

Strategic foresight: a case of application in power generating companies

Prospectiva estratégica: un caso de aplicación en empresas generadoras de energía

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Abstract

The economic and social growth is closely linked with energy development. All sectors of the economy need it; industry, trade, education, health, etc, which must ensure the continued supply of the same. Strategic foresight enables you to identify future scenarios of enterprises, institutions and other in the short, medium and long term through the analysis of internal and external variables. This paper presents a prospective analysis of the colombian power generating company "Emgesa S.A. E. S. P". First presents a contextualization through a set of background that allow you to have an overview of the same. Then four scenarios are presented. For each scenario develops an analysis of the weaknesses, opportunities, strengths, and threats (SWOT) that are generated by each one of them. This paper concludes that the company could increase its revenue in the year 2027 if properly implemented the strategies presented in the analysis.

key words: hydraulic power, power generation, renewable energy, strategic foresight, SWOT.

Resumen

El crecimiento económico y social está estrechamente vinculado con el desarrollo de la energía. Todos los sectores de la economía necesitan; la industria, el comercio, la educación, la salud, etc., que deben garantizar el suministro continuo de la misma. Previsión estratégica permite identificar escenarios de futuro de las empresas, instituciones y otras en el corto, mediano y largo plazo mediante el análisis de variables internas y externas. Este documento presenta un análisis prospectivo de la empresa generadora de energía colombiana Emgesa S.A. E. S. "P". En primer lugar, presenta una contextualización a través de un conjunto de antecedentes que le permiten tener una visión de conjunto de la misma. A continuación, se presentan cuatro escenarios. Para cada escenario se desarrolla un análisis de las Fortalezas, Oportunidades, Debilidades y Amenazas (FODA) que son generados por cada uno de ellos. Este documento concluye que la empresa podría aumentar sus ingresos en el año 2027 si se aplican correctamente las estrategias presentadas en el análisis.

Palabras clave: energía hidráulica, generación de energía, energías renovables, prospectiva estratégica, DOFA.

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1. Introduction

Colombia is one of the Latin America countries that has a large amount of natural resources, which allow you to generate energy from different sources: hydraulic, solar, wind, thermal, osmotic, etc. Energy is essential to human life, the majority of activities that are carried out in home, industry, clinics and hospitals, schools and universities, etc. require power energy. All sectors of the economy need directly or indirectly from it (Cayir Ervural, Zaim, Demirel, Aydin, and Delen, 2018). The objective of this paper is to present an strategic foresight analysis of the Colombian energy company "Emgesa S.A E.S.P." We developed a comprehensive study of the same, was formulated a goal for the company in a horizon of ten years, four scenarios were formulated, pull variables were defined and an analysis of the strengths, weaknesses, opportunities and threats (SWOT) for each one was developed. At the end was selected the most viable scenario and identified strategies that will allow the company to achieve the proposed goal. This paper concludes that the company can increase their revenue for the year 2027 if implemented the strategies formulated in the third scenario. The strategic foresight and the comprehensive analysis of the strengths, weaknesses, opportunities and threats (SWOT) of a company can help you make better decisions, improve profitability and increase competitive advantage.

1.1. Strategic foresight

Is a scientific field in rapid development judged from the increase in number of yearly publications the last decade (Phadermrod, Crowder, and Wills, 2016). The concepts of foresight, strategy, planning is in practice intimately linked, each of them leads to the other and is mixed: in fact, we talk about strategic planning, management and strategic foresight (Godet, Durance, Durance, and Michel, 2007). In the literature review we found the next definitions of strategic foresight: Whitehead (1967), define this as "the ability to see through the apparent confusion, to spot developments before they become trends, to see patterns before they emerge, and to grasp the relevant features of social currents that are likely to shape the direction of future events". Slaughter (1997), said that the foresight "is not the ability to predict the future, it is a human attribute that allows us to weigh the pros and cons, to evaluate different courses of action and to invent possible futures on every level with enough reality and meaning to use them as decision making aids". Chia (2008), affirm that the strategic foresight enables organizations to "penetrate and transgress established boundaries and seize the opportunities otherwise overlooked by others. Rohrbeck and Schwarz (2013), define this as the ability to implement actions that reflect critical decision-making; to discern, perceive and interpret weak signals and deduce relevant courses of action. Finally, De Moor, Saritas, Schuurman, Claeys, and De Marez (2014), says that the theoretical and managerial implications are that strategic foresight places organizations in a state of preparedness, broadening their vision to probe emerging social and technological trends in ways that result in innovations responsive to fast-paced business environments.

2. SWOT Analysis

Learning the current condition of strength, weakness, opportunities, and threat (SWOT) can help a enterprise in making a decision. For the middle term, it can also help in building strategic planning. However, conducting SWOT analysis is usually an expensive and time-consuming activity (Thamrin and Pamungkas, 2017). SWOT analysis, a commonly used tool for strategic planning, is traditionally a form of brainstorming. Hence, it has been criticized that it is likely to hold subjective views of the individuals who participate in a brainstorming session and that SWOT factors are not prioritized by their significance thus it may result in an improper strategic action (Phadermrod et al., 2016). The main purpose of this technique is to provide information about the internal and external variables that should be considered in the formulation of planning strategies for an organization (Osuna and Aranda, 2007). The variables of interest are grouped in four categories, usually identified with the letters S, W, O and T (Osuna and Aranda, 2007). This information would allow us to take advantage of the strengths and

opportunities, and to undertake actions for a better handling of the threats, as well as for lessening the effects of the weakness factors. All these should be considered as objectives for any strategic plan (Osuna and Aranda, 2007). Figure 1, presents the detailed description of each category:

Figure 1
SWOT Variables description.

S	W	O	T
Variables we should take advantage of in the growth and development of the organization. Variables associated with factors in which the organization shows certain strength.	Variables that, unless be corrected or improved, could impede or make difficult the growth and development of the organization. Variables associated with factors in which the organization shows certain weakness.	Variables associated with aspects that can be seen as opportunities that the organization could take advantage of for its growth and development.	Variables that could represent a threat to the growth and development of the organization; variables whose effects look advisable to prevent or neutralize.

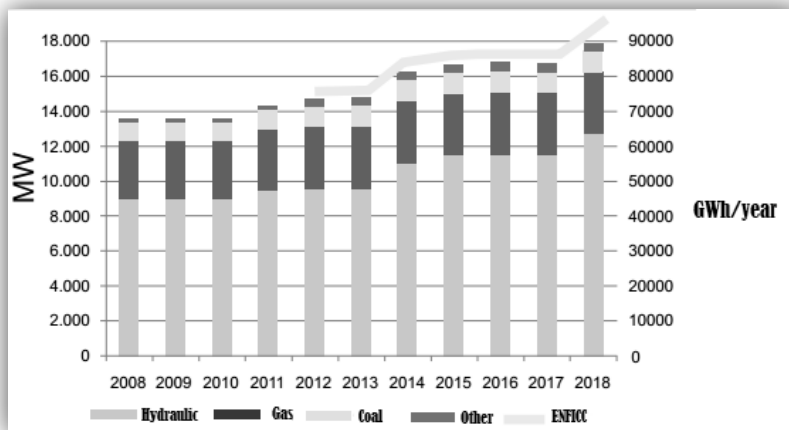
Source: Adapted from (Osuna and Aranda, 2007)

2.1. The power generation market in Colombia

The net installed capacity in the National Interconnected System (NIS) at the end of the year 2014, was of 14.420 MW. The generation of energy in Colombia comes from a 63.7% of water resources, while 31.5% comes from thermal resources such as gas, coal and fuel oil. The transmission of energy is the transport of the same through high-voltage lines, from the generation plants to the outskirts of the consumption centers (Juan D. Velasquez, Gil, and Franco, 2015). Subsequently, the energy is to be carried away captive, from the national transmission system (NTS) to the cities, which is the distribution activity. The marketing of energy for its part, is an activity carried out in free competition and includes the metering, billing and customer attention (Juan D. Velasquez et al., 2015).

Due to the agreements made in auctions in the months of May and June of the year 2011, the generators are committed to install 3.419 MW between 2012 and 2018, which corresponds to an additional 25% of the total installed capacity in the country (J D Velasquez, Dyer, and Franco, 2016). In addition to the installed capacity, it is important to analyze it from the point of view of the firm energy that is provided to the system, which means that the energy that is required by the country will be available, regardless of their generation technology, which allows us to mitigate the risk of rationing in periods of critical hydrology. Figure 2, presents the evolution of the generation park in the period 2008-2018.

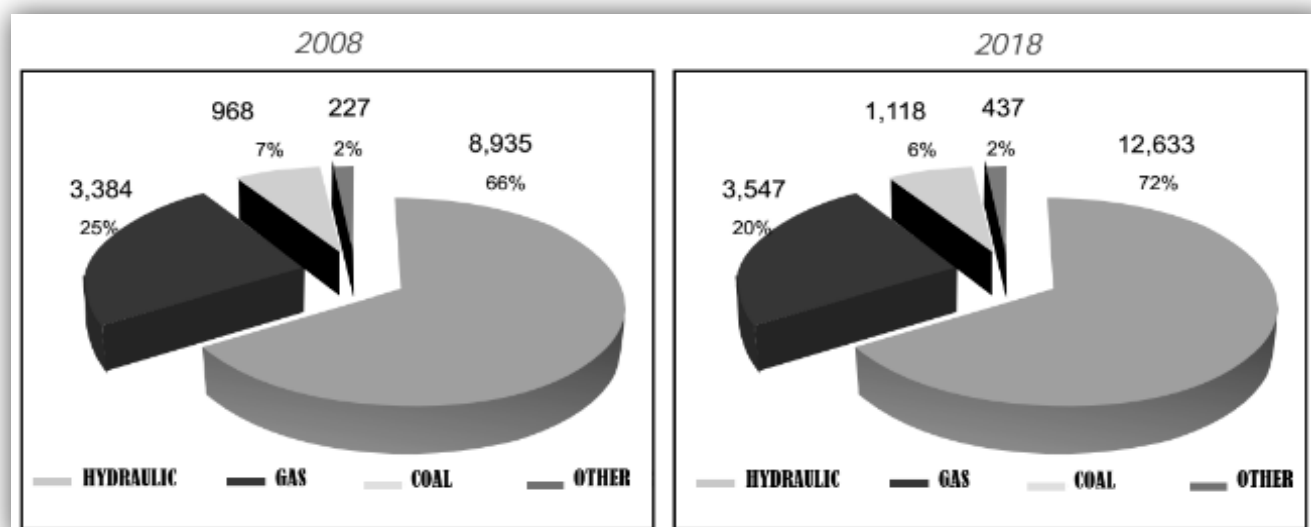
Figure 1
Evolution of the generation park 2008-2018 - (MW y GWh/year)



Source: ACOGEN

Under the new regulation rule are the investors who assume the risks inherent in the choice of technology, construction, financing and marketing of energy prices and quantities.

Figure 3
Evolution of the generator park composition by technology



The main enterprises in the colombian energy generation market are:

- EPM Group: is currently serving to Medellín, the metropolitan area and the municipalities of Antioquia department; in turn, participates in the following service of electrical energy: generation (energy production in a central, hydro, wind or thermal energy), distribution (transport of energy by the networks up to the final consumer, who receives it in accordance with the characteristics required for industrial, commercial or residential users) and merchandising (the sale of energy, a task that is oriented to the end customer and the wholesale market. The wholesale power market in Colombia is classified in the regulated and not regulated market) (EPM, 2018).

- EMGESA S.A ESP: is the second largest energy generation company in Colombia in terms of installed capacity, it was established on 23 October 1997 as a result of the capitalization process of the Bogotá Power Company, carried out by the company majority-owned by Chilean Spanish, Capital-Energy. This company is a subsidiary of ENDESA, first electric group of Latin America and third in Europe, present in 11 countries and three continents. The company's main activity is the generation and sale of electricity under the terms of the law 143 of 1994. This has ten hydraulic and two thermal generation centrals, with a net effective capacity declared before the without of 2,867 MW, which corresponds to 19.88 per cent of the actual net capacity of Colombia (EMGESA, 2018).

- ISAGEN: colombian company dedicated to the generation of energy, construction projects and marketing of energy solutions. Its competitive strategy is based on the expansion of its productive infrastructure, the comprehensive network of industrial customers and a participatory approach to the stock market with a strategy of low speculation. Operates five hydraulic generation plants located in the Antioquia, Santander and Caldas department. It has a total installed capacity of 2,132 MW, equivalent to 18.8% of the total capacity of the NIS at the end of 2011, distributed in 1,832 MW and 300 MW thermal, placing it as the third largest generator of Colombia (ISAGEN, 2018).

- CELSIA – COLINVERSIONES: this company occupies the fourth position in the colombian electricity generation market. It currently has two thermal generation power plants: “Colinversiones ZF” and “Merilectrica”, a Hydraulic Microcentral, “Rio Piedras” and a hydraulic project, “Hidromontanitas”. It also has a stake of 50.01% in the Pacific

Energy Company S.A. E.S.P., EPSA, one of the main energy companies in the southwestern region of the country (CELSIA, 2018).

- EPSA – GENSA: company of mixed public services with principal domicile in Manizales city, legal personality of its own, full administrative autonomy and independent capital. Subject to the general rules of the Law 142 of 1994. Its main shareholder is the nation (GENSA, 2018).

- GECELCA: company leader in generation and commercialization of electric energy and great dynamics in the natural gas market in Colombia, provides strength and support to the national electricity system, becoming "Support Thermal" in the case of possible energy deficit. Within your IT infrastructure GECELCA S.A. E.S.P. owns and directly manages the operation and maintenance of the "Termoguajira Central", with a net capacity of 151 MW. In addition, GECELCA represents the plant of TEBSA in Barranquilla with a 791 MW combined cycle plants and 127 MW open cycle (GECELCA, 2018).

- AES CHIVOR: company dedicated to the generation of energy in Colombia, has an installed capacity of 1000 MW, and is located in the Boyacá department, region of the Valle de Tenza, 160 kilometers from Bogota city. Has the most advanced technological platforms in the country and qualified and certified staff (AES-Chivor, 2018).

Table 1
Five market forces

Force	Description
Risks of competitors	the electricity market is a mature and concentrated market where the 81.05% is served by 5 generation companies, the entry of new players is limited by the high cost of the infrastructure investment to serve the market, this income is leveraged when auctioned firm energy concessions, this implies that the entry of new generators is limited to the government auctions.
Power of Suppliers	suppliers of power generation. Electromechanical equipment imported from Japan, Brazil, Germany and Argentina. Telecommunications equipment provided by telecommunications companies, taking into account the coverage of them. Inputs of civil works are served from the Colombian market in which there are several providers.
Substitutes Risk	the substitutes for the products of EMGESA are electrical energy from renewable sources, thermal generation and gas, however in the colombian market these substitutes are not sufficiently developed to become a direct threat by the current generation capacity.
Power of Buyers	colombian law classifies the energy market in two: regulated and non-regulated market. In the first, the price is assigned with the average price per month registered in "DERIVEX", the colombian stock exchange of energy. In the second, the supply of energy can be traded in two ways by direct contract by negotiation between generator and the client or by shopping in the energy pool, as it is a developed market and has few customers, the bargaining power of buyers is very low and therefore is not significant to force a different price to that purchase.
Rivalry Between Firms	the rivalry is minimal because the total sum of the installed capacity gives an account of the national demand and which is exported to countries such as Ecuador and Venezuela.

Source: authors' elaboration

The company has tangible resources (physical and financial), intangibles (reputation, culture and humans). Table 2, presents a detailed description of each resource:

Table 2
Resources description

Type	Resource	Description
Tangible	Physicals	has a total installed capacity of 2.914 MW distributed in 12 generation plants (Central Charquito - 19,5 MW, Paraíso 276,6 MW, Tequendama – 19,5 MW, San Antonio – 19,5 MW, Limonar – 18,1 MW, La Guaca – 324,6 MW, La Tinta – 19,5 MW, La Junca – 19,5 MW, Guavio - 1213 MW, Martín del Corral – 235,5 MW, Cartagena – 210 MW and Betania -540,9 MW).
	Financials	physical assets and income from its commercial activity. In 2017, his income was of 3.833 billions (COP), EBITDA was of 1.744 billions (COP). The financial assets was of 5.93 billions (COP) and the active was of 955.6 millions (COP).
Intangible	Reputation	this company has increased its installed capacity by 30%, has developed policies for environmental sustainability and has endeavored to develop the human and technical capacities within their collaborators. Throughout its history it has had financial stability.
	Culture	development the generation, distribution and merchandising activities while preserving the environment. Promotes the continuous improvement, energy efficiency, the rational use of resources and the pollution prevention, ensuring compliance with legal and environmental requirements established in the country.
	Humans	supports the continuous training of its employees, promotes the use of information and communication technologies, the professional development of its collaborators, has implemented quality of life policies for their employees (flexible schedules, telework, day of balance, among others).

Source: authors' elaboration

3. Results

SWOT, acronym for the internal strengths and weaknesses of a company, environmental opportunities and threats it faces. This technique assumes that an effective strategy is derived from a balance between internal resources (strengths and weaknesses) and the external situation (opportunities and threats). A balance between the strengths of a company and its opportunities, minimizing their weaknesses and threats (Romero-Gutierrez, Jimenez-Liso, and Martinez-Chico, 2016). Table 3, presents the SWOT analysis of the company:

Table 3
SWOT analysis

External Analysis	
Threats	Opportunities
EPM generation has a greater participation in the sector's growth projected to 2018, with the Ituango Hydroelectric Project.	Implement information systems of business intelligent (BI)
Legal, economic instability and political with serious risks of public order in the country.	Growth of the "PIB" above the 4.7% projected by the end of 2018. Generation market growth of 21%.
Difficulty obtaining environmental licenses	Possibility to participate in auctions of firm energy.
The non-favorable political environment for interconnection projects with Panama.	Improve the reliability in thermal power plants and water.
The transmission, distribution and transport infrastructure of gas are not available in an appropriate manner to support the sector growth.	The non - regulated customer is a skilled customer support by both values to vendors who have a broad knowledge of the market.
Hydroelectric generation projects in Ecuador and the current interconnection, would affect the prices of the colombian market.	Develop energy efficiency projects.

Internal Analysis	
Strengths	Weaknesses
The 14% of the company generation is thermal, the 86 % is hydraulic	Has a very high dependence of the generation capacity of water sources
Generation projects with renewable energy	Sales force with broad technical knowledge and regulatory framework
The 86% of energy is water, this has a low cost.	High dependence of the interconnection project Panama for expansion in the international market
Extensive knowledge, technical and operational know of the energy market	Not being able to participate in contracts of firm energy since it is necessary to have the fuel supply contracts
Financial solvency by its broad participation in the colombian market and their participation in the non-regulated market in the center of the country.	Market studies are required to meet the preferences of the customers and their needs unmet

Source: authors' elaboration

The objective of this Company for the year 2027 is increase the incomes with respect to the year 2017. Table 4, presents the objective and the considered variables:

Table 4
Variables

Variables Analyzed	Pull Variables
<ul style="list-style-type: none"> - Prices of substitutes for electricity generation. - Development of infrastructure for the energy transport from generation to the end user. <ul style="list-style-type: none"> - Regulatory framework that determines the growth of the country's energy sector. - Social conditions that determine the investment in generators parks of electric energy - by social and environmental effects. <ul style="list-style-type: none"> - The process of awarding the environmental license; required for the development of new generation projects. - Climate changes that affect the generation plants. - International business investment in power generation. 	<ul style="list-style-type: none"> - Regulatory framework that determines the growth of the country's energy sector (price, auctions of firm energy, exports). - Social conditions that determine the investment in generators parks of electric energy (social and environmental effects).

Source: authors' elaboration

3.1. Scenario analysis

Table 5, presents the four scenarios to analyze related with the regulatory framework and the social opposition:

Table 5
Scenarios

<p>Scenario III</p> <ul style="list-style-type: none"> - Little stability and favorability of the regulatory framework. - Low social opposition. 	<p>Scenario I</p> <ul style="list-style-type: none"> - Stability and favorability of the regulatory framework. - Low social opposition.
<p>Scenario IV</p> <ul style="list-style-type: none"> - Little stability and favorability of the regulatory framework. - High social opposition. 	<p>Scenario II</p> <ul style="list-style-type: none"> - Stability and favorability of the regulatory framework. - High social opposition.

3.2. Scenario I

This scenario has a wide confidence in the policies to encourage the expansion, ensure the reliability of the system and the adaptability of the prices according to the conditions of a free market competition, which benefits the end-user and the energy sector in general. Colombia has a privileged position, is a leader in the establishment of regulatory policies that promote the expansion and economic growth through domestic and international capital. Colombia has interconnections with Ecuador, Venezuela and Panama, is the country with the highest growth in renewable energy generation in Latin America, which is widely valued in the regional market.

Table 6
SWOT – Scenario I

Internal Analysis	
Strengths	Weaknesses
<p>The generation of the company is thermal (10%), hydro (86%) and renewable (4%).</p> <p>The project “El Guavio” is in an area of special hydrological characteristics, which allows a constant production even in difficult weather conditions.</p> <p>Clear policies of environmental coexistence and social responsibility in the presence areas.</p> <p>Financial solvency by its broad participation in the colombian market and their participation in the non-regulated market in the center of the country.</p> <p>Physical structure, financial muscle and know-how to increase participation in the regional market.</p>	<p>High dependence of the generation capacity of water sources and low participation in renewable energy generation. Will be affected by the phenomenon of Child.</p> <p>Not being able to participate in contracts of energy firm to gas because they require to have firm contracts for the supply of fuel, with low probability of release and with low probability of selling it in the secondary market.</p> <p>Customers from the non-regulated market to capture that are faithful to the competition, low participation in the non-regulated market with direct supply contracts.</p>
External Analysis	
Opportunities	Threats
<p>Implement business intelligence (BI) information systems that promote business specialization for the non-regulated market.</p> <p>Use figures ESCOS to develop energy efficiency projects.</p> <p>Development of solar, thermal and photovoltaic energy projects, that will allow us to take advantage of the high solar radiation presented by the phenomenon of child.</p>	<p>Difficulty obtaining environmental licenses due to the demands social responsibility of the projects, and the clarity of the auditable participation of the community.</p> <p>The hydric generation projects of Ecuador would affect the prices of the Colombian market, which would imply a lesser margin in the price of sale to this market.</p> <p>Unification of regional market prices that decrease the utilities.</p>

Source: authors' elaboration

Actions to follow:

- Increase the participation and success in the government auctions
- Develop strategies that promote growth in the non-regulated market
- To develop new projects of renewable energy generation for the expansion of its generation facilities in the country.
- To develop competencies in the sales force, promote the development energy efficiency projects and the rational use of energy using the ESCOS figure in the non-regulated market at the national and regional levels.
- Propose self-generation projects in the non-interconnected through marketing campaigns

3.3. Scenario II

The increase in foreign investment, the stability of the regulatory framework and incentives for the sector growth have promoted the expansion of the electricity sector and has grown in the neighboring countries attention, the attention of this market is taking place from the generation of clean and renewable energy. The foreign industries that generate high levels of air pollution have set their eyes on the country to implement projects that give account of their policies of reducing carbon emissions through international agreements. Have developed projects of clean generation and have been taking advantage of the environmental legislation favorable to their development.

Table 7
SWOT – Scenario II

Internal Analysis	
Strengths	Weaknesses
Its energy production is based on large-scale hydraulic exploitations. The technical and administrative capacities of the power generation business. Has a good corporate image at the environmental and technical level.	Has few developments in solar generation, wind and biomass projects. Has the largest number of customers in the center of the country. Has little experience in the implementation of renewable energy projects such as solar, wind and biomass generation. It has thermal plants of generation that express pollutant large amount of CO2.
External Analysis	
Opportunities	Threats
Development of solar, wind and biomass generation projects. Agreements with the polluting firms to obtain income through the carbon market. Development of the electrical transport infrastructure of in non-interconnected areas.	High competition among colombian generating companies. The climatic changes associated with the greenhouse effect alter the production and efficiency of the hydroelectric plants. Possible imports of hydraulic energy from Ecuador, which would reduce energy prices and decrease utilities.

Source: authors' elaboration

Actions to follow:

- Renew the thermal power generation, to improve energy efficiency in the generation systems, which will be reflected in the reduction of CO2 emissions
- Develop technical skills in the generation of renewable energy
- To realize dialogues and approaches with opposing social groups
- Make agreements with foreign companies to develop the carbon market
- Develop self-generation / cogeneration projects for the non-interconnected zones of the country

- To make use of the national interconnected network to construct the transmission infrastructure
- Conduct marketing campaigns that allow the income inversion in renewable energy projects or in cogeneration projects in non-interconnected zones

3.4. Scenario III

In the last decade, promoted the generation of energy with micro-power plants, which led to the decline of major obligation of firm energy (OFE) projects, currently the national interconnected system has the capacity to meet the current demand, but has few options to increase their participation in the same. There is high competition between large generators to obtain the greatest possible number of users not covered, since, to a diverse market and an offer so wide, the capture and retention of new clients is a factor of great importance.

Table 8
SWOT – Scenario III

Internal Analysis	
Strengths	Weaknesses
Has a significant number of loyal customers to their services despite the diversification of suppliers that has been presented on the market. Extensive experience in diversified generation portfolios. Direct interaction with the community impacted by the new generation projects through programs that promote the improvement of the communities quality of life.	The market is highly concentrated in the Colombian central area and has few possibilities of expansion to other regions of the country. Generation capacity has a significant concentration in hydraulic plants, which can affect in a positive and in a negative way by constant climate changes.
External Analysis	
Opportunities	Threats
Development of innovation projects in renewable energy, optimization and stability of the interconnected power systems. Establishment of new lines of business that are complementary to the service of power generation to captivate more customers. Energy exports to Central and South America by oversupply of generation in Colombia and installed capacity available in all its power generation centrals.	High number of generators participating in the auctions of energy to meet the demands of both the Colombian power market as the neighboring countries. Constant changes in the regulatory framework that affect the development of new projects and discouraging investment of foreign firms in Colombia.

Source: authors' elaboration

Actions to follow:

- Development of power generation projects in other Latin America countries
- Development of hydro-energy on a small scale, to expand the generation park
- Encourage the development of policies that favor the regulatory framework to promote the growth of the sector
- Establish internal policies that seek the loyalty of current users, social benefit programs and policies for efficient use of energy
- Search for approaches with other Latin American countries to develop renewable energy projects
- Propose self-generation projects in the non-interconnected by means of marketing campaigns that allow reinvestment of some of the proceeds in renewable energy projects or in cogeneration projects in non-interconnected zones

3.5. Scenario IV

The high prices of substitutes for electricity generation (price of oil and gas), discouraging the development of projects for the generation of thermal energy. The low level of the infrastructure development for the transport of energy from generation to the end user and the unfavorable prices of electricity to the end-user, discourages the multinationals to develop power generation projects in Colombia, despite the fact that the country can count on a climatic stability that do not affect the generation plants, in addition to the permanent change of regulation, national or foreign investors do not want to take the risk of the investment and growth, this is due to the low participation in the government auctions and proposals for development of infrastructure necessary to support the growth, there is a great distrust for the investment in the country and this implies that Colombia lose the participation of the regional market by low competitiveness of the prices offered. Finally, delays and barriers for the granting of the environmental license required for the development of new generation projects, are also an obstacle to the development of electrical projects.

Table 9
SWOT – Scenario IV

Internal Analysis	
Strengths	Weaknesses
Is recognized in the center of the country as the leader in power generation. It has an adequate financial liquidity to cope with unfavorable prices of electricity It has physical structure, financial muscle and the know-how to carry power from Colombia to other Latin American countries.	Concentrated only in the center of the country and therefore remains unknown, north, south, east and west of the country. Has plants for the generation of electrical energy that would be affected by the high prices of oil and gas.
External Analysis	
Opportunities	Threats
Development of photovoltaic, thermal and solar energy projects, which will allow us to take advantage of the solar radiation, through the importation of amorphous silicon solar panels from China. Implementation of wind energy projects in the north of the country.	Legal conflicts, economic and political rights with serious risks of public order in the country, generated by the granting of environmental licenses for the development of generation projects. Energy imports from Ecuador given the low interest rates of growth in the generation of domestic firms, which is reflected in the low price of electrical energy.

Source: authors' elaboration

Actions to follow:

- To develop renewable energy projects (solar - wind) that do not require a structure developed transport and that does not affect the environment
- Propose to the government the adoption of agreements and statutes that encourage the development of renewable energy projects
- Import panels and solar cells from Asian countries for solar energy generation and windmills for the development of large-scale wind power projects.
- Regional regain credibility in national companies offering competitive prices and quality in the service
- To develop dialogs with social, ethnic or cultural to reach agreements that facilitate the development of renewable energy projects
- To promote the sector growth through the financial leverage
- Propose self-generation projects in non-interconnected zones

3.6. Strategy analysis

Strategy I: develop the market, achieving a differentiation in products. Develop solutions that complement the CORE product through the development of new business lines.

Strategy II: growth, develop new markets. To develop markets in which the company currently not participating, such as the regional market and increase participation in the non-regulated market.

Strategy III: leadership in costs, maximize the operational control and losses in such a way that the costs of energy production are lowest to have a leadership in costs above the market average.

Strategy IV: leadership and segmentation of the target market, the company will focus on segmentation according to the consumption capacity

To achieve the goal in the year 2027, the company must develop solutions that complement the CORE product, through the creation of new lines of business or products that complement or meet the needs of existing customers. The company must learn more about their customers in order to be able to present proposals for high-value technology on the market, to provide products and additional services, complementary to the energy sector, to meet the needs both in optimization as in new infrastructure. The company can implement the following strategies:

- Offer complementary services: provide training to customers on the rational and efficient use of energy, on the rules of the electricity sector and the latest market updates.
- Have a team of highly trained and committed to meet the sector and to customers: knowledge the most relevant aspects of the market is practically a requirement in this segment of users, who are looking a seller who knows and understands the market and the production processes.
- Build relationships of trust and closeness: find out more about each of your customers and build relationships of trust with the same, being clear in the conventions that it offers and to provide first-hand information.

4. Conclusions

EMGESA S.A E.S. P should increase their participation in auctions and implement a business intelligence (BI) area that allows you to learn more about its customers and the continuous evolution of their needs. You must search for the diversification of the electricity generation by increasing their involvement in the production of renewable energy. The efficiency improvement of the thermal power generation systems, as well as changing the fuel used and the addition of systems that take advantage of the waste they give off, will allow the company to increase their incomes, reduce maintenance costs and minimize the environmental impact that it generates.

The strategic foresight can be very useful to all actors involved in the process of generation, transmission, distribution and commercialization of power energy, since it allows to define future scenarios with a relative occurrence probability, allows to propose orientations and strategic actions with base in the competitions and according to the dynamic conditions that constantly appear on the energy market.

Bibliographic references

AES-Chivor. (2018). AES Chivor somos la energía. Retrieved January 29, 2018, from <http://www.chivor.com.co/SitePages/Inicio.aspx#andpanel1-1>

Cayir Ervural, B., Zaim, S., Demirel, O. F., Aydin, Z., and Delen, D. (2018). An ANP and fuzzy TOPSIS-based SWOT analysis for Turkey's energy planning. *Renewable and Sustainable Energy Reviews*, 82(June 2017), 1538–1550. <https://doi.org/10.1016/j.rser.2017.06.095>

- CELSIA. (2018). CELSIA Historia. Retrieved January 29, 2018, from <http://www.celsia.com/es/nuestra-empresa/historia/pager/128/page/3>
- Chia, R. (2008). Enhancing entrepreneurial learning through peripheral vision. In C. M. Leitch (Ed.) (p. 27–43 BT–Entrepreneurial learning: conceptual f). Retrieved from http://www.routledge.com/shopping_cart/products/product_detail.asp?curTab=SERIESandid=andseries=2147330andparent_id=andsku=andisbn=9780415394161andpc=
- De Moor, K., Saritas, O., Schuurman, D., Claeys, L., and De Marez, L. (2014). Towards innovation foresight: two empirical case studies on future TV experiences. *FUTURES*, 59(1), 39–49. Retrieved from <http://lib.ugent.be/catalog/pug01:4287681>
- EMGESA. (2018). Know EMGESA. Retrieved January 29, 2018, from <http://www.emgesa.com.co/es/conocenos/Paginas/nuestra-historia.aspx>
- EPM. (2018). EPM Group Structure. Retrieved January 29, 2018, from <https://www.epm.com.co/site/investors/General-Information/EPM-Group-Structure>
- GECELCA. (2018). Generadora y comercializadora de energía del caribe. Retrieved January 29, 2018, from <https://www.gecelca.com.co/>
- GENSA. (2018). Gestión Energética. Retrieved January 29, 2018, from http://www.gensa.com.co/hist_novedades.php
- Godet, M., Durance, P., Durance, P., and Michel, P. (2007). *Prospectiva Estratégica : problemas y métodos*. Paris: Laboratoire d'Investigation Prospective et Stratégique.
- ISAGEN. (2018). ISAGEN energía productiva. Retrieved January 29, 2018, from <https://www.isagen.com.co/SitioWeb/es/nosotros/quienes-somos>
- Osuna, E. E., and Aranda, A. (2007). Combining SWOT and AHP Techniques For Strategic Planning. In *Isahp* (pp. 1–8).
- Phadermrod, B., Crowder, R. M., and Wills, G. B. (2016). Importance-Performance Analysis based SWOT analysis. *International Journal of Information Management*, 1–10. <https://doi.org/10.1016/j.ijinfomgt.2016.03.009>
- Rohrbeck, R., and Schwarz, J. O. (2013). The value contribution of strategic foresight: Insights from an empirical study of large European companies. *Technological Forecasting and Social Change*, 80(8), 1593–1606. <https://doi.org/https://doi.org/10.1016/j.techfore.2013.01.004>
- Romero-Gutierrez, M., Jimenez-Liso, M. R., and Martinez-Chico, M. (2016). SWOT analysis to evaluate the programme of a joint online/onsite master's degree in environmental education through the students' perceptions. *Evaluation and Program Planning*, 54, 41–49. <https://doi.org/10.1016/j.evalprogplan.2015.10.001>
- Slaughter, R. A. (1997). A foresight strategy for future generations. *Futures*, 29(8), 723–730. [https://doi.org/https://doi.org/10.1016/S0016-3287\(97\)00052-9](https://doi.org/https://doi.org/10.1016/S0016-3287(97)00052-9)
- Thamrin, H., and Pamungkas, E. W. (2017). A Rule Based SWOT Analysis Application: A Case Study for Indonesian Higher Education Institution. *Procedia Computer Science*, 116, 144–150. <https://doi.org/10.1016/j.procs.2017.10.056>

- Velasquez, J. D., Dyner, I., and Franco, C. J. (2016). Modeling the Effect of Macroeconomic Events on River Inflows in the Colombian Electricity Market. *IEEE Latin America Transactions*, 14(10), 4287–4292.
<https://doi.org/10.1109/TLA.2016.7786307>
- Velasquez, J. D., Gil, V., and Franco, C. J. (2015). An Overview of the Colombian Market for Standardized Derivatives of Energy Commodities. *IEEE Latin America Transactions*, 13(7), 2176–2182.
<https://doi.org/10.1109/TLA.2015.7273774>
- Whitehead, A. N. (1967). *Aims Of Education*. (U. Press, Ed.). New York: Macmillan. Retrieved from
<https://archive.org/details/AlfredNorthWhiteheadAimsOfEducation1967>