. Spain.

coherent fashion. Of course, the energy system analysis required for planning will have to be much more comprehensive and detailed, both overall and at the sub-sector level.

Figure 8 summarizes the relationship between energy planning and energy Policy, which shows the sequencing and coordination of the various planning stages and activities.

Figure 8. Energy Planning Stages and their Relation to Modeling Tools



Source: The authors

2.7 Sustainable Development and Energy

In 1987, the World Commission on Environment and Development (WCED) defined sustainable development as, *"A development that meets the needs of the present without compromising the ability of future generations to meet their own needs."*

The sustainable development approach changed the development paradigm followed until at least the '60s and '70s. It questioned the notion of differentiated responsibilities among the countries of the world due to the historically uneven pressure on their natural resources and the environmental impacts caused by the development model that prevailed in the world. This was caused by the global expansion of a socioeconomic approach centered on capital accumulation and a way of life that overemphasized consumer attitudes and a mercantile view of the world.

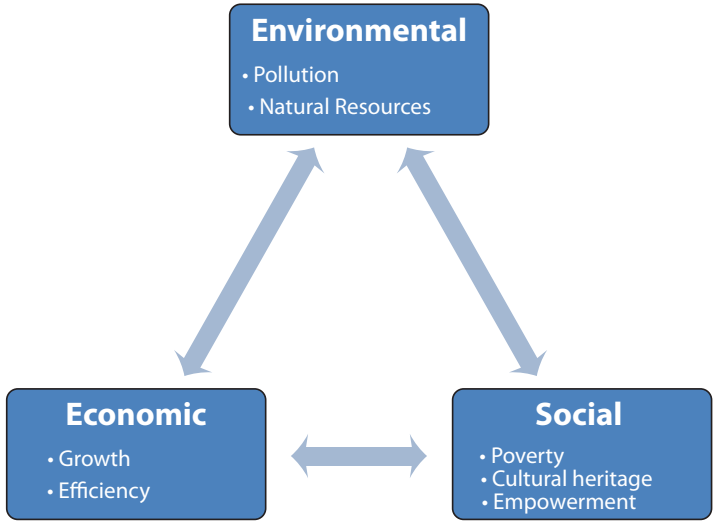
From an overall historical perspective, this predominant mindset brought about higher levels of socioeconomic development, but also greater environmental impacts. Now, one of the big questions is how to seek development

in countries with high levels of social and economic inequality and high rates of poverty or extreme poverty, as is the case in much of Latin America and the Caribbean, and how to distribute the overall costs and benefits of measures to reduce environmental risks and of the various aspects of such measures.

Global mechanisms have not yet overcome the difficulties of distributing benefits and costs fairly—in the Rawlsian sense—in the world. Nevertheless, the concept of sustainable development is already embedded in the culture of development Policy and planning worldwide.

In line with the above, sustainable development has three basic dimensions: social, economic and environmental sustainability. Economic development implies progress, which makes societies willing and able to cover the costs of goods and services because of higher incomes and greater efficiency in the production sector. This is closely related to economic efficiency. Moreover, social development means enhancing the welfare of the population as a whole, while seeking to reduce the effects of unequal incomes and access to the basic goods and services needed for life. It means seeking an efficient distribution of wealth with social justice. Finally, the environmental dimension refers to managing ecosystem services and the human beings who depend on them. Sustainable development basically involves the interplay of these three aspects (Figure 9).

Figure 9. Elements of Sustainable Development



Source: The authors

In light of the above, sustainable energy development can be defined as a set of actions and energy chain activities to provide 'sustainable energy,' i.e., affordable, accessible, reliable energy to meet the economic and social needs, while attending to environmental concerns. This development model also seeks equitable distribution in meeting those needs. In practice, this means using renewable energy sources and energy efficiency. An energy transition phase (transforming the energy mix under sustainable development criteria) also contemplates sources such as natural gas, geothermal and nuclear energy as 'alternative' sources that are better from a climate change perspective. Whatever approach is used, sustainable energy always involves a broad context that

includes resource supply, existing energy infrastructure and development needs.

From that perspective, due to complexity, restricted and difficult this concept is to implement, this Guidebook acknowledges its importance for energy policymakers and addresses the various dimensions of the energy problematique in a sustainability context, using a broad, systemic, comprehensive approach.

In this regard, we should not fail to mention that the United Nations Sustainable Development Summit of September 2015 set the Agenda 2030 with 17 Sustainable Development Goals (SDG), which included "affordable, clean energy."

At present, cutting-edge energy policies not only offer guidelines tailored to meet an area's energy needs, but also seek to ensure sustainable resource development by encouraging the use of renewable sources, energy efficiency, universal access to energy products and services at fair, competitive prices on the supply side and affordable costs on the demand side, and the search for industrial development without compromising environmental protection and emissions reduction.

2.8 Regional Integration,International Cooperation and the Energy Sector

Latin America and the Caribbean have abundant, diverse energy resources that are unevenly distributed throughout the region, which makes it ripe for energy integration. Several studies point out the benefits of resource complementarities and of coordinating and optimizing resource use and the infrastructure and facilities for the entire energy chain. This lays the groundwork for moving forward in the process of integrating and developing production chains with a regional focus.

In the region's institutional context, energy integration and cooperation should be developed with a broad regional policy base, as consolidated in the Community of Latin American and Caribbean States (CELAC), by incorporating the peculiarities of sub-regional processes [such as the Caribbean Community (CARICOM), the Central American Integration System (SICA), the Union of South American Nations (UNASUR) and others].

Regional integration in Latin America and the Caribbean began with mostly sub-regional mechanisms and processes at different periods between the '50s and '60s, coinciding with the international overhaul of economic and institutional systems (integration in Europe, consolidation of the United Nations system, expanding influence of the United States of America and of transnational corporations, etc.).

These regional and sub-regional integration processes were characterized, in general and throughout the '90s, by prioritizing business deals struck following very tough negotiations. Different economic groups and sectors promoted their particular interests, and in some cases there were even incompatibilities between national policies for bilateral relations and extra-regional countries or blocs.

Given its strategic significance for these economies, the energy sector has not remained on the sidelines of regional integration, but has had its own characteristics. These included network interconnections between countries (gas pipelines and power lines) that enabled long-term commercial transactions, the use of shared natural resources for hydroelectric generation through bilateral treaties and, above all, intensified regional cooperation—with an integrationist vision—at the institutional level.

Bear in mind that by the mid-twentieth century, oil had surpassed coal as the main source of primary energy in the world. A large portion of the main global oil reserves lay outside of the most highly developed countries, the major consumers of this fuel (in sharp contrast with the case of coal). This was an important geopolitical and economic factor in how the international system treated these strategic resources. Indeed, during the '60s and '70s, categories such as sovereignty and the use and value of natural resources were debated in the political arena on

development versus underdevelopment, international economic relations and the international division of labor.

It was in this historical context that the energy authorities of Latin America and the Caribbean decided in 1973 to create the Latin American Energy Organization (OLADE) as a specialized regional body linked directly to its Member Countries' Ministries of Energy and Hydrocarbons (or their equivalents), consolidated as a hub of regional and intergovernmental technical cooperation in its fields of expertise.

While OLADE is unique in its capacity as a specialized regional agency and linked directly to the energy authorities of the countries in the region, other international organizations make significant contributions to technical cooperation in various fields of energy, including entities belonging to companies in the industry. These include the Regional Association of Oil, Gas and Biofuels Sector Companies in Latin America and the Caribbean (ARPEL), The Economic Commission for Latin America and the Caribbean (ECLAC), the Regional Energy Integration Commission (CIER), the Organization of American States (OAS), and the Latin American and Caribbean chapter of the World Energy Council (WEC). Also noteworthy are the significant contributions of international financial institutions such as the Development Bank of Latin America (CAF) and the Inter-American Development Bank (IDB).

Significantly, in March 2013, most regional organizations working on technical cooperation in the energy fields (ALADI, ARPEL, CAF, ECLAC, CIER, OAS, OLADE, WEC) published the report "*Energía: una visión sobre los retos y oportunidades en América Latina y el Caribe*" (insights into the energy challenges and opportunities in Latin America and the Caribbean), which compiled these organizations' reflections on various issues on the energy agenda of the region's countries. Since these topics offer a broad overview of regional integration, we feel it is appropriate to share below some of the conclusions in the report.

One of the main challenges in the path towards energy integration is institutional—the creation of reliable regional mechanisms to regulate exchanges, establish clear and consistent rules to facilitate project construction/management and energy exchanges (or energy sources), and foster mutual trust among countries. Meeting the related objectives requires regional planning based on regional energy policies that seek to balance the principle of national sovereignty with a supranational approach in the best interests of the region.

We should also mention some of the processes or initiatives that have made progress in the search to balance national and regional approaches when designing energy policies or—better yet—action plans. The following examples stand out:

I. The South American Energy Council, which structured the South American Energy Treaty based on prior agreements on the South American strategy guidelines and action plan for regional energy integration adopted at the Presidential Summit in Cardales, Argentina (2010),
II. The Central American Integration System (SICA) has an "Action Matrix for Energy Integration and Development" and its current instrument (the 2020 Central American Sustainable Energy Strategy), and
III. The CARICOM Energy Policy adopted by the Energy Ministers of the Caribbean Community in March 2013.

These are examples of regional policy approaches achieved through a process of consensus building among the representatives of the Member Countries.[10] Note, however, that the 2020 Central American Sustainable Energy Strategy is implemented through follow-up organized and coordinated by SICA with the engagement of

10 Other integration and cooperation mechanisms and processes in Latin America and the Caribbean include the energy sector among their lines of action [such as the Bolivarian Alliance for the Peoples of Our America (ALBA), the Southern Common Market (MERCOSUR), the Andean Community, and the PETROCARIBE mechanism promoted by the Bolivarian Republic of Venezuela]. The examples mentioned in the main text are processes reached or advanced through agreements on how to manage energy with a systemic, strategic vision to guide efforts towards a regional or sub-regional energy policy.

specialized regional organizations, including OLADE.

Finally, we should mention the case of the Community of Latin American and Caribbean States (CELAC), whose intergovernmental body for energy issues—the Meeting of Ministers of CELAC—is making progress, with help from OLADE, in defining energy strategy guidelines for the region based on various sub-regional agreements.

Although energy integration has made great progress, we must acknowledge that many agreements and treaties have not been fully implemented. Therefore, full application of energy integration treaties requires including their contents in national energy policy guidelines and domestic plans and laws for the sector, to avoid contradictions that would hamper the expected results.

Note that before joining integration initiatives, it is imperative to assess their costs and benefits, all national, sub-regional, regional interests, and concrete possibilities to honor commitments to the integration process.

Since its inception in 1973, the fundamental purpose of the Latin American Energy Organization (OLADE) has been "integration, protection, conservation, rational use, marketing and protection of energy resources in the region" (Article 2 of the Lima Agreement). Likewise, the aims and duties listed in OLADE's founding document (Article 3 of the Lima Agreement) included: "encouraging its Members to implementing energy projects of common interest"; "promoting the creation of a Latin American energy market, starting with the promotion of a pricing policy to help to ensure its Member Countries a fair share of the benefits derived from energy sector development"; "promoting the creation and development of common energy policies as a factor in regional integration"; and "fostering technical cooperation, the exchange and publication of scientific, legal and contractual information, and the development and dissemination of energy-related technologies among its Member States."

Adopting a common policy is key to reaching higher levels of integration, but converging energy policies at the initial or intermediate stages of an integration process is a highly complex endeavor. This is due to the diversity of visions, goals, interests and strategies among the region's sovereign states, which do not always coincide fully with regional needs and trends. Therefore, national energy policies establish the guidelines and actions that will lead the states, to a greater or lesser degree, toward energy integration.

Achieving full energy integration among the countries of Latin America and the Caribbean is a complex process that requires the concurrence of states, businesses and the civil society. Experience has shown that integration initiatives and processes are most successful when their objectives are included in State mandates in the form of policies, plans and standards with a regional outlook.

One would be hard put to find any State that does not acknowledge the benefits of integration. However, even though most national policies express support for and commitment to integration initiatives, which governments adhere to when signing treaties, there is often little coherence between such statements in favor of integration and the actual steps taken to meet the aims of integrationist treaties or processes. Therefore, the policy should focus on ensuring real integration through specific mandates that set out the regulatory frameworks and action plans needed to meet the objectives set. The lack of proper instrumentation of national integrationist policies often results structural gaps that states attempt to fill through negotiations carried out in isolation, not as a bloc. As a result, countries belonging to the same integration effort may end up competing with each other in extra-regional energy markets.

The following recommendations can help to align a country's energy policies with its integrationist aims or commitments:

- When signing treaties and other legal instruments related to energy integration processes and initiatives, weigh the benefits for each State and recognize shared needs, especially those of less developed countries.

- Ensure the material conditions needed to implement the strategic agreements reached by States, to make them durable.
- To ensure consistency between national strategies and regional or sub-regional energy policy guidelines, include the commitments of energy integration treaties in national policies.
- Before or after signing bilateral agreements, make sure they are consistent with all multilateral integration processes.

In conclusion, we should emphasize the importance of linking national policies, plans, regulations and treaty undertakings to real possibilities for multilateral interaction, in order to move towards higher levels of energy integration.

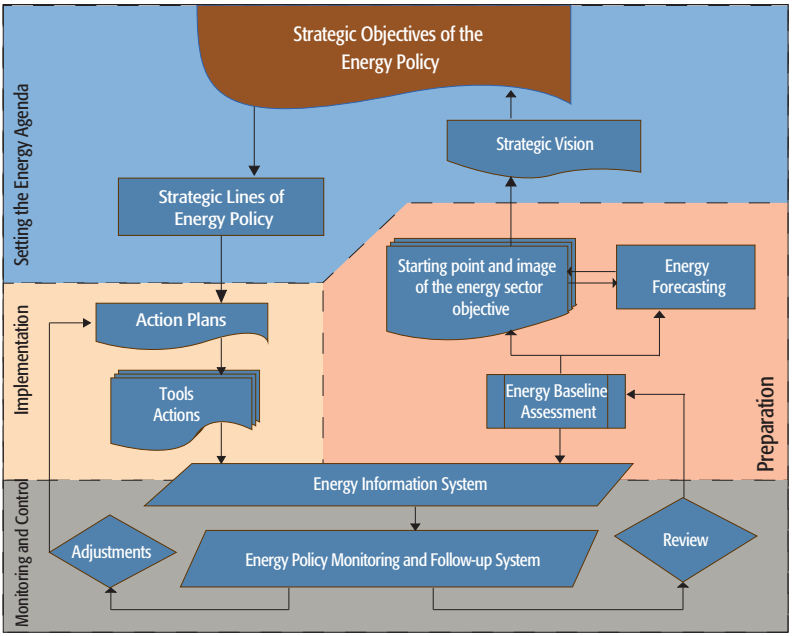
When a country's policies include integration considerations, implementing them properly requires national, sub-regional and regional organisms to promote coordination and complementarity at the economic, trade, energy, social, cultural, and other levels.

One determining factor is the way policies approach integration, because implementing integration plans will depend largely on the importance or value attributed to integration.

3 THE ENERGY POLICY PROCESS

Chapter 2 described the conceptual framework for energy Policy and reviewed some of the definitions more closely related to the approach and contents of public energy policies. This chapter will offer a general description of the Policy process. Again, energy Policy is a complex process with interrelated activities that require basic tools to be implemented effectively. These tools systematize such processes for an objective analysis of the energy sector, seeking to mitigate potential subjective biases that could hinder a social consensus of the vision and objectives of the energy policy.

Figure 10. Overview of the Policy process with sections to be included in an energy policy



Source: The authors

Figure 10 shows that the energy Policy process includes the following stages, reflected in the different sections of the policy:

1. Preparation
2. Defining the Energy Agenda
3. Implementation guidelines
4. Review: Monitoring and follow-up

Each stage follows well-defined procedures using the tools, procedures and techniques detailed in the following chapter. Note that these steps relate to the public Policy cycle described in the section on definitions and general concepts.

This chapter describes the Policy procedure and the steps to be taken when designing its parts, all or some of which may be included in the energy policy document (or formalized in the institutional framework of a country or region). It is important to clarify this point, because the government agency responsible for the sector in a given country may choose to publish or formalize the outputs of the Policy process described below and not issue a legal or administrative document containing all stages of the process. For example, it may prefer formalization and disclosure of the part pertaining to the Energy Agenda.

This chapter contains several theoretical considerations gleaned from OLADE's Energy Planning Manual.

3.1 Energy Information as an Enabling Factor in the Policy Process

Figure 10 shows that, as in the case of energy planning, systematizing historical energy and socioeconomic data is vital energy Policy. It is also essential for policy preparation, implementation and review (monito-ring and follow-up).

Without a sufficiently complete, reliable and timely information system, it is impossible to propose an acceptable energy policy and develop action plans to guide the implementation process. Nor is it possible to implement a monitoring and follow-up system for such plans.

Information systems should cover both the international (regional and global) level and the national level, for which information is required on energy laws, standards and regulations, and on socioeconomic and environmental matters, both for the sector as a whole and for the sub-sectors formed by the different energy chains.

Accordingly, systematized information management maximizes the value and benefits of data analysis, minimizes acquisition and processing costs, assigns responsibilities for effective, efficient use, and thereby ensures a continuous supply of information.

Where energy information is scattered (not systematized) or not based on official, reliable data that reflect the reality, it will be difficult for public policymakers to build a sustainable energy future grounded on the country's current energy situation.

3.2 Preparation

The preparation phase of Policy seeks to learn more about the status of the sector, understand what historical events led to the current situation, and project the behavior of relevant energy variables using future scenario parameters.

Data analysis tools are used to prepare an energy baseline assessment to gain an in-depth understanding of the industry's status. An energy forecasting tool is used to study future scenarios and project sectoral variables. Below is a brief description of the scope of these tools.

Energy Baseline Assessment

As a tool for energy Policy, baseline assessments seek to characterize the starting point as best possible and should help to draw a clear picture of the envisioned energy policy. In other words, they are not merely descriptive presentations of information and statistics on the energy system.

The baseline assessment required for energy Policy should take into account the national setting (other energy-related sectors) and the international (regional and global) surroundings.

Thus, a detailed description of the starting point should highlight the main 'problem situations' caused by weaknesses and threats in a national energy sector. It should also point out present and future opportunities for the energy sector and any strengths that can be used to overcome its weaknesses, mitigate its threats and harness its opportunities. It is vital to detail the causes associated with each of these factors, specifying the nature of the sphere they belong to, their potential consequences, and the institutions they are part of, particularly those of any major stakeholders.

Finally, it is vital to design systemic strategies to decipher the interactions among these factors, in order to identify critical elements that should be deemed priorities for policy intervention.

Energy Forecasting

Energy forecasting can be described as a tool that combines energy scenario projections, public policy analyses and energy planning. It seeks primarily to identify the priorities of the State, regional, sector, or supply chain under study.

As mentioned in OLADE's Energy Planning Manual, the main advantage of energy forecasting is that it can provide such inputs as:

- Including the prospects for technological evolution
- Providing sources of knowledge
- Facilitating a dialog among stakeholders
- Mobilizing broad, collective discussions to reflect on the future
- Encouraging the creation of collaborative networks
- Providing information to design and develop technology policies
- 'Exploring the future' in the form of 'what-if' discussions, using the scenario technique for the degree of uncertainty in decision-making

Reviewing Current Energy Policies

Like all public policies, energy policies are State guidelines aimed to meet the needs of society. Since State policies emanate from the will of the public political power as wielded by government authorities, it is highly sensitive to the State's sovereignty and authority to regulate and manage its strategic resources.

This suggests that the decision to begin a review of established energy policies should come from the State power itself or, when proposed by third parties, at least have government endorsement before being implemented.

Although energy policies should include a mechanism for continuous review through suitable monitoring and follow-up of the actions taken to achieve their objectives, they may require major rethinking if found to be partially or entirely impractical in view of the current situation in the national energy sector.

Accordingly, there are two types of policy review from a procedural perspective:

1. *The regular, systematic process of adjusting and improving policies that are already in the implementation phase, and*
2. *Reviewing current policy guidelines that need adapting to current conditions in the energy sector, either because their original defining circumstances changed or because the State has* changed its outlook for the sector.

The first case refers to a common, cyclical activity that is usually planned and systematized as part of energy Policy and is therefore imperative (see the points in Sections 3 and 4 hereof on monitoring and follow-up). The

second case is an extraordinary, complex activity needed to detect obstacles, inconsistencies or lacunae in an approved energy policy that is in the implementation phase.

At this point in the Practical Guidebook we are addressing the latter case, since the first type of review was already covered as part of the procedures recommended herein.

In both cases, reviewing a policy is essential to keep it current with the domestic energy sector and for continuous learning and improvement to achieve measurable results in the implementation process.

Therefore, if the country or region has an energy policy in the implementation stage, it is advisable for the review assessment to validate the energy Policy process and check whether its objectives, strategic lines and instruments are up to date. To facilitate a review of existing policies in the implementation phase, the fo-llowing steps are recommended:

1. *Reviewing and commenting on reports from previous policies*, referencing updated energy sector assessments and the approach proposed in this Policy guidebook
2. *Preparing and implementing a group dynamics technique with stakeholders in the energy sector (a viable alternative could be the tool called a focus group*[11])

In this case, a focus group is a suitable technique to obtain an updated assessment to validate certain policy elements[12] (vision, objectives and strategic lines) as a basis for adjusting the targets and action plans in the future.

Where possible, it is advisable for this activity to involve the energy officials and professionals who were involved in making the original energy policy, in order to confirm the information first hand. Together with re-presentatives of the current energy Policy and planning institutions (see Section 2 on the Institutional Framework), they can help structure the key elements to implement a policy that is fully aligned with the realities, needs and prospects of the domestic energy sector and its sub-regional, regional and international projections.

At this point, at least the following should be completed:

- The Policy process used (next steps, follow-up)
- A list of documents (their sequence and importance)
- Assigning leaders and roles for the Policy process; the origin and nature of the energy Policy mandate
- Instruments formalizing the policy; assigning responsibilities for the action plans; planned policy review and follow-up procedures

It is also advisable to validate the relationship between the current institutional framework and the postulates of the current policy, as well as the legal feasibility of implementing it under the current legal framework.

Finally, to show whether the energy policy truly represents the domestic situation, a systemic analysis could be conducted with the baseline assessment of the energy system (see Section 4), to see whether the critical

11 A focus group is a research technique designed to gather and analyze the opinions and attitudes of a target audience. It consists of gathering a group of six to twelve persons with a moderator responsible for asking questions and coordinating the meeting.

12 Validating existing policy elements with this approach is a process of consensus building with stakeholders attending a face-to-face meeting, which is recorded and reported on.

points it detected are still linked to the objectives of energy policy under review. If so, we recommend determining whether that policy solved all or part of the problem.

The outcomes of the proposed review should guide those responsible in their monitoring of subsequent and complementary actions, following the steps listed in Section 4 hereof.

3.3 Setting the Energy Agenda

An energy agenda is a statement of the situation to be reached through the energy policies. Its scope is not rigidly defined, but rather depends on the level of detail that government institutions decide to use for the policy.

In general, an Energy Agenda should establish a Strategic Vision or simply a Vision, which is a clear, concise, complete statement of how the future energy sector is envisioned once the objectives set in the policy have been met. These objectives can be classified by the range and/or depth of the intention, namely:

- General or higher-order objectives
- Specific objectives

General or higher-order objectives identify where resources and efforts should be spent during the policy implementation phase. They relate directly to the strategic vision, tend to be long term and must necessarily enable fulfillment of that vision. They answer the question 'why' or 'what for.' General or higher-order objectives pursue an approach to or a perspective of society. They can also be expressed as outcomes, in which case they should always be stated as an improvement on a situation or an increase in a variable.

Specific objectives are designed to meet the higher-order objectives, but intervene at the level of internal processes or specific activities and tend to have a shorter time horizon, while answering the same questions as the higher-order objectives.

Note that specific objectives can be more easily instrumented than general objectives, in the sense that they are the starting point for formulating aspects of policy implementation (strategic lines and tools).

The energy agenda states these objectives in an organized fashion (by energy sub-sectors or strategic issues, as discussed in Chapter 4), and may also include strategies designed to achieve them through strategic lines that say 'how' they will be achieved.

3.4 Implementation Guidelines

The energy agenda is implemented through action plans (APs) designed to meet the objectives and achieve targets within well-defined timeframes.

Chapter 4 discusses how these action plans are developed. However, we recommend that the scope of an action plan include at least the following:

1. The goal or objective met by the AP
2. The AP's strategic line
3. Implementation tools
4. Targets
5. Main actions to obtain or develop the tools
6. Their relation to plans underway or planned by government institutions
7. Assumptions and current context

8. Performance indicators/metrics of the action plan
9. Tentative schedule to implement the action plan
10. Responsibilities for the action plan
11. Stakeholders involved
12. Potential sources of financing
13. Priority level based on benefits

3.5 Review: Monitoring and Follow-up

Monitoring and follow-up of policy execution ensures timely, adequate, effective work on its guidelines and objectives by those responsible for implementing the relevant tools and by decision makers in the government sector. It is a tool for supervising implementation of the proposed measures and for adjusting actions as scenarios change in the future.

Monitoring involves collecting, measuring and distributing performance data to determine the scope of outcomes. Follow-up includes deciding on preventive and corrective measures for the action plans through a feedback process that makes it possible to assess parts of the policy (objectives, action plans, strategic lines, targets, etc.) for different time horizons (short, medium and long term). This monitoring and follow-up phase facilitates the process of refining and revising the policy cycle described in Chapter 2 and includes monitoring and following up of the progress made in the action plans, to compare achievements and plans during the Policy process.

4 IMPLEMENTATION GUIDELINES

4.1 Steps in Energy Policy

The methodological approach proposed herein for Policy and monitoring includes four key steps shown in Table 1. The methodological tools used seek to achieve the outcomes shown in Table 1, thereby covering the requirements of each of the key steps or processes.

Table 1. Energy Policy Processes

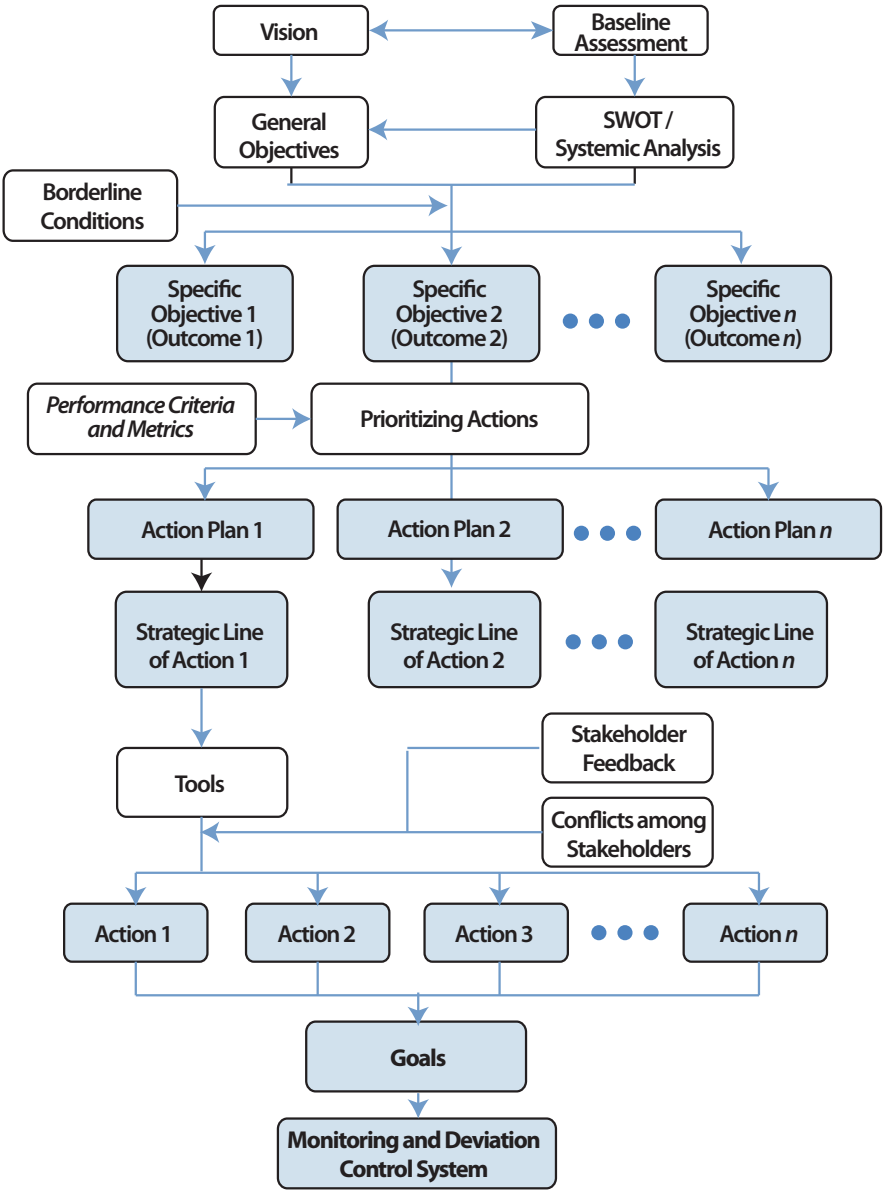
Step	Process	Outcome	*Question Answered*
1	Baseline Assessment	Building a Target Situation/ Image	What is the status of the energy sector?
2	Objectives	General objectives, specific objectives	What is to be achieved by implementing the policy?
		Prioritizing objectives	What is the order of priority of the objectives in achieving the policy vision?
3	Action Plan	Strategic Line	How do we intend to go from the current situation to the desired situation?
		Tool	How will the strategic lines be made operational?
		Action	What activities can put the proposed tools into practice? Or: What actions are needed to obtain a particular tool?
4	Monitoring and Review	Monitoring and Review System	How is implementation of the energy policy tools progressing? What have we learned and how can we improve?

Source: The authors, based on OLADE *et al.*, 2003.

The flow of interrelationships among these tools is shown in Figure 11 and includes processes involving stakeholder relations and management.

The following sections detail the four basic steps and define intermediate steps for each one to guide smaller portions of the process. Thus we have a detailed roadmap for energy Policy, designed like a check-list, as shown in Figure 12, for easy monitoring of the entire process.

Figure 11. Flowchart of energy Policy tools



Source: The authors, based on OLADE *et al.*, 2003.

Figure 12. Check-list for energy Policy

BASELINE ASSESSMENT

- Review of Enabling Factors/Dimensions
  - Human Resources
  - Information and Planning System
- Energy Sub-Sector Review
  - Electricity Sub-Sector
  - Oil and Gas Sub-Sector
  - Biomass Sub-Sector
  - Coal Sub-Sector
  - Alternative Energy Sub-Sector
- Review of Central Issues / Cross-Cutting Dimensions of the Energy System
  - Institutional
  - Laws, Rules and Regulations
  - Energy Mix
  - Infrastructure
  - Energy Integration
  - Energy Efficiency
  - Financing
  - Society and Environment
  - R&D+I (Research and Development plus Innovation)
  - International Cooperation
- Building a Target Situation/Image

AIMS

- Systemic Analysis
- General Objectives
- Specific Objectives
- Prioritization (limited resources, planning, prioritization)

ACTION PLANS

- Strategic Lines
- Targets
- Tools
- Actions

MONITORING and FOLLOW-UP System

- Managing the Objectives
- Managing the Action Plan
- Stakeholder Management
- Risk Management
- Change Management

Source: The authors

Each point is broken down below, with its appropriate method.

4.2 Steps for Preparing a Baseline Assessment

As mentioned above, a baseline assessment is the basis for recognizing flaws or weaknesses and strengths in the energy sector (or one sub-sector) to identify situations that require an energy policy intervention in order to enhance the strengths or correct the weaknesses.

A comprehensive baseline assessment of the energy sector consists of analyzing each energy sub-sector throughout the production chain and identifying the basic or enabling factors and cross-cutting dimensions of the energy system, based on the systemic approach described in Chapter 2.

When starting a baseline assessment, it is important to survey the current situation of the basic dimensions for Policy and subsequent execution.

Review of Enabling Factors

Enabling factors include essential elements needed to start exploring the entire the energy system. They will form the basis of the baseline assessment, planning and monitoring for the policy (which require data) and effective implementation of the proposed interventions (which require human resources).

Human Resources

This is a critical factor throughout the energy policy cycle, which includes preparation, implementation and review, follow-up, and correction of deviations. It is also necessary for all measures to be implemented in the context of the action plans. A baseline assessment of this matter should guide strategies to ensure the provision of human resources with the right skills to implement the policy proposals. An energy policy developed without considering the availability of skilled personnel to implement it will be doomed to failure.

Information and Planning Systems

As mentioned in previous sections, an energy policy is part of a development policy that sets its guidelines and strategic priorities. Energy Policy should be based primarily on a comprehensive assessment of the energy sector and all related activities. It is here that an energy information system—where available—plays a vital role, being the major source of data for the baseline assessment.

At the beginning of the assessment process, information on the following dimensions should be collected and systematized:

- The energy mix dimension (statistical data on production, consumption by source and sector, conversion and transformation efficiencies, balances, energy losses, reserves and resource potentials, etc.)
- The energy demand dimension (indicators on consumption sectors and data on equipment, appliances and machinery for end-use of energy)
- The economic and financial dimension (macroeconomic data such as Gross Domestic Product (GDP), devaluation and inflation rates, etc., in addition to microeconomic data such as interest rates, rates of return on energy projects, financing, pricing and tariffs)
- The infrastructure dimension (features of facilities at energy transformation centers, transport and distribution infrastructure, etc.)
- The environmental dimension (emissions levels, impacted areas, affected types of flora and fauna, environmental policies, etc.)
- The social dimension (population growth rates, the human development index, literacy rates, the Gini

index, gender equity issues, etc.)
- The political dimension (rational energy use policies, energy conservation and equipment change-out policies, suitable policies to promote the use of renewable energy, subsidy policies, etc.)
- The legal dimension (current legal, regulatory and normative frameworks favorable to or inconsistent with implementation of a given energy policy, including the constitution, laws and decrees, and lesser legislation such as regulations, resolutions and technical standards. This includes undertakings through signed treaties.)
- The institutional dimension (institutional structure within which the energy activities will take place)
- The international dimension (the international context within which energy policy actions will be carried out)

The basis for this information should be official, reliable, accurate, complete, timely, updated, and easy to access. It should be obtained through various standardized actions and procedures, such as statistics and standardized analyses, and should come from national and international organizations, estimates, surveys, and other reliable sources.

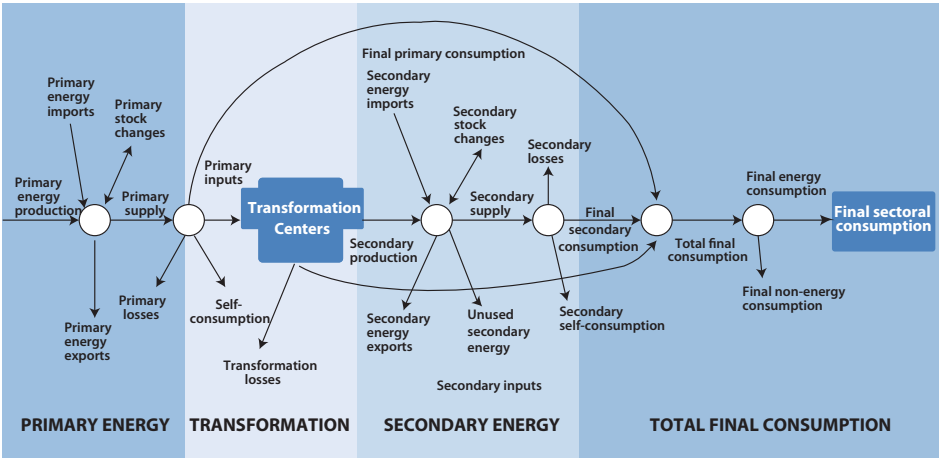
Information availability obviously depends on each country, especially the awareness among maximum authorities of how important energy information management is. In some cases, this information may not be readily available, or may not be of expected the quality for a given country. Some countries may even show a decrease in the availability and quality of the information collected (Planning Manual, OLADE, 2015).

Actually, the availability and reliability of a country's information is in itself a point of assessment, which should be seen as a weakness to be corrected or a strength to be harnessed by the intervention strategies proposed in the energy policy.

In any case, the minimum content of systematized information required for a baseline assessment is the National Energy Balance,[13] which reflects energy flows through the energy chain (see Figure 13). If not availa-ble, effective energy Policy will not be feasible. Lacking this information, it is advisable first to rectify this situation and then to proceed with the above.

13 An extension of the Energy Balance is the Useful Energy Balance, which adds information on energy end-use efficiency and conversion.

Figure 13. Structure of the Energy Chain



Source: Excerpted from the OLADE Statistics Manual (2011), p. 31.

Energy Sub-Sector Review

At this point, it is necessary to identify and analyze the major energy sub-sectors of the country or region and the production chain for each sub-sector. This should cover the entire production chain of each sub-sector and detail each of its links. It uses categories such as primary energy sources, transformation centers, secondary energy sources, distribution and transportation, and final consumption.

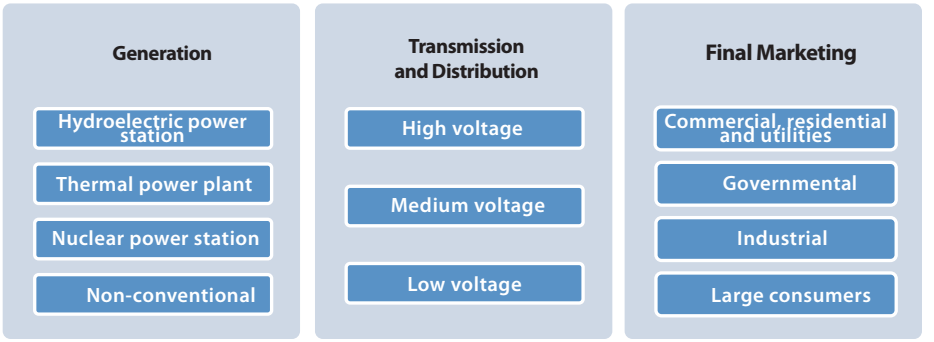
Per country analyses should identify the peculiarities of each sub-sector. A country may have particular conditions that define the size of a sub-sector and justify analyzing and assessing it in greater detail. In this case, that segment may receive a similar treatment to other energy sub-sectors.[14] Below is a brief description of the production structure in the different sub-sectors, which will be reviewed in depth under the cross-cutting issues/dimensions discussed herein.

The Electricity Sub-Sector

Power Generation: The various forms of generation (Figure 14) are differentiated by the primary energy sources they use. The heat source for thermoelectric plants may come from fossil fuels, biofuels, nuclear fuel, or others. Hydroelectric generation transforms mechanical energy from rivers or dams. Non-conventional generation transforms energy from wind, solar, biomass and other sources. At this stage of the production chain, the supply security of primary sources and power availability is important.

14 One example of this is Paraguay, whose major integration effort is a hydroelectric project with two other countries of the region. Another is Venezuela, whose upstream oil and gas activities are highly significant due to their role in the energy sector and the country's entire economy.

Figure 14. Diagram of the Electricity Sub-Sector



Source: The authors

Transmission and Distribution: Generated energy must be transmitted and distributed to final consumption centers. This segment should include technical data on the operation of transmission and distribution infrastructure (such as size, voltage), the organizational structure of energy chains (public or private), supply qualities (reliability rates, loss levels), expansion plans, and others.

Consumption: This point should identify different power consumption segments (residential, commercial, industrial, large consumers, etc.), and characterize these stakeholders' relationships to public utility companies. Figure 14 outlines how the power sub-sector works.

The Hydrocarbons (Natural Gas + Oil) Sub-Sector

Many countries depend on importing oil and oil products, and their economies are subject to price fluctuations for these sources, which have a huge economic impact. Producer countries also have significant economic impacts due to production royalties. Because of this sub-sector's large direct impact on the economy, it should receive special attention.

The oil & gas production chain includes upstream (prospecting, exploration and production), midstream (natural gas liquefaction, oil and gas transportation and storage) and downstream (refining, distribution and marketing) activities.

Upstream, the items most sensitive to assessment are available resources, reserves and concessions (regulatory framework and concession status), while the main midstream impact is from infrastructure and logistics. The downstream variable that requires closest attention is the pricing structure for the marketing of oil products.

Table 2 illustrates the oil and gas production chain. In countries that depend entirely on oil and gas imports, upstream and midstream activities are likely very limited, but there may still be a legal framework to incentivize them.

Table 2. Outline of the oil and natural gas sub-sector

Oil and gas production chain		
Upstream	*Midstream*	*Downstream*
Prospecting	Natural Gas Liquefaction	Natural Gas Regasification
Exploration	Transportation	Oil Refining
Exploitation	Storage	Distribution and Sale

Source: The authors

End uses and their technologies should be included in the baseline assessment to identify efficiencies, trends and potential changeouts that could be proposed.

The Bioenergy Sub-Sector

Assessing the bioenergy production chain should begin by characterizing the demand and consumption sustainability of biomass in all its forms. This process can take into account the following points, among others:

- Demand by consumption sector (industrial, residential, commercial, utilities, etc.) and market management, or formalization of the biomass market
- Regional demand and potential regional markets
- Land-use changes and their geographical location
- Cultural and social aspects of biomass use
- Marketing prices
- Institutions related to forest policies and legislation

Sources of biogas production and crops for producing energy sources or raw materials should also be considered in the bioenergy sub-sector, e.g., sugarcane, soybean, rapeseed, palm and the like, grown to produce energy sources (ethanol, biodiesel, etc.). That is, the same type of crop grown for food production or industrial inputs would not be deemed a crop grown for energy purposes. Accordingly, the assessment should include variables such as:

- Economic return on energy crops
- Legal and environmental restrictions on energy crops
- Biofuel markets and regulations on mixtures with hydrocarbons
- Installed capacity to produce biofuels
- Land uses and disputes
- Gross Total Potential (GTP)
- Gross Energy Potential (GEP)
- Economic Energy Potential (EEP)

Finally, this sub-sector includes the management and use of plant wastes generated by agricultural, agro-industrial and forestry activities. This includes livestock and urban wastes, provided they can be used to produce biogas for energy purposes. In general, this type of biomass can be classified into agricultural waste (stubble and cuttings), livestock (manure), agro-industrial waste (peels, pulp, bleach, bagasse, cobs, etc.), forestry waste (branches, shavings, cuttings, sawdust, and roots), and municipal waste (paper, cardboard, etc.). A baseline assessment of this biomass segment should refer to variables such as:

- Gross Total Potential (GTP)
- Gross Energy Potential (GEP)
- Economic Energy Potential (EEP)
- Regulations for urban landfill management

The Coal Sub-Sector

In the coal sub-sector, as in the case of hydrocarbons, special attention should be paid to the variables of resources and reserves. Resources[15] refer to the amount of coal in a coal mine or deposit. Not all resources are recoverable using current technology, but reserves[16] are recoverable resources.

According to the Energy Planning Manual, two types of coal are considered, which in turn are subdivided into other subcategories, according to the following classification:

Hard coal

- Anthracite
- Bituminous coal
    - Coking coal
    - Other bituminous coals

Brown coal

- Sub-bituminous coal
- Lignite

The other segments of the coal production chain to be analyzed are shown in *Table 3*. The type of mining, types of product in storage, logistics, and demand sector should also be characterized.

Table 3. The coal production chain

The coal production chain		
Mining	*Stockyard*	*Market*
Opencast mining	Thermal coal	Thermal plants
Underground mining	Metallurgical coal	Industries Coking ovens

Source: The authors, based on "*La cadena del carbón mineral*" (Colombian Ministry of Mines and Energy, 2012)

15 This description does not take into account the economic feasibility of extraction.

16 Subdivided into proven (or certified) and unproven (or indicated) reserves, depending on the results of exploration and the confidence in these results. The economic returns of extracting proven reserves can be estimated, while unproven reserves are subdivided into probable and possible, with increasing degrees of uncertainty.

In this context, the production chain in coal-producing countries has the following steps:

- Exploration – reserves and qualities
- Development and assembly, preparation and mining (production)
- Beneficiation, classification and washing[17]
- Transformation of coal in coke production and other processes
- Transportation from mines to beneficiation sites and storage yards
- Marketing, distribution and use

The Alternative Energy Sub-Sector

Depending on a country's energy/environmental status and its natural resource potential, it may be necessary or desirable to explore alternative energy options to seek suitable solutions for the national energy mix.

Some alternative sources to analyze (depending on each country's availability) could be:

- Solar energy
- Hydropower from small hydro plants (SHP)[18]
- Wind energy
- Geothermal energy
- Marine energy
- Nuclear energy

Some of the salient features that may arise from an analysis of this sub-sector are:

- Potential, projects, alternative energy initiatives
- Technological development
- Identification of the production chain for each alternative source
- Certified potential of alternative sources

Review of Cross-cutting Factors/Dimensions of the Energy System

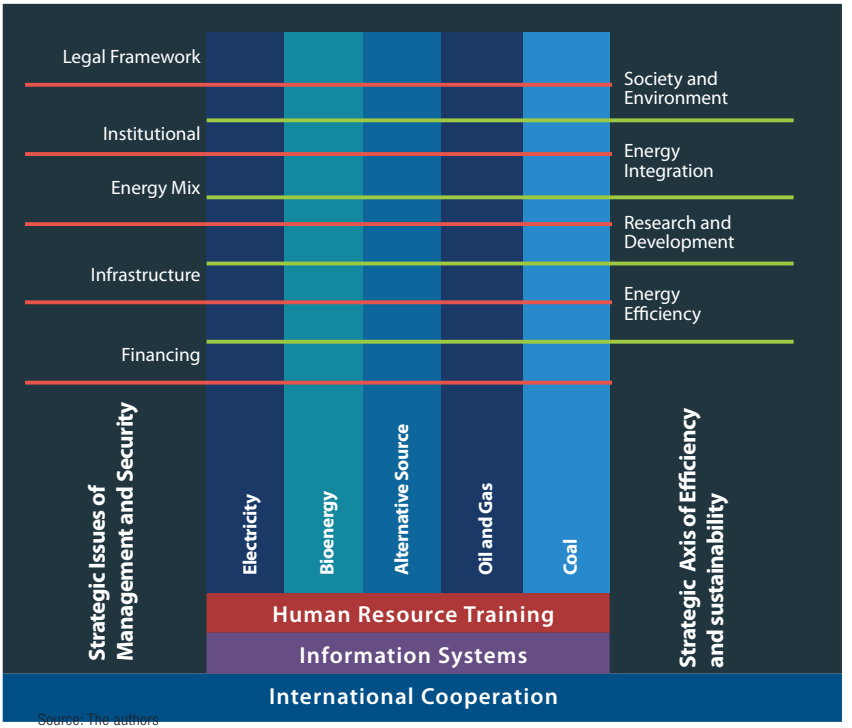
The cross-cutting dimensions to be assessed are those that complement the enabling factors in an analysis of a country's overall energy sector and component sub-sectors. As shown in Figure 15, these dimensions can be classified into:

- *Strategic issues of energy management & security: legal framework, institutional framework, energy mix, infrastructure, financing.*
- *Strategic issues of efficiency & sustainability: society and environment, energy integration, research & development, and energy efficiency.*

These strategic issues may or may not be confirmed in whole or in part for a given country. They guide the assessment, strategies and lines of action for issues deemed crucial to the energy sector, with its unique characteristics, and are common to many countries of Latin America. Detailed below is a summary of the minimum considerations under each issue in the baseline assessment process.

17 Required to enhance the physical characteristics of coal, adapt it to specific uses and enable transportation.
18 Note that this is an alternative energy source, not merely a renewable energy source. In fact, large hydro plants also use renewable sources, but are not included among the alternative sources.

Figure 15. Scope of public policies: strategic sectors and issues



Source: The authors

Legal Frameworks

Legal frameworks are undoubtedly is an essential subject of analysis prior to making, reviewing and implementing an energy policy. Since the laws and regulations comprising it are a key element of the State in the exercise of its public political power, it is infeasible to implement guidelines that are not in strict keeping with the applicable legal system of a given country. Therefore, before establishing policy guidelines, a comprehensive review of the constitutional framework, ordinary laws, decrees, regulations, resolutions and standards, in that order, as well as treaty undertakings, is essential. It would be impractical, for such a dynamic sector as energy, to design a policy that from the start had legal barriers to implementation and that required constitutional reforms by a constituent assembly, the adoption of amendments, or the enactment of new laws in parliament to achieve the consistencies that would ensure its legal feasibility.

On this point, we would emphasize that energy policies that are merely imported from other countries with different legal systems tend to fail.

We should also start by realizing that a functioning energy sector depends largely on the regulatory framework governing public spending and tax issues, as well as rules on how to finance public works and address different types of investments (private or public, domestic or foreign). Therefore, one should identify the legal instruments involved in designing and implementing plans and investments in the sector, starting with the constitutional

framework and the institutions created by general administrative laws, then legislation regulating public contracts, and finally those relating to investment and financing.

Sometimes a review of the regulatory framework for the energy sector will reveal legislative lacunae, contradictory rules, tacit derogations and other obstacles to proper implementation of the energy policy in question. In this case, we recommend preparing a legal digest to weed out any 'dead legislation' to make way for the 'rule of law', so that all corporate and State actions are grounded on a body of law. This will ensure full subordination to the existing, formally-instituted legal order.

The Institutional Framework

One of the key strategic priorities is undoubtedly the institutional framework. The formal processes of socio-economic policies emanate from a given institutional framework made up of competent authorities and officials for energy policy assessment, development, approval, revision, and implementation, which should be consistent with the basic guidelines established in government policies. Full implementation of energy policies also requires specific, comprehensive institutional frameworks that may or may not exist before national parameters are defined. Therefore, it is essential to compare the actual conditions to those needed to comply with this State intervention framework that defines the institutional structures and assigns/distributes their roles. In this sense, every State policy for the sector must include this item on its agenda of priorities (see Figure 16).

On this issue, a description is prepared of the institutional stakeholders and interest groups related to the energy policy, understood as public bodies and entities at the national and sub-national levels, and private companies with interests in the energy sector. All these stakeholders and interest groups are involved in or affected by the Energy Policy, whose ultimate aim—as regards the institutional framework—would be to guide actions in a joint, harmonious, orderly manner when making decisions and seeking answers and solutions, thereby avoiding inter-agency conflicts, gaps or overlapping competencies.

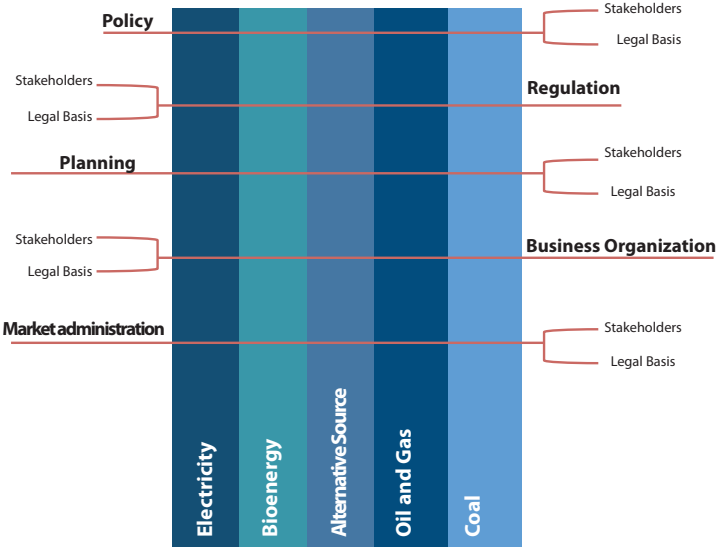
In this context, the different institutions currently in place should be studied, based on their internal regulations and the assignment of decision-making competencies in the sector. Therefore, the interactions or networks among the key energy sector entities should be described as they pertain to Policy, in line with the provisions of national development plans.

Next, the different roles related to the sectoral policy and regulations should be reviewed and broken down into *governing, regulatory, representative, coordinating, supervisory,* and other roles that a particular government agency may have in an energy sub-sector, contrasting the levels of intervention according to the legal framework versus the actual intervention of the agency.

Figure 16 shows a study design of energy-sector stakeholders by sub-sector and by role (Policy, regulation, planning, business roles, etc.).

Another important aspect is the ability to conduct an institutional study to compare the legal powers of a department, company, entity or body to its actual organizational exercise of each of those legal powers.

Figure 16. Central Topics for Analyzing the Institutional Dimension



Source: The authors

The Energy Mix

On this particular issue, OLADE's Planning Manual states, *"The Latin American energy mix is comprised primarily of conventional energy sources (oil, coal, natural gas, and large-scale hydropower) whose production exceeds consumption and makes it an exporting region. Its production, transformation and consumption cause several economic, environmental and social impacts that require intervention through various policy instruments to ensure sustainable energy use."* Under these circumstances, such instruments should be based on the national energy balance. Studying this balance will provide a clear view of the status of the country's energy production and consumption chain. This is supplemented by analyzing data from historical energy balances to trace the evolution of the energy mix and link those dynamics to past and present socio-environmental, economic and sectoral conditions, in order to understand its evolution over time and its present situation. Some aspects of this study are:

- The share of domestic renewable sources in energy production
- Diversification of primary transformation/production focused on energy security
- Energy availability: hydropower, oil and gas, biomass, wind, solar, etc.
- Biofuel production
- Efficient use of energy sources, e.g., low end-use in biomass technologies
- Efficiency, exports and sustainable supply of biomass
- Electricity self-production, independent production and consumption
- Coverage of energy needs
- Overall and sectoral energy intensity (by consumption sector)
- Substituting vulnerable energy sources (per the country's energy mix)
- Quantification of reserves and potentials

Infrastructure

Energy is a determining factor in the production apparatus and an essential part of the people's welfare. Due to the characteristics of the sector and of the infrastructure involved in the energy industry, its various forms and varied sources, this sector requires large-scale investments and long periods for project implementation and investment recovery. Therefore, energy policies cannot be made without coordinating with expansion plans in the socioeconomic sectors, particularly infrastructure expansion in the energy sector.

Accordingly, this dimension should study the infrastructure requirements for coverage of energy services or sources, the impact of infrastructure on the level of access to such services, and their relationship primarily to the most vulnerable social strata. This study can reveal features such as:

- The geographic and demographic coverage of energy services
- The organization of infrastructure for markets to function
- Production technologies
- Production efficiency indicators
- The need to invest in infrastructure

Energy Integration

Energy integration is a major strategic issue for achieving certain objectives, can contribute to social welfare and energy security, and is influenced by the geopolitical, ideological and economic context in which relations among countries are played out (ECLAC, 2013). Complementarities among the countries of the region present opportunities to build synergies for optimization and sustainability of energy resource use.[19] In this sense, energy integration among countries can refer to energy trade or exchange (coal, oil and natural gas), or interconnection of power grids or pipelines (electricity, natural gas, oil, and oil products).

As discussed in Chapter 2, the path toward energy integration at the regional or sub-regional level is not always straight and easy to travel. One of the main difficulties is reconciling national and regional interests and expectations. However, recent experience has shown that progress is possible through consensus, taking gradual steps and cementing relationships of trust among the political, economic and social stakeholders of the countries, especially among governments. It is feasible, therefore, to reach sub-regional or regional agreements, which depending on each case can be expressed in international legal instruments that contain intentions and decisions based on a strategic vision of shared benefits. However, depending on the nature of the integration process, it is often difficult to internalize decisions made regionally to ensure they are implemented throughout the territory covered in the agreement.

One way to promote consistency between regional and national energy policies is for national objectives—both general and specific to mention prior regional agreements explicitly, or else to set *a priori* aims that establish a national directive or position in a regional negotiation. In the first case, the policy should contain a strategic line, specific instruments (which might be domestic regulations) and targets—where applicable—to guide its actions in conformity with regional agreements. In the second case, the directive on the country's position should inform national strategies for international negotiations on the issue.

Energy Efficiency

It is indisputable that the economic development of a country is closely linked to having an adequate supply of energy. As mentioned above, strategies to build the energy supply, through suitable infrastructure expansion at appropriate costs, are a central concern. However, energy supplies cannot be expanded without considering so-

19 Energy integration policies can contribute to efficiency, and as such should be considered potential strategies in this field (Planning Manual, OLADE).

cial and environmental sustainability and decisively building energy efficiency into the entire chain of production and use. In fact, energy efficiency, which includes controlling loss of energy flows, should be one of the strategic lines in such Policy efforts. In this sense, energy efficiency relates not only to end-use technologies, but also to the entire production chain for a given energy source.

Thus, many of the challenges a country faces have to do with increasing energy efficiency measures for both supply and final consumption. Such a strategy, which includes actions (and outcomes) on the short, medium and long term, applies to all consumption sectors and to all energy supply activities.

In this context, energy efficiency is a crosscutting issue. In addition, related actions usually fall outside of the public sphere of energy Policy and require the engagement of private sector segments. Another precondition is to coordinate different areas in what is called systemic or organizational capacity. Thus, it is important to identify energy efficiency deficiencies or opportunities for each energy source by considering the following:

- A legal framework for efficient energy use
- National or regional energy efficiency plans
- Studies on the potential for energy saving

Financing

When making energy policies, it is imperative to examine the investments needed in the energy sector, as they usually have long maturation periods. This requires anticipating project startup by more than five to ten years in many cases[20] (Planning Manual, OLADE). Such investments require not only available financing sources, but also capacity building in financial management and a clear, predictable legal framework for investors.

Accordingly, it is important to identify present and future (potential) sources of financing to implement plans related to the sector and the structural aspects of financing. The points to consider include the following:

- Access to multilateral banks
- Access to capital markets
- National rates compared to international rates
- Energy share of the trade balance
- Size and makeup of energy markets
- Price-setting mechanisms and profitability
- Royalties on natural resource extraction or use
- Taxes, subsidies and market regulations
- The financial management indicators of public and private companies in the sector (liquidity, EBITDA, leverage, etc.)
- Cost of the Capital Weighted Average of public and private companies in the sector
- Inflation rates
- Level of public indebtedness

In addition, in scenarios where the needs to invest in public infrastructure exceed public funds, due to financial constraints or limited administrative and operational capacities to handle numerous large projects more efficiently, non-traditional financing mechanisms, such as public-private partnerships, leases and trusts can be considered. However, in all cases the economic costs, the impact on society and the strategic nature of energy resources for the State should be taken into account.

20 The upstream oil business is especially risky, as it has one of the longest maturity periods from startup to achieving results. Therefore, the financing mechanisms for the sector and private participation are key factors.

Society and the Environment

Energy availability is closely linked to meeting the needs of society, and the related activities have an impact on the environment. Energy exploration, exploitation, production, distribution and marketing follow national and international legal frameworks that include means and procedures to ensure environmental protection for sustainable development. In that sense, this issue should identify all interactions between the energy system and the environment, to detect any strengths and weaknesses. Such a study can reveal features such as:

- The legal framework on the environmental impact of activities
- Institutions related to energy and the environment
- The energy system's environmental impact in terms of supply and demand
- Mitigating the effects of climate change
- Climate change adaptation measures
- Natural resource management
- Environmental services
- Environmental impacts of exploration, production, distribution and marketing of coal, hydrocarbons and derivatives.

This issue should also explore the energy sector as a trigger of social progress for the people and its role in enhancing their living conditions. This includes aspects such as the gender approach, personal development opportunities, the energy sector's contribution to creating jobs, and reducing social inequalities.

Research & Development plus Innovation (R&D+i)

Research, development and innovation in all energy areas are the pillars for future implementation and application of an energy policy. At this stage in the baseline assessment, it is essential to have a general idea of the capacities available in these fields to meet the challenges of technology development in the different sectors to be intervened through future plans to be proposed.

International Cooperation

It is important to recognize that the energy system is not isolated from the other sectors (economic, social, etc.) and cannot be seen as independent from the regional and international milieu. External mechanisms of energy cooperation and integration (international, regional, etc.) have differing levels of interaction with organizations, companies and other countries. It is critical to have a general idea of these relationships when making energy policies that might affect domestic and foreign markets for energy sources.

This cooperation can be technical, economic or otherwise. Technical cooperation has to do with transferring skills and scientific/technological resources for a country's socio-economic development, while economic cooperation can be provided through financing mechanisms of various forms.

Building a Starting Point and a Target Image

The Starting Point

Having analyzed the enabling and cross-cutting issues in each energy sub-sector, one will have a general picture of the functioning and dynamics of the national energy system. On this basis, it is possible to identify aspects of the baseline assessment that represent the sector's strengths, weaknesses, threats and opportunities.

The next step is to characterize each of these aspects within the established dimensions, identifying their causes, consequences, types (weakness, strength, opportunity or threat), and the major stakeholders related to each.

Here it is important to note that the energy system has both positive and negative aspects, both within and outside the sector, which will be the starting point for setting the energy policy objectives. *Table 4* illustrates the dimensions to be considered for each situation of the oil and gas sub-sector, as well as the causes and consequences of each situation or aspect identified. This analysis should be performed for each sub-sector included in the baseline assessment of the energy sector.

Table 4. Identifying the Starting Point

Sub-sector	Dimension or issue	Evidence of the situation	Possible causes	Potential consequences	Type (SWOT)
Oil & Gas	Legal				
	Institutional Framework				
	Society and Environment				
	Infrastructure				
	Energy Efficiency				
	R&D+i				
	Financing				
	The Energy Mix				
	International Cooperation				
	Energy Integration				
	Human Resources				
	Information and Planning System				

Source: The authors

Target Image and Vision of the Energy Policy

The target image is the situation sought through the energy policy intervention and is usually represented by a vision that seeks—based on the situations detected in Table 4—to overcome the weaknesses of the sector and mitigate any threats by using its strengths and taking the opportunities in the environment.

On this basis, a Vision is drawn up (a desired end state for the energy system) that reflects the desired state of the general objectives on the long term. The path is laid out according to the specific objectives for each cross-cutting dimension and energy sub-sector, which will then be made operational through the strategic lines, tools and targets for each action.

4.3 Steps in Setting Objectives

The policy objectives define a desired state to be achieved within a specific time period. To prepare these objectives for the energy policy, we suggest conducting a systemic analysis through consensus building on certain proposals developed with the help of energy sector specialists and stakeholders working on the cross-cutting issues proposed above, to complement the sectoral perspective.

Systemic Analysis

While the information gathered under the above item is useful to identify challenges in the energy sector, its analysis is very complex due to the large amount and diversity of data that is usually collected. Therefore, the partial result achieved could be combined with the simplification strategies described below.

This technique seeks to quantify any abstraction or subjectivity and to prioritize components of the status of each sub-sector and cross-cutting element under study. These elements can be assessed by using a pairwise comparison of the level of impact of a given item over another by answering the question, "How does element A influence the intervention on element B?" The rating scale goes from 0 to 3 as follows: no influence (0), little influence (1), moderate influence (2), and a great influence (3). The main diagonals (self-influence) are simply not assessed, as they are unimportant to the final outcome. The influence of each item can be scored during work meetings with industry experts.

The active sum (i.e., the levels of influence of one A item to all others in the analysis) defines that item's overall impact on all other items of the sector. Likewise, the passive sum (i.e., the levels of influence of all items on a given item) determines that item's level of interaction.

The result of this systemic analysis should reflect the reality of the sector under study. If it is not possible to do this scoring exercise with the experts, we suggest that they review the final results to receive their approval of the exercise's validity.

Table 5 shows an example of an influence matrix with the scores for five items of the assessment. The procedure is as follows. The second cell of the first row answers the question, "What degree of influence does element 2 have on item 1?" In this example, the answer is a moderate influence, and a score of two (2) is given. This procedure is repeated until the matrix is filled out. Next, the columns for each item are added up and the total is the active sum. We then add up the rows for each item and the total is the passive sum. In this example, Item 5 has the greatest impact, while item 3 has the most interactions with the other items.

Table 5. Influence Matrix

	Item 1	*Item 2*	*Item 3*	*Item 4*	*Item 5*	*PS*
Item 1	*0*	*2*	*0*	*0*	*2*	*4*
Item 2	*0*	*0*	*1*	1	2	4
Item 3	1	2	0	3	3	9
Item 4	1	2	2	0	3	8
Item 5	2	3	*0*	*3*	*0*	*8*
AS	*4*	*9*	*3*	*7*	*10*	

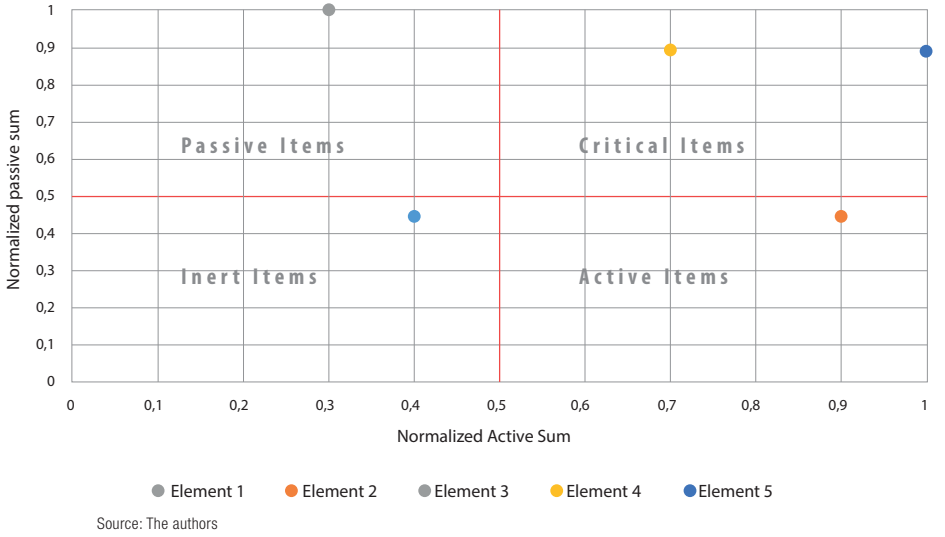
Source: The authors

PS: Passive Sum; AS: Active Sum

The results are shown in Cartesian form in Figure 17, where the x-axis measures the normalized active sum (i.e., the active sum of each item divided by the highest active sum), and the y-axis measures the normalized passive sum (i.e. the passive sum of each item divided by the highest passive sum). This graph can be divided into four quadrants to plot critical, active, passive and inert items. The baseline items with high impact scores (high active sums) and those with high interaction scores (critical elements) are taken to be the most significant. This suggests that interventions on these items could reach a large number of items, either directly (high active sum) or indirectly (high interaction).

This approach characterizes the most significant elements for later use when setting the objectives. However, note that while a systemic analysis can help set objectives and guide tasks, it cannot replace subsequent validation with representatives of the major institutional stakeholders.

Figure 17. Systemic characterization of assessment items



Source: The authors

With this systematized information, we now have priorities for each energy issue and sub-sector. After analyzing these results we can start studying the identified needs in order to propose objectives. It is important to note that the above exercise does not rule out the possibility of setting objectives based on all surveyed items of the baseline assessment when their complexity allows it.

General Objectives

The OLADE Planning Manual defines these objectives in the following terms: *"General objectives can be described as long-term objectives of a general nature involving structural changes in the present situation. They follow sectoral Policy, can have different levels of priority, and make up the agenda of priority issues for the country's energy development."*

These general objectives are generic principles that intervene structurally in the society affected by the energy policy and favor long-term social, political, environmental, economic, and fiscal sustainability through energy development.

The general objectives in our proposal arise from the critical elements of systemic analysis and represent the overall guidelines of the energy policy. They detail the desired state that we wish to achieve.

Specific Objectives

The specific objectives that arise from the general objectives focus on different sub-sectors, dimensions and/or perspectives. These objectives are usually linked to tools with shorter deadlines and specific targets to be met within limited time horizons.

Specific objectives usually address particular situations identified in the baseline assessment. They may refer to cross-cutting or basic dimensions, should be written so as to target measurable results with indicators and should be prioritized to establish a hierarchy.

Prioritizing Specific Objectives

The available financing for energy Policy is a limitation in many developing countries, so you may not be able to pursue all objectives simultaneously, especially if they are many.

Therefore, it is important to prioritize strategic objectives for sector development based on the vision proposed in the policy. It is advisable to rank these specific objectives by priority in terms of their contributions to achieving the general objectives. This will provide a quantitative signal of which objectives cannot be postponed and must be addressed urgently.

Quantifying the contribution of specific objectives to achieving the general objectives is also a powerful tool for monitoring and follow-up of these higher-order objectives.

As a novel contribution, this guide proposes using a simple method to prioritize objectives called the Analytic Hierarchy Process (AHP), which has the advantage of including subjective criteria and attributes. This tool reveals subtle differences among potential solutions, adds rationality and logic to decision-making, and measures the consistency of the results obtained. Appendices A and B show the details of this method and how it is calculated.

4.4 Steps for Developing Action Plans

An action plan should combine objectives with strategic lines, which in turn include tools, actions and measurable targets.

Defining Strategic Lines

Strategic lines can refer to general or specific objectives. There can be several ways to meet the same objective, so it is important to define lines of action based on an analysis of external and internal conditions for each objective.

Comparing internal threats to weaknesses leads to survival strategies, comparing threats to strengths gives defense strategies, comparing opportunities to strengths produces offense strategies, and opportunities to weaknesses provides adaptive strategies (Table 6).

Table 6. Matrix to Identify Strategic Lines

Specific Objective 1			Internal conditions					
	Weaknesses			Strengths				
	WE1	WE2	WE3	ST1	ST2	ST3		
External conditions	Threats	TH1		LA1			LA5	
		TH2			LA2			
		TH3						
	Opportunities	OP1		LA3			LA6	
		OP2		LA4				
		OP3						

Source: OLADE *et al.*, 2003, p. 184

Each strategic line is related to policy tools, and each of these to the actions needed to obtain such tools. When establishing strategic lines, it is important not to lose sight of a prospective study of the energy system.

Defining Targets, Check Indicators and Monitoring Indicators

An important issue to consider in the following procedures is that each strategic line requires one check indicator and one monitoring indicator. Check indicators are used to measure the achievement of objectives, to which they should be closely linked. They should be evaluated at the end of each period because they refer to verifiable achievements over long time periods. Monitoring indicators are used along the way to evaluate metrics that support the check indicators and ultimately define the set of objectives to be achieved by using certain tools.

Identifying the Tools

The next step is to identify the policy tools to be used in pursuing a given objective by following a certain strategic line, as shown in Table 7.

Each policy objective should have at least one strategic line, but there may be several strategies to achieve the same objective. In summary, the following procedure is followed: objective "i" is met by implementing one or more strategic lines by using a particular tool.

For this process, we recommend engaging the support of energy-sector experts and stakeholders.

Table 7. Tool Identification Matrix

	Specific Objective 1	Specific Objective 2	…	Specific Objective n
Strategic Line 1	Tool 1.1	Tool 2.1		Tool n.1
Strategic Line 2	Tool 1.2	Tool 2.2		Tool n.2
…				
Strategic Line n	Tool 1.n	Tool 2.2		Tool n.n

Source: OLADE *et al.*, 2003, p. 186

Having decided on the tools for each specific objective, we suggest using a Stakeholder Response Matrix (Table 8) to identify the stakeholders who are already involved or could be involved in each tool.

Table 8. Stakeholder Response Matrix

Specific Objective				
	Tool 1	Tool 2	Tool 3	Tool 4
Stakeholder 1				
Stakeholder 2				
Stakeholder 3				
Stakeholder 4				

Source: OLADE *et al.*, 2003, p. 187

The analysis carried out using the Stakeholder Response Matrix should be one of the inputs for stakeholder management, explained below.

4.5 How to Develop a Monitoring and Follow-up System

The deviation monitoring and follow-up system measures progress made on the action plans, to compared what is being done to what was planned in the energy policy.

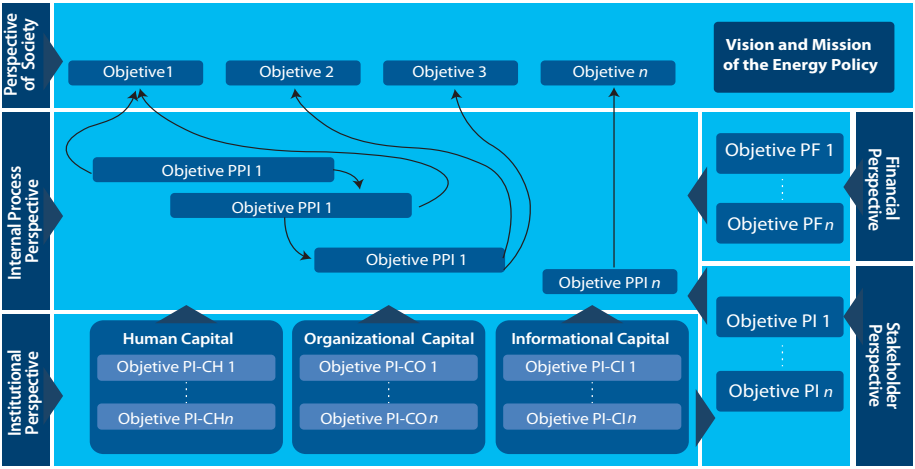
Managing Objectives

As mentioned above, the general and specific objectives set in the initial steps are usually numerous and diverse, and need to be managed systemically to monitor the actions proposed to achieve them. In this sense,

strategically managed objectives (reduce weaknesses, leverage strengths, capture opportunities and mitigate threats) are key to developing the monitoring system, which is based on strategy maps (with specific objectives). This map groups strategic objectives sorted by size and interconnected by cause-effect, to identify the critical and logical path that a given objective follows. These objectives are also organized according to different intervention perspectives. Thus, each strategic objective identified in the objective-setting process is classified according to the viewpoints of institutions, stakeholders, financing, internal processes and society.

Strategy maps are useful tools for succinctly illustrating the strategy set out in the energy policy. Figure 18 shows a strategy map for the energy policy with the different perspectives defined in Appendix C. We recommend preparing strategy maps for the energy sector as a whole and, if necessary, for each of the energy sub-sectors.

Figure 18. Strategy Map Layout



Source: The authors

Managing the Action Plan

Managing action plans is also closely related to managing objective, since action plans refer to the desired state (target image) based on a specific initial situation, using tools and actions to achieve a target.

Indicators should be monitored periodically to track the status/fulfillment/processing of the action plans and to determine whether (or not) the objectives are being met. They can be monitoring indicators or check indicators, as mentioned above. The former assess the performance of one or more actions during the execution period, while the latter (check indicators) assess whether the action was completed successfully.

Indicators can be numerical (e.g., percentage of fossil fuel consumption), or linguistic (e.g., the status of a bill—adopted, completed or under development). Indicators should also meet certain standards, such as:

- Clear and unambiguous
- Consistent names and measurements
- Cover all perspectives in the strategy map
- Clear, logical relationships between monitoring and check indicators

The quantitative value to be reached in the check indicator by the deadline for a given action relates directly

to a target. To achieve it, the indicators for each action plan should be assessed by the stakeholders involved in implementing, supervising, coordinating, planning, approving and/or accompanying the action.

The basic form used to manage action plans is shown in Appendix D with instructions for filling it out.

Stakeholder Management

Energy policies are both made and supervised by major stakeholders and interest groups. Therefore, to facilitate the process of monitoring and correcting deviations, we suggest following certain stakeholder management procedures.

The main purpose for this plan is to promote systematically the engagement of project stakeholders to strike a balance between their expectations and the objectives set. It also helps us plan communications to satisfy the requirements of those interested in the project and to solve issues together with them.

An essential tool for managing this plan is the Stakeholder Registry, which identifies and characterizes the individuals and organizations actively engaged in the project (or action plan), as well as their expectations and levels of influence.

The Stakeholder Management Approach

The method of the Stakeholder Management Plan comprises several procedures, including:

a. Identifying the stakeholders: This consists of identifying individuals or organizations and collecting information that is important to the project interests, to engage their participation and impact on project success. This is achieved by studying stakeholders and through expert judgment. The outcome is a stakeholder register.
b. Planning stakeholder management: This entails using appropriate management strategies to ensure effective stakeholder engagement throughout the project life cycle.
c. Managing stakeholder engagement for the duration of the action plan: This involves communicating and working with stakeholders to meet their needs and expectations. In this way, incidents are addressed promptly and suitable stakeholder engagement encouraged.
d. Supervising stakeholder engagement: This is the process of monitoring of the overall relations with project stakeholders, adjusting strategies to ensure their engagement.

Proper implementation of the Stakeholder Management Plan requires the commitment of the body coordina-ting the application of the National Energy Policy, which should be in charge of managing the pertinent activities.

Risk Management

A Risk Management Plan is a set of procedures to decide how to approach, plan and implement responses to contingencies that might adversely affect successful implementation of the energy policy. Such a plan is needed to identify and document events or situations that might adversely affect the project.

We suggest identifying and managing such risks to energy policies (particularly their action plans) by using the

risk management practices recommended by the Project Management Institute (PMI).

A risk management plan includes the following procedures:

a. Identifying risks to decide which might adversely affect the action plan, and describing them
b. Assessing these risks qualitatively to assess their likelihood and how much of an impact they might have
c. Planning responses for such risks by seeking options and actions to enhance the opportunities and reduce the threats to the action plans
d. Monitoring and supervising the risk management to identify when such situations occur or new contingencies arise
e. Keeping a log of lessons learned to record what is done when risks are identified and solved

Change Management

For change management, we suggest the practices of the Project Management Institute (PMI), a collection of formal, documented procedures to request, approve (or reject) and monitor the implementation of changes/deviations in deliverables and documentation of the project and Management Plan.[21]

In the case of the energy policy's action plans (and targets) for each of the strategic issues identified, this method will also control the factors and causes that make those changes necessary, to ensure that they are beneficial, have positive impacts (through the action taken) and, when contingencies arise, effectively identified by the risk management system.

Change is monitored and managed throughout implementation of the action plans established in the energy policy, from inception to completion. This usually refers to events or incidents that arise during execution of the plans, and any stakeholder involved can make the proposed change. For these reasons, such procedures should be continuously handled by those responsible for implementing and monitoring the action plans to keep them updated throughout implementation of the energy policy.

Change Management Plans include the following activities:

a. Reviewing, analyzing and approving (or rejecting) requests for change
b. Managing the implementation of approved changes
c. Maintaining the integrity of the action plans
d. Reviewing, approving or rejecting all recommended preventive and corrective actions
e. Coordinating change management throughout the project
f. Documenting the impact of requested changes

It is important, therefore, to keep a follow-up record of all change requests, indicating both approved and rejected changes. In addition, change management includes following up on updates to the action plan caused by approved changes. Detailed below are the types of changes that can be requested and the persons or institutions in charge of approving and implementing them.

21 Project Management Institute, "A Guide to the Project Management Body of Knowledge," Fourth Edition, 2008.

5 BASIC CONDITIONS TO START ENERGY POLICY

The conditions of each country may be totally different when deciding to make or review the energy policy. In addition, as already mentioned in this Guidebook, the contents and scope of the work can be different depending on the decision of the competent authority to determine these issues. However, there are basic or minimal conditions to start the process, without which it would be difficult—if not impossible—to carry out the tasks.

The most important condition is the express political will of the maximum authority empowered—by either legislation or ad-hoc delegation—to develop public policies for the energy sector. To make this will operational, we recommend that this authority set up a work team comprised of public stakeholders (and also private and civil society stakeholders where applicable) from the full spectrum of the energy sector. This team can be directed by the maximum authority, but when setting it up, its roles should be well defined, particularly those of the coordinator or team leader.

As one of the first activities of the work team, which should have representatives of stakeholders from across the energy sector, we recommend developing Internal Regulations to define who may participate, how representatives will be appointed, the scope of its work and, above all, how decisions will be made within the group. The work team, which reports directly to the maximum authority of the sector, should be primarily responsible for making the policy. It may, if deemed necessary, consult with energy sector technicians or specialists, prefe-rably from within the country, except for specific issues, but it should be clear that they are not responsible for Policy, which always falls to the State.

The work team can create groups and subgroups for sub-sectors or strategic issues (or for sub-regions of the country) as described herein. They can include authorities, technicians, professionals, businesspersons, academics, and workers representing the country or its sub-regions. Its membership should emanate from a State decision, according to the way it makes public policies (primarily the scope of social participation). Without this basic organization of the work team, it is hard to achieve suitable, complete energy Policy.

To conclude, listed below are other very important items to ensure the success of the Policy process:

a. Access to quality information on the energy sector, respecting the criteria of accuracy, completeness (in time and scope, covering all aspects of the national or sub-national energy mix) and timeliness. Information should be systematized to facilitate the baseline assessment. For example, organizing the data in the energy balances is important to understand the past and present situation of the sector.
b. Trained human resources, to enable and facilitate data interpretation, define scenarios and conduct complementary studies and reviews as needed for Policy. To this end, we re-commend partnering with national research & development institutions specializing in different energy fields. International specialists may be needed for specific cases where no national expertise is available.
c. Energy planning capacities. This Practical Guidebook has reiterated the importance of energy planning and its close relationship to energy Policy. We recommend that the work team formed for energy Policy should commission surveys and studies on future ener-gy scenarios or energy forecasts.

6 Glossary

Systemic Analysis: A technique or method for studying specific items in the baseline assessment of a sector, which seeks to link those items together by identifying how much influence each item has on the others, using pairwise comparisons of items and the cumulative effects of the comparison. The results help to identify highly interrelated items in a given sector or system and the items that most influence or are influenced by the others. For example, it helps to identify the system's critical elements, where an energy policy intervention would be most effective.

Energy Baseline Assessment: A study and/or its output (document/report) that presents a complete (or partial, depending on its scope) picture of the energy sector (or sub-sector), usually with planning or policymaking objectives. It is done systemically and takes into account aspects such as the domestic and foreign context, energy mix characteristics (reserves and potential energy flows related to supply and demand, foreign energy trade, major restrictions or external conditioners such as environmental and technological ones), the institutional/functional structure of the sector, its pricing structure and tax status, characterization of user segments, and potential energy savings or efficiency. It is a complete assessment of the field under intervention. Energy balances (of final or useful energy) are important (though not exclusive) tools for energy baseline assessments. It is also essential to set temporary parameters or limits on the baseline assessment, including the time interval under study, which may involve interpreting historical data as inputs for analysis, and the region or territory within which the baseline assessment will be conducted.

Enabling Dimensions: Essential elements to start the task of exploring the entire the energy system. They are the basis for policy assessment, planning and monitoring (which require information) and effective execution of the proposed interventions (which require human resources).

Target Image/Situation: A declaration of the final or intermediate state to be targeted in a given sector when making and implementing a policy through strategies and actions.

Performance Indicators/Metrics: Quantitative or qualitative, numerical or linguistic variables to monitor and measure/verify the status and trends of the action plan against its intended targets. They can be monitoring indicators (to measure the performance of actions at certain time intervals) and/or check indicators (to identify the outcomes or end products of one or more actions).

Tool: A policy tool is defined as a 'product' for implementing a specific strategic line such as a program, project, plan, law, regulation or study. Tools seek to answer the question, "How or by what outputs will the objectives be met?"

Strategic Line: Describes the path to achieve a specific objective[22] and seeks to answer the question, "By what measures will the objectives be met?"

Strategy Map: A tool for planning and supervising the management of action plans, causally related to strategic objectives set for a sector or organization. These objectives are organized within the framework of perspectives or dimensions according to the category of action or the stakeholders engaged in or reached by the actions. Examples of perspectives include: i) the institutional perspective (primarily human resources in a company or organization); ii) the perspective of the internal processes of a sector or organization; iii) the perspective of resources or financing; and iv) the perspective of the higher-order objective for the energy sector or sub-sector.

Target: The concrete (qualitative or quantitative), verifiable expression of an objective to be achieved within a given time period, with the necessary resources.

22 United Nations, ECLAC, OLADE, GTZ. (2003). *Energía y desarrollo sustentable en América Latina y el Caribe: Guía para la formulación de políticas energéticas.*

Specific Objectives: Define a concrete situation to be achieved in the sector, usually by solving certain issues identified in the baseline assessment. Their ultimate scope and contents depend on each case. In the energy sector, examples are those relating to supply, the supply chain, or various categories of energy use. They can also address international relations, with concrete objectives to cover part or all of the energy mix. Specific objectives should aim to achieve the general objectives and can be sectoral, sub-sectoral or cross-cutting, for instance. They refer to outputs or outcomes that can be expressed by indicators. Specific objectives should be prioritized to order them into short term, medium term and long term objectives.

General or Higher-Order Objectives: An expression of the guiding principles of an energy policy. They convey the most complete, concrete idea of the final state to be reached through a series of orderly, consistent actions, and usually seek to counteract weaknesses and threats, address gaps and vulnerabilities, enhance the strengths of a country or system, and/or harness opportunities. In the case of policies, higher-order or general objectives seek to create a change or have an impact from the perspective of society. We recommend writing them in the infinitive.

Objective: A programmatic element that identifies the aim towards which resources and efforts should be directed in order to fulfill the vision or the vision/mission in the case of an organization, or the institutional aims in the case of programmatic categories. Being a qualitative expression of a purpose within a given time period, objectives should answer the questions "why" and "what for." We recommend writing them in the infinitive.

Action Plan: States the work to be done to achieve the specific objectives (with definite targets) through actions that take into account the internal and external conditions of a given system. The same specific objective can be related to several action plans. In this context, an action usually serves to obtain a policy tool or refers to applying such a tool.

Energy Policy: The fully-developed expression of a desired situation in the energy sector or system of a given territory over which there are jurisdictional powers or capacities (public power) to coordinate and implement actions by way of a specific institutional structure. Policies comprise at least a strategic vision, objectives and targets with definite deadlines, but may include strategies (strategic lines), tools and actions. Energy policies are linked to other sectoral policies and to the overall policy of a given territory.

Starting Point*:* Refers to the initial situation or state of a sector to which a given policy will be applied. The baseline assessment is the basis for defining this state, which serves as a starting point for designing the target situation (or target image).

Assumptions and Current Context: A detailed description of the exogenous conditions of the energy sector under assessment that might affect successful implementation of an action plan.

Vision or Strategic Vision: A brief statement of an achievable desired situation in a given sector (or organization) within a definite timeframe. It is directly related to the general objectives.

An observation regarding energy sector terms: All of the general energy sector concepts in the Practical Guidebook were taken from publications of OLADE, particularly its Energy Statistics Manual.

7 Appendices

APPENDIX A

The Analytic Hierarchy Process

Hierarchies help us to understand and visualize all aspects of a problem by grouping them according to their importance and influence at different levels. They also help us to see their interrelations and how each aspect affects the overall situation.

Hierarchies can be divided into two groups:

a. Structural Hierarchies: organize the different parts of problems in descending order according to their structural characteristics, and analyze their complexity by breaking the elements down into groups, subgroups and so on.
b. Functional Hierarchies: break elements down into their different parts according to their essential relationships. Linear functional hierarchies, used in the Analytic Hierarchy Process, make it possible to descend or ascend linearly from one level to another.

To organize a decision-making problem into a hierarchy, we should thoroughly understand the situation or problem being addressed, the options available, the factors affecting the decision, and the outcome that is sought. It is advisable for hierarchies to be designed by a diverse group of people that understand the subject matter, as they can contribute different ideas and viewpoints, depending on how they each see situation or problem.

Hierarchies can analyze problems on at least three levels—aims or objectives, criteria and alternatives—as shown in Figure 19.

Setting the Objective

The aim or objective of a problem describes what the decision maker(s) seek to achieve when choosing one of the proposed alternatives.

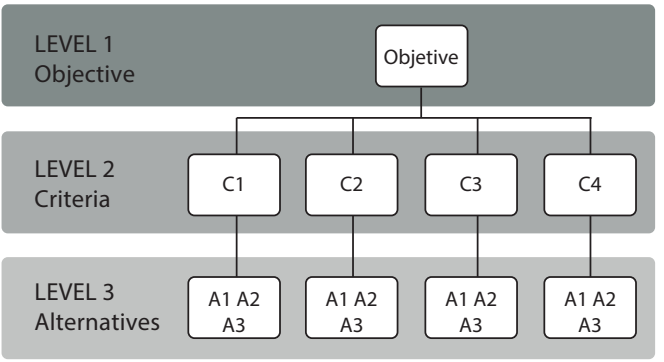
Objectives are at the highest level of the hierarchy, independent from the other levels and elements (criteria, sub-criteria and alternatives).

Setting the Criteria and Sub-criteria

Criteria are factors that the decision maker(s) deem essential to analyzing the problem. Criteria can be represented at a single level of a hierarchy, but if greater detail is required, can be inserted at as many levels of subordinate criteria (sub-criteria) as are necessary between the alternatives and the upper row of the criteria.

Criteria and sub-criteria are subjected to pairwise comparisons (two by two) to decide how they affect the upper element (criterion to objective and sub-criterion to criterion). Each lower-level element should relate to at least one upper-level element, in order to assess the relative impact of the former on the latter and on the problem as a whole.

Figure 19. The Hierarchy Tree



Source: The authors

Identifying Alternatives:

Alternatives are potential solutions to the problem being addressed, and are located at the lower level of the hierarchy, below the criteria and sub-criteria. Alternatives are compared by pairs, according to the criteria and sub-criteria included in the hierarchy, which makes it possible to identify the alternative that best suits the objective.

PRIORITIZATION[23]

Once the decision-making problem is represented in a hierarchy, the criteria, sub-criteria and alternatives should be prioritized, starting with their pairwise comparison. These comparisons establish the preference that each element has over another in relation to the element at the next highest level.

After setting the preferences for each element, the results are summed up to give a unique number for the priority of each element (sub-criteria, criteria and alternatives). With these results we can make a decision and choose the alternative that has the highest priority.

COMPARISON

The preference of each element is based on judgments regarding its relative importance to another when compared to an upper-level element. Different values will be obtained by different individuals, depending on their levels of experience, available information, understanding of the problem, and intuition.

23 ALMUDENA C. P. 2013. La decisión multicriterio; aplicación en la selección de ofertas competitivas en edificación. Máster en Edificación. p. 30

Therefore, it is important to make decisions based on the opinions of diverse individuals with differing viewpoints (as long as they are not too extreme, as this would hamper reaching an agreement). Their views can be discussed at a meeting with all members of the decision-making group attending and giving their inputs, and the results based on a total or majority consensus based on a vote. Another method, which eliminates the need for discussion, is to ask for individual opinions using a questionnaire. The final values are obtained by combining all individual opinions through a geometric mean.

To compare the relative importance of one element over another, value judgments are expressed numerically. These equivalences (value judgment - number), are determined on the AHP fundamental scale proposed by Saaty.

The fundamental scale for pairwise comparisons (T. L. Saaty 1997):

1 - Equal importance
3 - Moderate importance
5 - Strong importance
7 - Very strong importance
9 - Extreme importance

If necessary, intermediate values can be used to show the scoring more precisely.

The scale of preferences is made up of nine value judgments, ranging from 1 to 9, with the numbers 2, 4, 6 and 8 used to give intermediate judgments.

Comparisons are best represented on a matrix, a simple way to reflect which elements are dominant and which are dominated. This matrix is called the pairwise comparison matrix.

Pairwise comparison matrix A is a square n x n matrix in which a_{ij} gives the preference as a numerical value of the element in row i when compared to the element in column j, for i= 1, 2, 3,…n y j= 1, 2, 3,….n, such that when i=j the value of a_{ij} = 1, because we are comparing the element to itself.

Matrix A has the form:

$$A=\begin{bmatrix} 1 & a_{12} \dots & a_{1n} \\ a_{21} & a_{22} \dots & a_{2n} \\ a_{n1} & a_{n2} \dots & 1 \end{bmatrix}$$

When preparing the matrix, the Analytic Hierarchy Process is based on four axioms:

Axiom 1: Reciprocity. This refers to the condition of reciprocal judgments.

$$a_{ij} = 1/ a_{ji}$$

$$A=\begin{bmatrix} 1 & a_{12} \dots & a_{1n} \\ 1/a_{12} & 1 \dots & a_{2n} \\ \vdots & & \vdots \\ 1/a_{1n} & 1/a_{2n} \dots & 1 \end{bmatrix}$$

Axiom 2: Homogeneity. The elements being compared are of the same order, magnitude or hierarchical level.

Axiom 3: Dependency. There is a hierarchical dependency between the elements of two consecutive levels.

Axiom 4: Consistency. When the pairwise comparison matrix is perfectly consistent, then $a_{ij} = a_{ik} / a_{jk}$ for i, j y $k = 1, 2, 3 \ldots n$.

To populate the matrix, first you fill in the entire diagonal with numbers 1, because each element is being compared to itself. Then we fill in the spaces above the diagonal with values from the Saaty scale. The number of comparisons to fill in these spaces is obtained using the following formula:

$$((n \times n) - n)/2;\ n = \text{the number of elements compared}$$

SYNTHESIZING THE RESULTS[24]

To obtain the priorities from the judgments given in the m x m comparison matrix, an approximation method is used. The first step is to obtain the normalized matrix by adding up the values in each column and dividing each cell of the column by its sum.

Normalized matrix A, obtaining A'

$$A' = \begin{bmatrix} \frac{a_{11}}{\sum a_{i1}} & \frac{a_{12}}{\sum a_{i2}} & \cdots & \frac{a_{1n}}{\sum a_{in}} \\ \frac{a_{21}}{\sum a_{i1}} & \frac{a_{22}}{\sum a_{i2}} & \cdots & \frac{a_{11}}{\sum a_{in}} \\ \frac{a_{n1}}{\sum a_{i1}} & \frac{a_{n2}}{\sum a_{i2}} & \cdots & \frac{a_{nn}}{\sum a_{in}} \end{bmatrix}$$

Next we calculate the average of each term of matrix A', from term 1 to term n, to obtain the matrix W of relative weights, which are often placed to the right of matrix A.

After obtaining the normalized matrix, the relative priority is obtained for each of the compared elements by averaging each of the rows of the normalized matrix.

$$W = \begin{bmatrix} \frac{a_{11}}{\sum a_{i1}} + \frac{a_{12}}{\sum a_{i2}} + \cdots + \frac{a_{1n}}{\sum a_{in}} \\ \frac{a_{21}}{\sum a_{i1}} + \frac{a_{22}}{\sum a_{i2}} + \cdots + \frac{a_{11}}{\sum a_{in}} \\ \frac{a_{n1}}{\sum a_{i1}} + \frac{a_{n2}}{\sum a_{i2}} + \cdots + \frac{a_{nn}}{\sum a_{in}} \end{bmatrix} = \begin{bmatrix} w_1 \\ w_2 \\ w_3 \end{bmatrix}$$

Donde w_1, w_2 y w_3 son las prioridades

Where w_1, w_2 and w_3 are the priorities

CONSISTENCY INDICATORS[25]

After prioritizing the elements, we need to be sure that the results are valid for decision-making. These results come from value judgments made in the comparisons, which may or may not be consistent. Keep in mind that perfect consistency is very hard to achieve, so one should expect a certain degree of inconsistency when making comparisons.

24 Vargas, R. V., & IPMA-B, P. M. P. "Using the analytic hierarchy process (AHP) to select and prioritize projects in a portfolio", PMI Global Congress. 2010, p. 1-22.

25 Vargas, *op. cit*.

An entirely consistent matrix would show that $a_{ij} = a_{ik} / a_{jk}$ for $i, j\, y\, k = 1, 2, 3 \ldots m$. This property requires that all columns of a matrix be dependent. The columns in any 2 x 2 comparison matrix are entirely dependent, so they are always consistent.

For other *m* x *m* matrices, a degree of inconsistency is highly likely. The Analytic Hierarchy Process enables one to measure the inconsistency of judgments using a consistency proportion or ratio. The consistency ratio should not exceed 5% for 3 x 3 matrices, 9% for 4 x 4 matrices, and 10% or less for other matrices.

The closer you are to these values, the more consistent the judgments based on pairwise comparisons will be. When these values are surpassed, it means that the judgments are inconsistent and random, and should be reviewed and corrected.

An estimate of the degree of inconsistency incurred when assigning ratings is the *RC* consistency ratio, which is the degree of inconsistency when scoring the relative importance of the criteria and alternatives for a problem. A common practice is to put it at the bottom of each comparison matrix to monitor scoring consistency.

The *RC* consistency ratio is calculated using the following expression:

$$RC = \frac{IC}{CA}$$

Where *IC* is the consistency index and *CA* is the random consistency. The *IC* consistency index is obtained as follows:

$$IC = \frac{\lambda max\text{-}n}{(n\text{-}1)}$$

Where:

$\lambda max\text{-}n$ is the characteristic average value

n: is the size of the matrix

To calculate λmax, multiply $A.W$, which gives an estimate of $\lambda max.W$, that is, $A.W = \lambda max.W$. Then we divide each component of λmax *W* by the component for W, which gives us λmax. Next we average the λmax estimates to find a total average estimate for λmax. With this estimate, we then calculate IC using the above expression.

This index is divided by the random consistency (CA) value (Table 9). Saaty suggests obtaining this value from the following Table. According to the size *n* of the matrix, which is the number of criteria or alternatives analyzed, we obtain its estimate.

Finally, we calculate the consistency ratio *(RC)* value by dividing the consistency index *(IC)* by the random consistency *(CA)*.

Table 9. The Random Consistency Index

Number of items compared	1	2	3	4	5	6	7	8	9	10
Random Consistency Index	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.5

Source: The authors

THE RESULTS AND HOW TO ANALYZE THEM[26]

The Analytic Hierarchy seeks to enhance the quality of decision-making by lending scientific rigor to each stage of the process. It includes two aspects of human thought: qualitative (defining the problem and establishing the hierarchy) and quantitative (giving concise judgments and preferences).

It uses numerical scales to reflect thoughts, judgments and intuitions, and to measure tangible and intangible qualities using the same criterion. Numerical scales help reflect assessments or judgments whose complexity cannot be suitably expressed in words. Numerical results reflect very subtle differences among the possible solutions and bring rationality and logic to the decision-making process. The choice made is fully justified by the numerical results, which favors the objectivity and transparency of the process.

The objectivity of the decision made is enhanced because the AHP method takes into account the views of all those involved in the decision, both by defining the problem and establishing the hierarchy, and by making judgments and assessments.

Once all comparisons have been made, we have a consensus on the final outcome: an ordering of the alternatives. This outcome, then, is based on priorities set by the judgments and assessments made through the stakeholders' comparisons of the AHP model components.

26 Vargas, *op. cit*.

APPENDIX B

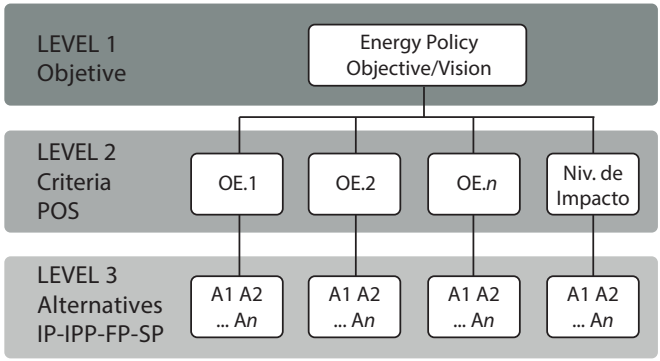
Applying the Analytic Hierarchy Process to Energy Policy

To prioritize the objectives, we used the Analytic Hierarchy Process (AHP), a structured technique for making complex decisions. It includes identifying priorities from among a set of alternatives instead of selecting one or simply categorizing them. This makes it possible to compare diverse and often incommensurable elements in a rational, consistent way in relation to certain criteria, in order to achieve an objective.

The hierarchy tree adopted for prioritizing the objectives of each strategy map is shown in Figure 20. In this prioritization, all strategy maps use the energy policy vision as the objective to be analyzed.

The criteria for each strategy map to be analyzed are strategic objectives pertaining to the Perspective of Society (POS), because from this perspective, the objectives are interpreted as the result of implementing the Energy Policy. Likewise, the criterion to analyze the level of impact for each objective is the POS for each subsector. Finally, the alternatives to be analyzed are the strategic objectives making up the Institutional Perspective (IP), the Funding Perspective (FP), the Internal Process Perspective (IPP), and the Stakeholder Perspective (SP) of each strategy map in question.

Figure 20. The Hierarchy Tree Applied to each Strategy Map



Source: The authors

APPENDIX C

The Balanced Scorecard

The Balanced Scorecard is a management and monitoring tool for strategic planning that is widely used in business, industry, nonprofit organizations and government entities to align the activities of an organization with its vision and strategy, to improve internal and external communications, and to monitor its performance based on tracking strategic objectives. It was proposed by Robert Kaplan and David Norton[27] at the *Harvard Business School* in the '90s, as a performance measurement framework that added non-financial strategic measures to traditional financial metrics to give managers and executives a more 'balanced' vision of their organization's performance.

This tool has been adapted for use in government agencies and non-governmental organizations. Therefore, being a consolidated tool that is also used by the public entities of Paraguay[28], we decided to include it in this Guidebook as an element of the energy policy Monitoring and Deviation Correction System.

As a strategic management system applied to energy Policy, this tool helps to:

- Formulate a consistent, transparent strategy by turning the energy policy vision into strategies
- Communicate the strategy to the different stakeholders involved
- Identify, coordinate, communicate and link objectives and indicators
- Connect the objectives with the financial and budgetary planning
- Systematically measure the performance of action plans and propose corrective actions

This monitoring implementation tool was selected for the following reasons:

a. It facilitates supervision of the achievement of objectives, targets and action plans established through a planning process
b. It favors in handling the tool
c. It ensures the ability to view a table summarizing various monitoring indicators and their relationships with the objectives and action plans.

The Balanced Scorecard Adapted to Managing Public Policy Strategies

In its original form, the BSC provides executives with a comprehensive framework that translates the vision and strategy of an organization into a coherent set of objectives and indicators organized around four different perspectives:[28]

Finance: considers the return on investment and the economic added value

Clients: beneficiaries of the strategies implemented and evaluated to ensure their satisfaction, retention for the organization, and the maintenance and growth of their market share

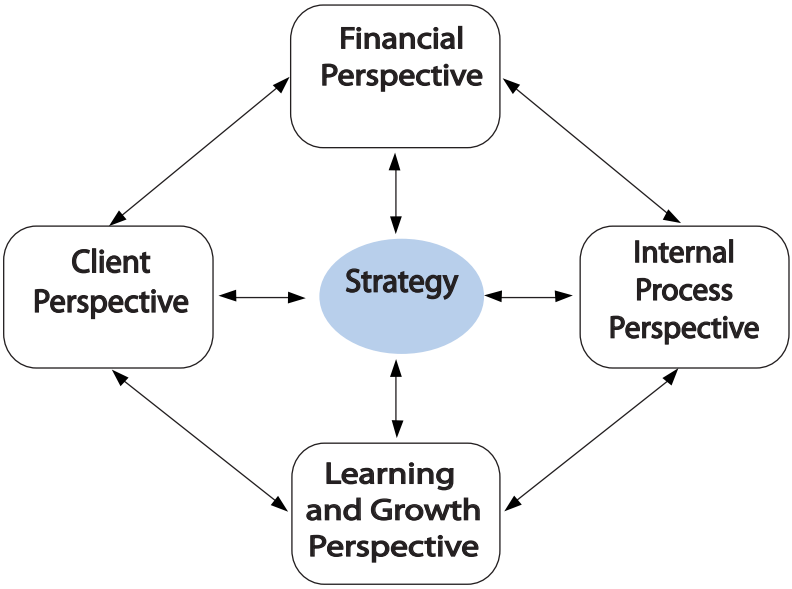
27 *The Balanced Scorecard: Translating strategy into action*, Robert S. Kaplan and David P. Norton, 1996.
28 For example, the Balanced Scorecard is used by the National Electricity Administration and the National Customs Office.

Internal processes: a set of stages to establish value propositions aimed at attracting and retaining clients in selected market segments and meeting shareholder expectations of financial returns. Processing takes into account quality objectives and targets, response times, costs, and the introduction of new products.

Learning and growth: identifies the infrastructure that the company must build to improve and grow in the long term through increased employee satisfaction and information system availability

The Balanced Scorecard complements the financial indicators of the past with measures of future performance indicators, and adds other objectives from different perspectives. These four perspectives are shown in Figure 21 in relation to the strategy used by an organization.

Figure 21. Organizational Strategy in Relation to the BSC Perspectives



Source: P. Niven - Adapted from the original proposal by R. Kaplan and D. Norton.

With the selection of these perspectives, the objectives seek organizational progress, taking into account client and investor satisfaction by developing the quality of human resources in terms of education, training and efficiency gains. As a result, financial improvements and higher levels of return on investment are sought.

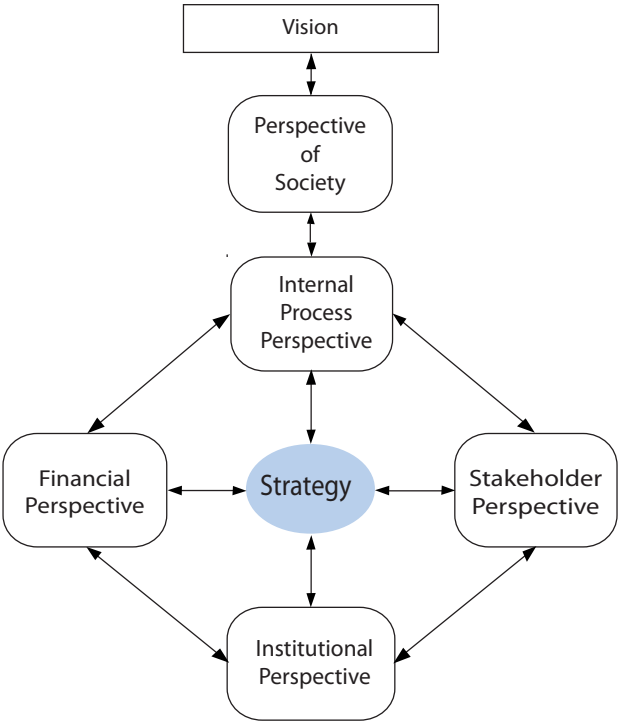
The Balanced Scorecard has been effective in measuring performance in the private sector, but can also be easily applied to non-profits, public entities and, as proposed herein, to monitor the fulfillment and application of public policies, in this case for the energy sector. However, in the case of public policy strategies, certain changes must be made when selecting these approaches, to adjust them to the aims sought.

Therefore, strategy remains crucial from all public policy perspectives. Once the strategy has been developed, the BSC is a means for interpreting the strategy and its application. Although the financial aspect is important for

efficient resource use, it is not the most important aim of public policy. Objectives relating to social impacts are more important because they point towards the policy vision.

As for perspectives, there are two fundamental changes, as seen in Figure 22. The main difference is that the strategy moves in search of the public policy vision.

Figure 22. Public Policy Strategy – from Perspectives to Vision



Source: Adapted from the original proposal by Niven.[29]

Second, the client perspective gains greater importance, after which transformation it is called the Perspective of Society. This implies a shift from the original approach described above to the fact that the benefit of applying the strategy to society is more important, using financial tools to achieve those objectives.

Note also that the Financial Perspective, while not critical, is still very important. Few objectives, action plans and targets can be met without funding. Financial control in the public-sector BSC makes it possible to determine the feasibility of a plan by assessing the financial constraints to carrying out the activities. Thus it is that the new set of perspectives to be taken into account for the Balanced Scorecard and used for public policy management consists of objectives pertaining to the following perspectives:

The Institutional Perspective: The Learning and Growth Perspective is deemed an institutional (agency) perspective in the energy sector or sub-sector in which the action plans will be implemented. It consists of

29 Balanced Scorecard: Step-by-Step for Government and Nonprofit Agencies. Second Edition, Paul R. Niven, 2008.

human capital, organizational capital and informational capital.

The Internal Process Perspective: This is identified with action plans to be implemented by the agents of the sector.

The Perspective of Society: The BSC client perspective is deemed a perspective of society or of the social stakeholders on whom policy implementation will have some effect.

The Financial Perspective: Seeks to identify the government strategy in order to optimize the financial resources. Note that unlike a business case, the Financial Perspective is not an outcome, but rather a means to meet the objectives.

The Stakeholder Perspective: Defines stakeholders following the guidelines in the Manual of the Project Management Institute (PMI).

APPENDIX D

The Balanced Scorecard Form

The basic form used for the Balanced Scorecard is shown in Table 10, and the instructions for filling it out are explained below. Again, we suggest using one BSC for each energy sub-sector, and another one for the overall energy sector.

Table 10. The Balanced Scorecard Form

Balanced Scorecard – Sub-Sector									
Strategic Objective	Strategic Line	Tool	Check Indicator	Target			Status Last Review	Responsible	Observations
				Short-term	Medium-term	Long-term			

Source: The authors

The Balanced Scorecard

Strategic lines, tools, indicators and targets are organized according to the action plans into ten strategic issues. However, we suggest monitoring the energy policy by energy sub-sectors, because the strategic objectives can be viewed as a matrix structure (Figure 23).

Figure 23. The Balanced Scorecard Form by Energy Sub-sectors

Balanced Scorecard – Sub-Sector									
Strategic Objective	Strategic Line	Tool	Check Indicator	Target			Status Last Review	Responsible	Observations
				Short-term	Medium-term	Long-term			
1	2	3	4	5	6	7	8	9	10

Source: The authors

Filling out the Balanced Scorecard Form

The proposed order of activities for filling out the forms for the strategic lines is shown in Table 11. Each of the activities is explained in the glossary of terms above.

Table 11. Activities for filling out the form on strategic lines

Nº	Activity
1	Take the objectives from each strategy map and complete field 1
2	Look in the strategic line forms that refer to the selected strategic objective. Fill out as many rows as there are strategic lines that meet the condition (field 2)
3	Choose a critical tool from each strategic line that will allow for follow-up (field 3)
4	Define the Monitoring Indicator for the chosen tool, which must be obtained from the form for the right strategic line (field 4)
5	Fill out the short, medium and long-term objectives, according to the definitions given for the tool, in the right form for the strategic line (fields 5, 6 and 7)
6	Complete the status of the last review. In the case of numerical indicators or percentages, write the progress made. In the case of linguistic indicators, include them (e.g., approved, ongoing, completed, or pending) (field 8)
7	State the person or organization responsible for the tool (field 9)
8	Complete with any relevant comments** (field 10)

Source: The authors

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