FUNDAÇÃO GETÚLIO VARGAS

ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

CHARLES DANIEL HELY MARIE LA CLAVIERE

ENTRY ON THE BRAZILIAN RENEWABLE POWER MARKET: A CASE STUDY

SÃO PAULO

2016

CHARLES DANIEL HELY MARIE LA CLAVIERE

ENTRY ON THE BRAZILIAN RENEWABLE POWER MARKET: A CASE STUDY

Tese apresentada à Escola de Administração de Empresas de São Paulo da Fundação Getulio Vargas, como requisito para obtenção do título de Mestre Profissional em Gestão Internacional (MPGI)

Campo de conhecimento:
Finanças e Estratégia

Orientador: Prof. Dr. Mario Aquino Alves

SÃO PAULO

2016

LA CLAVIERE, Charles.
Entry on the Brazilian renewable power market: A case study / Charles LA CLAVIERE. - 2016.
83 f.

Orientador: Mario Alves
Dissertação (MPGI) - Escola de Administração de Empresas de São Paulo.
1. Energia renovável - Brasil. 2. Energia – Fontes alternativas. 3. Aquecimento global. 4. Política energética. I. Alves, Mario. II. Dissertação (MPGI) - Escola de Administração de Empresas de São Paulo. III. Título.

CDU 620.91(81)

CHARLES LA CLAVIERE

ENTRY ON THE BRAZILIAN RENEWABLE POWER MARKET: A CASE STUDY

Thesis presented to Escola de Administração de Empresas de São Paulo of Fundação Getulio Vargas, as a requirement to obtain the title of Master in International Management (MPGI).

Knowledge Field: Strategy

Approval Date

27/01/2016

Committee members:

Prof. Dr. Advisor Mario Alves

Prof. Dr. Marcus Gomes

Prof. Dr. Tania Christo

“Il faut cultiver notre jardin”

Voltaire, *Candide ou l’Optimisme*, 1759

Acknowledgment

I would like to thank Professor Mario Aquino Alves from the FGV-EAESP. His kindness and patience were key assets in the preparation of this Master's thesis.

I would like to thank Ms Joisa Campanher Dutra for her availability and advice.

Ultimately I would like to thank HEC Paris and FGV-EAESP for giving me the opportunity to be part of the MPGI Program and to spend an incredibly rich year in Brazil.

ABSTRACT

International climate conferences as well as growing awareness over sustainability issues have shed light on the key role renewable energies would play in the energy transition. As opposed to fossil fuels, they can be regenerated on a short period of time and therefore are expected to be part of the solution to limit global warming. For decades, Brazil has had a strong hydroelectric sector, but it is now also a leader in all other alternative energy sources such as wind power, biomass or solar energy. These industries are promised a thriving future, thanks to the country's natural potential as well as a supportive legislation, and are attracting many local and international players. This study aims to fill a void in literature analyzing the example of a foreign firm entering on the Brazilian renewable power market. Relying on literature as a conceptual background, a single case study has been conducted to outline all the aspects of the entry process. In this development, causal relationships between strategic orientations and the evolution of the business have been identified. This research brings a contribution to the academic discussions over entry dynamics in the renewable power industry through evidences from the Brazilian market.

Keywords: Renewable energies, entry strategies, Brazil, power market

RESUMO

Conferências internacionais sobre o clima, bem como crescente conscientização sobre as questões de sustentabilidade lançaram luz sobre o papel fundamental que as energias renováveis poderiam desempenhar na transição energética. Ao contrário de combustíveis fósseis, elas podem ser regeneradas em um curto período de tempo e, por conseguinte, espera-se que sejam uma parte da solução para reduzir o aquecimento global. O Brasil sempre teve um forte setor hidrelétrico, mas agora está na vanguarda em relação a todas as outras fontes de energias alternativas, como energia eólica, biomassa o energia solar. Estas indústrias são uma promessa para um futuro próspero, graças ao potencial natural do país, bem como uma legislação de apoio, e estão atraindo muitas empresas locais e internacionais. Este estudo tem como objetivo preencher uma lacuna na literatura analisando o exemplo de uma empresa estrangeira que entra no mercado da energia renovável no Brasil. Baseando-se na literatura como um fundo conceptual, um único estudo de caso têm sido realizados para delinear todos os aspectos do processo de entrada. Neste desenvolvimento, relações causais entre as orientações estratégicas e a evolução do negócio foram identificadas. Esta pesquisa traz uma contribuição para as discussões acadêmicas sobre as dinâmicas de entrada no setor de energia renovável através de evidências do mercado brasileiro.

Palavras-chave: Energias Renováveis, estratégia, Brasil, Mercado de Energia

TABLE OF FIGURES

TABLE OF CONTENTS

1. INTRODUCTION

1.1 General introduction

Since the discovery of Brazil, both economists and historians have been amazed by the numerous cycles that have shaped the Brazilian economy. First, timber (brazilwood) at the beginning of colonization, then precious metals in the 16th and 17th centuries, and eventually coffee during the 19th century. Each of them was considered in its time as a lasting source of prosperity, but all of them came to an end for diverse reasons ranging from international competition to demand scarcity.

In the past decade, a discreet sector has been experimenting a tremendous growth in Brazil: renewable energies. One figure may help to understand the scope of this silent economic success of green energies: between 2013 and 2014 solar power capacities experienced a 122.2% growth (Empresa de Pesquisa Energética, 2015). Analyst's reports now consider Brazil as the new Eldorado for alternative energies and national and foreign companies are actively investing to position on this promising market, despite of the escalating economic crisis.

There is no doubt that with over 7000km of coastline, 12% of the world surface water resources and favorable winds, the country can boast of huge renewable power potential. To top it all Brazil energy consumption is expected to rise by 71% by 2035 (BP Energy Outlook, 2014). All these factors (power consumption growth, a renewable-friendly natural environment and a supportive legislation) are coming together to create a potentially very profitable market

As of today, the Brazilian power market is still dominated by federal and state utilities companies; still the privatization of the sector is gaining ground and a large part of the new investments are coming from private investors. Capacity expansion will take place on this market at an accelerated pace and foreign companies are expected to keep entering this market to provide both financing of new projects and technological knowledge. Many leading players in the renewable power have already set foot in Brazil and often have numerous projects in construction.

Nevertheless these foreign investors remain slightly irresolute when engaging on large projects in Brazil as they often lack medium to long term visibility on the green energies market in Brazil which remains a young market. Therefore, it seems essential to study the case of a

foreign company that has been active on this market for several years already, and also to assess the benefits derived from its Brazilian experience in order to draw insightful conclusions for both academic and professional purposes.

1.2 Personal motivations

Before entering the subject, I believe it is important to describe the motivations that have led me to pick this particular issue for my thesis. The decision to select a topic focused on renewables in Brazil has been influenced by at least three factors.

First of all, I have had a deep interest for sustainability questions and how some sectors can grow while reducing the human footprint on Earth. I believe renewables are one of the most impressive industry of our time since they are expected to help billions of men and women to live a modern life while dramatically reducing their fossil fuels use.

While writing this thesis, environmental issues were on top of the political agenda. Be it Pope Francis successful encyclical *Laudato Si* calling to more wise in our use of resources, or the crucial COP 21 conference in December 2015 which has set carbon reduction objectives that should shape our life and the life of our children. Therefore it was a very inspiring time frame to write this thesis.

Finally, I picked Brazil as the scope of this research first because it is clearly on of the most promising market for green energy with a huge untapped potential. It is also a country where I have lived for over a year and to which I keep a very deep and special relation.

1.3 Research question

My research question for this master thesis is: How do foreign companies enter the Brazilian renewable power generation market?

Renewable energies are experimenting a tremendous growth in both developed and developing countries. Brazil seems to be among the drivers of this growth as renewables are experimenting an unprecedented boom which will radically transform the country's energy matrix.

2 OBJECTIVE

The main objective is to understand how foreign firms can penetrate the Brazilian market for renewable power generation, and this implies studying the strategic aspects of this market entry and assessing the consequences on the firm's performance.

Some specific objectives shall be reached as steps towards the main objective.

- To give an understanding of the Brazilian power market in order to thoroughly grasp the challenges faced by the entering firm. National energy markets are complex realities with numerous players and strict regulations. Therefore, it is essential to give insights on this market regulation, size, stakeholders should ease comprehension of the firm's situation in Brazil.
- To enlighten the key steps of this operation and their strategic aspects for the management. Giving an overview both the history of this entry in Brazil and a description of the key directions taken by the company in the country.
- Draw up a panorama of the company's performance indicators in Brazil from several perspectives (financial, operational…).

This research and its objective seem particularly relevant in the current context of renewable energy expansion in Brazil. For decision makers in the business world, it is always precious to benefit from the experience feedback from other companies. The Brazilian energy market has not reached maturity and many managers, especially from foreign firms, remain unsure on whether to invest in this country or not. This work should allow them to better understand the sector's challenges and give them key elements for their decision making.

In an academic perspective, several parts of this topic have been explored such as market-entry strategies or green competitiveness. Nevertheless the study of renewable energy firms from a corporate strategy and market entry perspective is still quite new, and this is especially true in emerging markets such as Brazil where, though there are improvements, large voids remain to be filled in various areas of academic research.

3 LITERATURE BACKGROUND

3.1 Power market definition

3.1.1 General framework

3.1.1.1 From production to retail

To thoroughly understand this thesis, it is essential to give a detailed view of electricity as a product and as a market.

Electricity is a commodity, that is to say a good that can be bought or sold in order to satisfy a specific need. As opposed to other product or services, it has no qualitative differentiation across markets, which implies it is fungible: the essential properties of the product remain the same no matter who produces it (United Global Asset, 2015). Electricity is however a very specific type of commodity as it possesses several specific features. First of all, electricity has a global demand since every individual or economic agent across the world is likely to use electricity to a greater or lesser extent. Electricity storage is possible through options such as pumped-storage hydroelectricity or batteries, but remains costly and with very limited use. Electricity also needs to be accessible on demand as end-users will not wait to consume it. Therefore, to balance supply and demand, in most grid systems power plants need to respond to consumption spikes straight away. Finally, electricity is key to a country's development, as energy access allows for a better satisfaction of basic human needs such as healthcare and education. In the world, 1.2 billion people still do not have access to electricity and nearly 3 million are without clean cooking and heating facilities (mainly wood and charcoal) as of 2015 (United Nations Foundations, 2015). Therefore it is highly understandable that electricity is "already well established in the framework of human rights" (Tully, 2006).

Electricity is produced through the generation of electric power from primary energy sources. These can be non-renewable sources (coal, natural gas, uranium) or renewable sources (wind, solar, hydro, tidal, biomass…), and this work will focus on the latter. On the scientific level, there are several fundamental methods to generate electrical energy, mostly using a turbine which drives an electric generator.

The scope of this thesis is limited to the electricity generation sector, but for the sake of understanding, a quick run-through of the different steps between power generation and the end user is necessary. This process could be qualified as the electricity value chain.

The first step corresponds to activity of generating electricity from primary energy sources. The process is carried out by various types of facilities (dams, nuclear power plants…) whose production cost highly depend on the energy source. Still, these technologies can be sorted into two groups: conventional electricity generation, which includes thermal (production through the chemical characteristics of a fuel), and hydro (production through the energy of stored water). Non-conventional such as solar PV or windfarms rely on the energy flow. On an economic level this sector is referred to as the electricity generation industry.

After being generated electricity is transferred from plants to high voltage substations through transmission lines. This network is referred as the power grid and corresponds to the electricity transmission industry. In many countries deregulation has led to the separation of the transmission and the distribution industries. The transmission step is all the more essential as most power plants are located far away (hundreds to thousands of kilometers) from end-users locations.

Electricity distribution industry is considered the final step for power to reach end-users. Distribution substations transform the voltage of electric current coming from transmission lines to match the utilization voltage of end-users (domestic appliances for homes).

There is a fourth step in the electricity value chain which is rather a customer oriented function than an industrial process. The electricity retail industry corresponds to supply of electricity to individual customers. Until the 1990's, it was an integrated service in the electric utilities which was only in charge of connecting users and billing electricity, but since then the sector has undergone a wave of liberalization and several countries made the retail of electricity an independent market. Therefore to the connection and billing functions of retailers was added a risk management function: suppliers sell electricity at a fixed price to consumers while they purchase it on a competitive wholesale market at fluctuating price (Parkinson, 2012).

Figure 1 Electricity value chain (Associação Brasileira de Distribuidores de Energia Eléctrica, 2015)

3.1.1.2 Electricity market fundamentals

As mentioned above, electricity is vital for most human activities, ranging from the economy to basic human needs such as heating or cooking. Therefore, governments tend to keep a close eye on this strategic sector through various methods. In the vast majority of countries, the electricity market is subject to tight public regulation, with some liberalization waves in the recent years. Though power industries remain country-specific and regulation may vary a lot from country to country, there are some general trends and patterns across the globe.

In economics, a market is a place where supply and demand operate to exchange items and where prices are set and communicated (Business Dictionary, 2015). This is the case for electricity, a commodity which end users are looking to buy from production capacities. Electricity markets have very specific features (complex storage, supply should match demand at all time…) that make them necessarily designed and regulated by authorities.

The electricity market term refers in fact to two distinct market: the wholesale electricity market where power is bought from generation plants by retailers and the retail electricity market where electricity is bought from retailers by end-users. It should be noted that a recent move in some markets has taken place and now more and more large end-users are buying directly the electricity they need from generators, therefore bypassing traditional retailers and negotiating the price themselves. Our scope will have us describe only the wholesale market

as generating firms are only involved on this one. Wholesale electricity markets have two timing horizons: short term (spot market) and long term (forward market).

Transmission and distribution usually fall into the category of natural monopolies. First of all, distribution implies very high initial investments to cover the whole territory with substations and transformers. Therefore, once these infrastructures are built, the marginal cost of every new customer to connect to the grid is very low and competition hard to achieve. Regarding transmission lines, it would also be an economic nonsense to try to create competition as it would mean replicating expensive high voltage transmission lines on the same route. Therefore, these two activities often have remained highly regulated. Nevertheless, their framework changed as generating activities were liberalized. In several countries, transmission and distribution now follow a new scheme called Performance Based Regulation (PBR) which replicates some competitive markets incentives (such as price caps on given costs) to these sectors to have them improve service while limiting expenses (Mandel, 2014).

True wholesale market only exists when the electricity sector has been at least partly deregulated (as it was the case for Brazil, cf infra.). Since electricity generation and retail have been considered for a long time a natural monopoly operated by large integrated utilities, for nearly a century there was no such thing as a competitive wholesale electricity market. Continued improvements in transmission technology across the 20th century and the development of a grid system have enabled remote electricity trading and the *deintegration* of utilities (unbundling of the product and services provided by utilities). In the 1990's, a deregulation trend boosted reform programs that have changed the story in numerous countries transforming generation monopolies into deregulated wholesale power markets (Soft, 2002).

Generating activities are not generally considered a natural monopoly and during the last 30 years broad movements of ideas have supported free competition on this segment. Historically, electricity has been a vertically integrated industry as utility companies managed the entire production process, from generation to distribution. Electricity firms were either state owned or privately owned and regulated as natural monopolies. Pressure came from economists supporting deregulation concepts such as the Chicago School of Economics; for them it made no sense to vertically integrate generating activities in the system as they were not a natural monopoly and competition could take place. Regulated monopolies in this sector were accused of several flaws such as "high operating costs, construction cost overruns on new facilities, high retail prices, and falling costs of production from new facilities [...] driven by the

development of more efficient generating technologies" (Joskow, 2008). Deregulated generators were therefore expected to provide increased efficiency, improved service and reduced costs as they were to offer their production close to marginal cost to face competition (Posner, 2015). The history of liberalization of the electricity industry started in South America, with Chile in 1987 being the first country to launch the deregulation wave. Then followed just after England, Wales and several developed countries, including the US with the 1992 Energy Policy Act (Fares, 2014). The key idea of this movement was the dismantling of historic vertically integrated electricity companies in order to separate generating activities from transmission, distribution and retail sale. This marked the birth of large centralized wholesale electricity markets where generators sale their electricity to other parties. The general framework on these markets is that generation companies bid every day for the volume and price of electricity production they are willing to offer and a regulation agency is responsible for efficiently dispatching next day production across power plants through complex algorithms. This way only plants with the lowest marginal cost structure will be used to match the forecasted demand on the next day, thus optimizing resource allocation. In the end, this new institutional framework was expected to provide long term benefits to end users: they would pay a price closer to the efficient cost of their electricity supply and experience a better service thanks to competition. On a sector level, innovation was expected to be fostered and generating capacity expansion incentivized as private suppliers would compete on the market (Joskow, 2008).

Deregulation experiences in the generation sector are now mature enough to offer scholars a sufficient hindsight to draw some lessons. Several key electricity markets have faced deregulation with mixed outcomes. England and Wales have thus experienced important benefits from their electricity market restructuring, and these benefits have been estimated comparing with what would have happened if the electricity system had continued unreformed. Using this comparative scenario, large efficiency gains as well as improved availability have been observed in generating companies operations after the reform (Newbery and Pollitt, 1997). Argentina also highly improved its electricity sector performance thanks the introduction of a new legal framework in 1991 (a severe crisis took place the end of the 1980s due to lack of maintenance). The whole sector was deregulated and vertically integrated utilities were separated to introduce competition, and the country quickly experienced increasing investments in the generating activity, higher efficiency and smaller waste of energy (Pollitt, 2004). California was conversely a case in point of electricity market liberalization

failure. Though this state followed some the basic features of typical electricity market deregulation (unbundling of vertically integrated utilities, introduction of competition…), things did not go as planned and the reform turned into a nightmare for the end users. In 2000, California restructured the sector and rapidly experienced a major crisis: several black-outs, insufficient capacity and price spikes. Several causes can explain this failure, but the most significant were the poor market design by authorities which allowed high market power from players and the lack of incentives to build new capacities as demand was growing (Sweeney, 2002).

Most of the issues experienced on these markets are tightly linked to the incomplete reform of their national electricity markets. A complete electricity framework reshape should take into account all the recommendations of what Joskow (2008) called the "textbook model" : "privatization of state-owned enterprises, vertical and horizontal restructuring to facilitate competition […], PBR regulation applied to the regulated transmission and distribution segments, good wholesale market designs that facilitate efficient competition among existing generators, competitive entry of new generators, and retail competition, at least for industrial customers.". In the different countries mentioned above, where energy crises took place in the 1990's or early 2000's, one or several of these elements were too often missing be it by insufficient political commitment or pressure from lobbies that benefit from an uncompetitive energy market.

It is important to mention this story of deregulation and the birth of a free wholesale market in the light of this thesis subject. Indeed, this political will to liberalize the electricity market has enabled the renewable energy players to expand and grow beyond their national borders.

3.1.2 Power in Brazil

3.1.2.1 Regulation model evolution

In 1879, Emperor Dom Pedro II granted Thomas Edison the privilege of introducing the use of electric technology in Brazil. The first electricity powered permanent public lightning was inaugurated in what is now Central do Brasil station in Rio de Janeiro. Historical records points Campos (state of Rio de Janeiro) as the first Brazilian city to have access to electricity services. In 1883, Campos 52 kW thermoelectric generation plant was inaugurated by Dom Pedro II (Ministério de Minas e Energia, 2015).

From then on, the electricity sector in Brazil experienced a steady development with some landmarks to this expansion such as the creation of Elétricas Brasileiras (Eletrobras) in 1962 (Centro da Memória da Eletricidade no Brasil, 2015).

Until the 1990's, the Brazilian electric sector remained highly government-controlled with a traditional structure of vertically integrated utilities. Eletrobrás, at the federal level, and various state operators were in charge of generation, transmission and distribution of electricity countrywide (Vagliasindi & Besant-Jones, 2013). This system was in line with the traditional model of vertically integrated electric utilities that were prominent at that time.

The transformation of the power sector stemmed from the constitution reform of 1988 which authorized investment from private entities in infrastructure and defined a legal scheme. It was further pursued by the Lei N°9074 in 1995 which laid the basis for the *deintegration* of the sector with the production process being unbundled. Along with laws passed later on, it designed new institutions in charge of the regulation of the new power market structure.

After the reforms, Eletrobrás generation activities were split in a dozen of generation companies which were mostly privatized. The first one was Gerasul in 1998 bought by Suez (now ENGIE), followed notably by Eletropaulo bought by Lightgás. The concepts of Independent Power Producer and of Free consumer (entities that could bypass regulation and enter in bilateral trade) were created, and competition was also introduced in the areas of generation and commercialization (Larrea, 2006).

Still, these reforms did not produce sufficient effect to boost investments. Power capacity could not keep pace with demand growth: between 1990 and 1999, capacity increased by 28% while demand rose by 45% (Larrea, 2006).

This situation, together with the dramatic droughts of 2001 and 2002, was the main cause of the *apagão* crisis where several shortages were experienced in Brazil. Right after the crisis, the Comite de Revitalização do Modelo do Setor Elétrico designed a set of propositions to improve the structure of the sector for the future (Larrea, 2006).

After these events, a new set of reforms was implemented from 2002 called the "new model". Its main features were an emphasis on long term contracts to secure additional capacities, improvement of the regulatory framework and implementation energy auctions to fully cover electricity needs.

As of today the Brazilian market is regulated by several main institutions created by the first and second sets of reforms. The first wave of reforms (between 1995 and 1998) gave birth to four main entities.

- The Agência Nacional de Energia Elétrica (ANEEL – Lei N° 9427), which regulates all the electricity value chain (generation, transmission, distribution and commercialization.

- The Conselho Nacional de Politica Energética (CNPE – Lei N° 9427), which is responsible for suggesting national energy policies

- The Operador Nacional do Sistema Elétrico (ONS – Lei N° 9648), which controls generation and transmission activities in their use of the power system

- The Mercado Atacadista de Energia Elétrica (MAE – Lei N° 9648), which organizes wholesale electricity trade.

The second wave of market reforms referred to as the new model gave rise to:

- The Empresa de Pesquisa Energética (EPE – Lei N° 10.847), which makes projections on the energy market to support both the ANEEL and the goverment in their decision making
- The Comitê de Monitoramento do Setor Elétrico (CMSE – Lei N° 10.848), which is responsible for the control of the quality of service

- The Câmara de Comercialização de Energia Elétrica (CCEE - Lei N° 10.848), which replaced the Mercado Atacadista de Energia Elétrica and is responsible for electrcity commercialization (Vagliasindi & Besant-Jones, 2013).

Two distinct markets stemmed from these reforms:

- The Mercado de contratação regulada (Regulated contracting market), where distributors must make sure to contract sufficient new electricity to cover their future needs. It includes power producers, distributors and electricity traders. MCR represents 70% of the electric generation in Brazil (Costa, 2009).
- The Mercado de contratação livre (Free Contracting market), where agents can negotiate freely the terms of their electricity contracts and are not subject to price regulations. It includes large consumers (mainly companies), independent power producers and electricity traders (sell energy to free consumers and distribution companies). It accounts for 30% of the electric generation in Brazil (Costa, 2009).

Once agents have selected their market framework, they purchase the electricity at a spot price which is calculated by the CCEE (Câmara de Comercialização de Energia Elétrica).

Regarding generating plants, authorizations for new capacities are organized for renewables through contract auctions since 2004. The government organizes energy auctions to procure for additional electric generation capacities ; then power generators have to bid with the electricity price they are willing to enter the contract and the ones with the most competitive offer win the bid. This new model has been very effective to foster the development of new capacities as it was “offering long-term contracts (that ease project financing), fostering competition, and providing a transparent and objective selection criterion” (International Association for Energy Economics, 2012). The government also holds exclusive auctions to renewables which have been very successful to promote green energies in the country. Between 2005 and 2012, 62 GW of new capacity has been contracted for US$ 300bn (US$ 70/ MW on average), including 60% of renewable - 40% of large hydro and 20% of other alternative renewables (PwC, 2013).

3.1.2.2 Electricity mix in Brazil

Brazil is the largest electricity market among South American countries (Larrea, 2006). In 2014, according to the Empresa de Pesquisa Energética (EPE) electricity generation installed capacity reached 133 914 MW (a 5.7% increase from 2013).

Installed capacity grew tremendously in Brazil since the beginning of the 20th century, keeping pace with the country's growth both demographically and economically. According to the Ministério de Minas e Energia, in 2014 installed capacity in MW has been multiplied by more than 100 since the 1940's and by more than 10 since the 1970's.

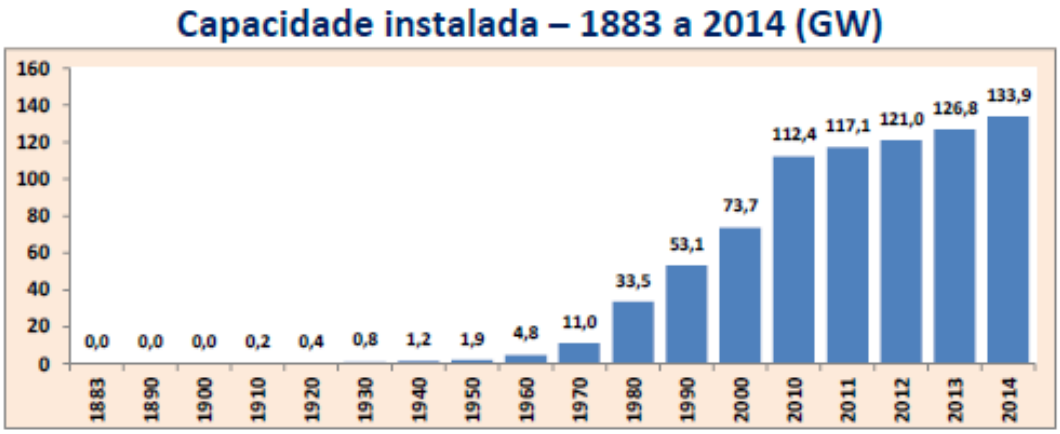


Figure 2 Installed capacity in Brazil from 1883 to 2014 in GW (Ministério de Minas e Energia, 2015)

When looking at the historical distribution of this electricity generation capacity it is very interesting to note that since the beginning both hydro and thermoelectric generating facilities have played key role. As stated above, Brazil's first generation plant was a thermoelectric facility (inaugurated in Campos in 1883). Nevertheless, the first hydroelectric plant was built only 6 years later, in 1889, in the city of Juiz de Fora (Minas Gerais). Already in 1900, Brazil's electric generation capacity relied more on hydraulic plants (5300 kW) than thermic plants (5100 kW).

Since then, hydraulic power generation has always been prominent in the Brazilian energy landscape and, this is clearly noticeable when looking at electricity mix data: hydro installed capacities have always remained between 87% and 67% of the total since 1970 in Brazil (Ministério de Minas e Energia, 2015).

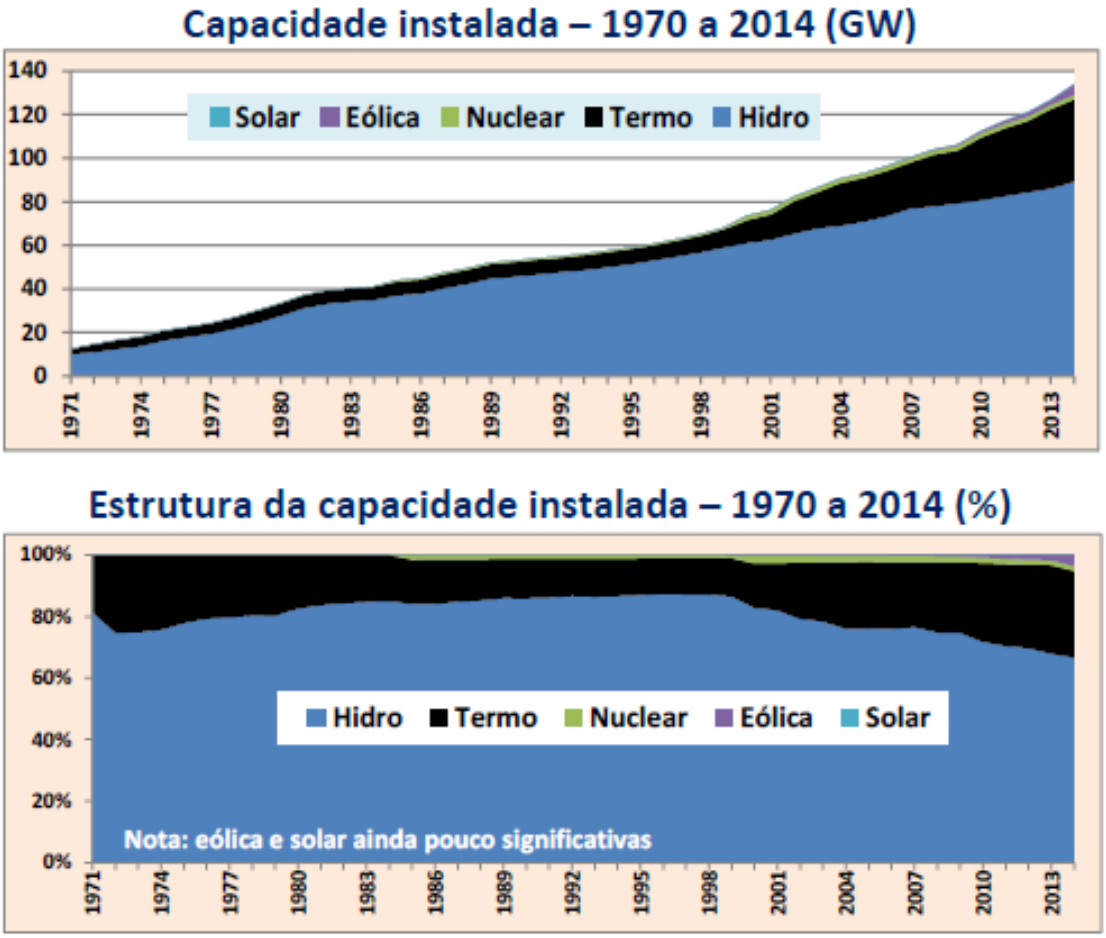


Figure 3 Installed capacity evolution and distribution of the generating complex

(Ministério de Minas e Energia, 2015)

Though hydropower largely dominates the Brazilian power landscape, its share is shrinking in favour of other sources wheter traditional (thermal) or alternative (wind and solar).

- **Hydropower** is the main electricity generation source in terms of installed capacity. In 2014, according to the Empresa de Pesquisa Energética, hydroelectric power capacities reached 89 195 MW (a 3.7% increase compared to 2013) which accounted for 66.6% of the country's generation capacities in 2014. Hydropower has always been a strategic source for Brazil given its huge potential, and the country is the world second-largest hydroelectric power generator in the world (after China) and the third in terms of hydro potential (after Russia and China) with plenty of untapped capacity. As mentioned above hydro has been dominant in Brazil since the early 20th century, but the real take off of this energy source took place during the military dictatorship (1964 – 1985).

This period witnessed the construction of some of the world largest dams such as Tucuruí (8370 MW) and Itaipu (14 000 MW - shared with Paraguay). In 2015, Brazil had 158 hydro plants operating, 9 plants being built and another 26 projects cleared for construction (Duran, 2015). Dam building remains a sensitive issue in Brazil due to the social and environmental impact of their construction, as exemplified by the strong protests related to the Belo Monte dam construction in Amazonas (Le Monde, 2015). Two other issues are associated with dams in Brazil. First regarding geography, most of the hydro potential of Brazil is concentrated in the North of the country (especially the Amazon river basin) while most of the demand come from the industrialized cities of the South and South East. Then, dry periods have become critical in recent years, as insufficient reservoir levels have triggered temporary shutdowns of hydro plants (International Hydropower Association, 2015).

Though hydro is the top generating source in Brazil, its share has kept declining since 1996 when it represented 87.4% of the country's installed capacity (Ministério de Minas e Energia, 2015). Record droughts in Brazil since the 2000's and increasing environmental concerns about dams construction have led authorities to diversify the electricity matrix, increasing the share of non-hydro resources, in particular thermal facilities (Deloitte, 2010).

Top ten largest Brazilian Hydro powerplants (in operation)				
Position	Name	River	State	Capacity (GW)
1	Tucuruí I e II	Tocantins	Pará	8.54
2	Itaipu (Parte Brasileira)	Paraná	Paraná	7.00
3	Ilha Solteira	Paraná	São Paulo	3.44
4	Xingó	São Francisco	Sergipe	3.16
5	Paulo Afonso IV	São Francisco	Alagoas	2.46
6	Santo Antônio	Madeira	Rondônia	2.29
7	Itumbiara	Paranaíba	Minas Gerais	2.08
8	São Simão	Paranaíba	Minas Gerais	1.71
9	Gov. Bento Munhoz R.N.	Iguaçu	Paraná	1.68
10	Eng° Souza Dias (Jupiá)	Paraná	São Paulo	1.55
	Brazil			**89.19**

Figure 4 Hydro plants ranking by capacity (Ministério de Minas e Energia, 2015

- **Thermal power** is the second electricity generation source in Brazil in terms of capacity with 37 824 MW in 2014 (a 3.6% growth compared with 2013), and it

represents 28.2% of the country's generating capacities. Thermal generation encompasses several sources in Brazil, including gas, oil, coal and biomass. The first source of thermal generation in Brazil is natural gas. In 2014, natural gas power facilities had a total capacity of 12.6 GW (representing 33% of thermal generation in Brazil); then comes biomass generation facilities which are mostly using bagasse (what remains after sugarcanes are crushed to extract juice) with over 81% of the biomass production using this fuel. With a total capacity of 12.3 GW, biomass represented 32% of Brazil thermal generation. Ultimately, oil (7.9 GW) and coal (3.4 GW) are the last main sources of thermal generation, representing respectively 21% and 9% of the country's thermal generation.

As mentioned above, thermal plants generation is on the rise as it benefits from the diversification strategy of Brazilian authorities that want to shift from the hydro centered model. From 1996 to 2014, thermal generation capacities increased from 7.0 GW representing 11.6% of the electricity mix) to 37.8 GW representing 28.2% (Dassie, 2011 and Ministério de Minas e Energia, 2015).

Top ten largest Brazilian thermal powerplants (in operation)				
Position	Name	Type	State	Capacity (GW)
1	Governador Leonel Brizola	Natural gas	Rio de Janeiro	1.06
2	Mário Lago	Natural gas	Rio de Janeiro	0.92
3	Norte Fluminense	Natural gas	Rio de Janeiro	0.87
4	Santa Cruz	Natural gas	Rio de Janeiro	0.84
5	Porto do Pecém	Coal	Ceará	0.72
6	Uruguaiana	Natural gas	Rio Grande do Sul	0.64
7	Fernando Gasparian	Natural gas	São Paulo	0.58
8	Mauá	Oil	Amazonas	0.55
9	Termopernambuco	Natural gas	Pernambuco	0.53
10	Cuiabá	Natural gas	Mato Grosso	0.53
	Brazil			**37.8**

Figure 5 Thermal plants ranking by capacity (Ministério de Minas e Energia, 2015

- **Nuclear energy** is the smallest electricity generation source in Brazil with less than 2 GW of installed capacity in 2014. There is only one nuclear power plant in Brazil whith two

active reactors, located in Angra dos Reis (Rio de Janeiro). They have been built in 1985 and 2000 and are both operated by Eletronuclear (an Eletrobras entity). A third reactor (Angra III) in under construction but it should not enter into service before 2018 (Valor, 2014).

Largest Brazilian Nuclear powerplants (in operation)			
Position	Name	State	Capacity (GW)
1	Angra II	Rio de Janeiro	0.88
2	Angra I	Rio de Janeiro	0.89
	Brazil		**1.99**

Figure 6 Nuclear plants ranking by capacity (Ministério de Minas e Energia, 2015)

- **Renewable energy** is the third largest source of power generation in Brazil. As Biomass was already mentioned, renewables in this paragraph shall only refer to the two main sources of green energy: solar and wind power. In 2014, they represented an installed capacity of 4.9 GW. Wind energy in Brazil is booming, and the wind farm total capacity almost doubled in 2014, from 2686 MW to 4888 MW (EPE, 2015). Most of the wind energy is generated in the North and North East (with the exception of Rio Grande do Sul), where the winds are the strongest. According to Portal Brasil, in 2015, Rio Grande do Norte has the largest installed capacity (2243 MW), then comes Ceará (1233 MW), Rio Grande do Sul (1300 MW) and Bahia (959 MW).

Top ten largest Brazilian wind farms (in operation)			
Position	Name	State	Capacity (GW)
1	Praia Formosa	Rio de Janeiro	0.11
2	Alegria II	Rio de Janeiro	0.10
3	Parque Eólico Elebrás Cidreira 1	Rio de Janeiro	0.07
4	Miassaba 3	Rio de Janeiro	0.07
5	Rei dos Ventos 3	Ceará	0.06
6	Canoa Quebrada	Rio Grande do Sul	0.06
7	Rei dos Ventos 1	São Paulo	0.06
8	Eólica Icaraizinho	Amazonas	0.06
9	Alegria I	Pernambuco	0.05
10	Parque Eólico de Osório	Mato Grosso	0.05
	Brazil		**4.89**

Figure 7 Wind farms ranking by capacity (Ministério de Minas e Energia, 2015)

- **Solar energy which**, even though it is growing rapidly, remains marginal in Brazil. In 2014, installed capacity of electricity generation from solar sources reached 15 MW (compared to 5 MW in 2013).

Several other sources of renewable energy are in trial in Brazil such as tidal power, but none of them have yet reached a large generation scale.

3.1.2.3 Energy policy

Brazil's electricity demand is expected to rise by 80% in 2035 (BP Energy Outlook, 2014) and therefore new generation capacities will have to be installed every year at a steady pace. Alternative energies such as wind and solar power are particularly well designed to meet these fast-growing power needs. For instance, in Brazil, solar plants can be built in less than a year (Spatuzza, 2015) as opposed to several years for a large dam.

On the long run, economic growth is the key driver to electricity demand. Indeed, there is a strong positive correlation between Gross Domestic Product and electricity demand, as more economic activity needs more electricity. When GDP per capita increases, energy demand is also expected to grow as households will increase their electricity consumption improving their comfort and using new appliances (OME, 2007).

In Brazil, the Empresa de Pesquisa Energética is in charge of planning the evolution of the energy demand in order to support government decisions in this area. According to their last report (Plano Decenal de Energia 2024), GDP is expected to grow by 38% between 2015 and 2024, representing a 3.2% compound annual growth rate. GDP per capita is also expected to rise by 30% by 2024 while the Brazilian population will grow from 205.3m to 217.8m (+6%). These figures have been taken into account by EPE's calculations in order to forecast the country's need for generation capacity. Between 2015 and 2024, 74 099 MW should be added to meet the Brazil's energy demand. This increased capacity should be distributed as follows:

- 27 183 MW increase in hydroelectric capacities
- 10 546 MW increase in thermoelectric capacities
- 34 965 MW increase in renewables (wind, biomass, solar and PCH – small hydro)

- 1 405 MW increase in nuclear energy

These numbers clearly show that a large shift is anticipated in the Brazilian energy matrix as traditional energies' share will dwindle. Hydro, which represented 67.6% of the matrix in 2014, is expected to account for 56.7% in 2024 and thermoelectricity should be reduced from 14.8% to 14.3%. Alternative energies are expected to boom, and in 2024 wind is expected to represent 11.6% of the electricity distribution (vs 3.7% in 2014), solar 3.3% (vs less than 1% in 2014) and biomass 8.7% (vs 8.3% in 2015).

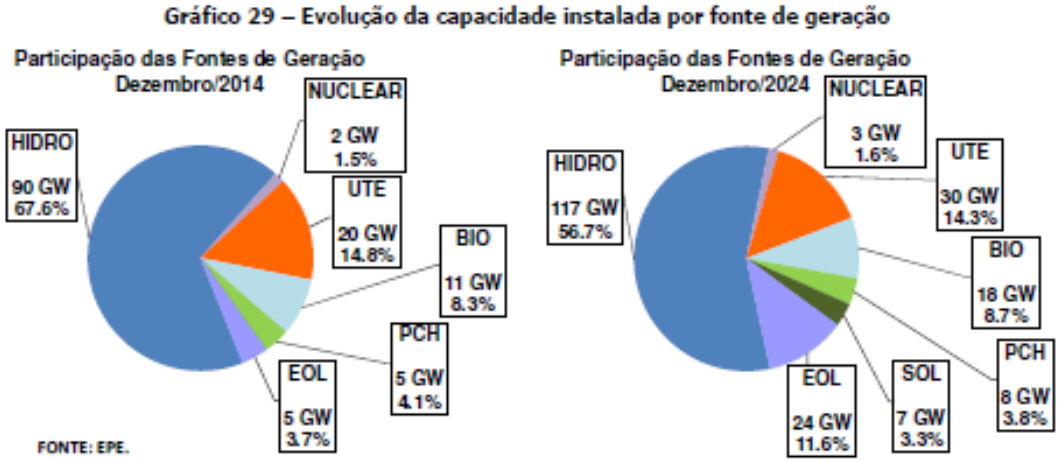


Figure 8 Distribution of electric generation installed capacities between 2015 and 2024 (EPE, 2015)

Renewables will account for a large share of new capacities installed between 2015 and 2024. By then, an additional 19 GW of wind power, 6 GW of solar and 7 GW of biomass are expected to be built. This shift will make Brazil a lasting land of opportunities for power producers looking to invest in renewable electricity generation.

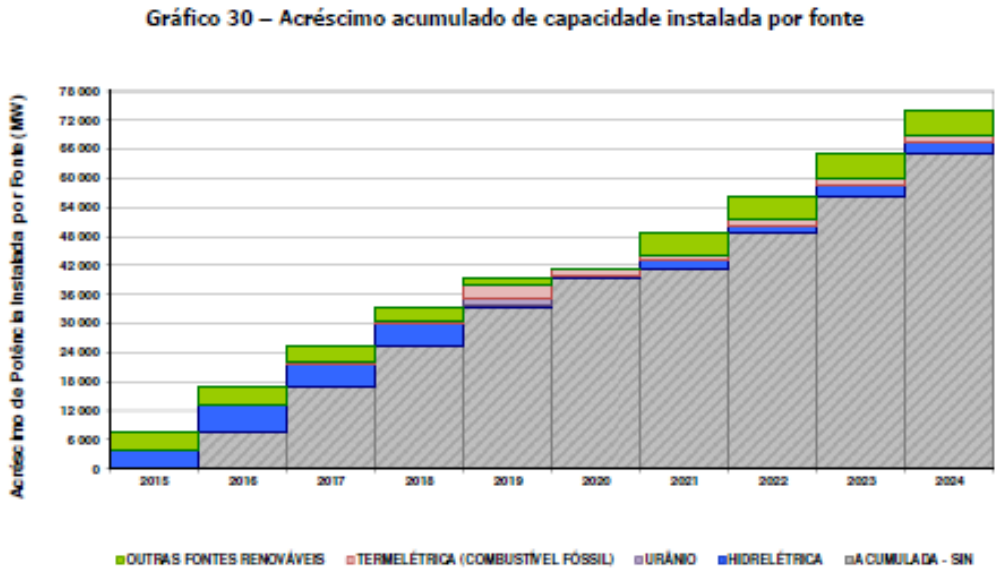


Figure 9 Electricity generation capacity increase by source between 2015 and 2024 in MW (EPE, 2015)

3.2 Renewable energies fundamentals

3.2.1 General aspects

Renewables are usually defined as energy sources that are replenished by nature on a human timescale, deriving from the sun or from other natural movements of the environment (Ellabban, Abu-Rub and Blaabjerg, 2014).

The International Energy Agency expects renewables to account for 37% of the world electric power generation in 2040 vs 21% in 2012 (IEA, 2014).

3.2.2 Hydro power

Hydro power gathers all electricity production from hydraulic sources. The main principle is to "use the force of water created by a head of water (artificial dam or natural waterfall) to drive a turbine connected to an electric generator" (Observ'ER 2013). Hydro power is by far the most widespread source for renewable power generation in the world. It is still rapidly

growing as in emerging countries massive hydroelectric power potential remains untapped. According to the International Energy Agency, hydropower accounted for 16.5% of the world electric generation in 2013 (IEA, 2014).

In Brazil, there is a sub type in hydro power generation which is called PCH. It corresponds to Pequena Central Hidrelétrica and refers a generation plant with a capacity between 3 MW and 30 MW according to the ANEEL.

3.2.3 Wind power

Wind energy captures the power of air flows through wind turbines in order to produce electricity. It has earned its status as the second most widespread source of non-fossil electric generation in the world. Wind power has a very high growth prospect, as onshore wind farms costs have shrunk by 30% between 2000 and 2012 (Investir, 2015). Wind energy only accounts for 2.3% of the world electricity generation but installed capacities are expected to triple by 2020 (IEA, 2014).

3.2.4 Biomass

Biomass energy is obtained by the combustion of biological material. It is divided into four categories: solid biomass, biogas, solid renewable municipal waste and liquid biomass. It represents three-quarters of the global renewable energy output but only 1.4% of total electricity generation in 2012, as most of it is used for other purposes such as transport biofuels (Observ'ER, 2013). Nevertheless, it remains a promising renewable electricity generation source in many countries.

3.2.5 Solar power

Two technologies compete at providing electricity through the conversion of sunlight. First photovoltaic module technology (PV) that generates electrical current by the contact of light with some semi-conductors. The other one is solar thermal plants (Concentrating Solar Power

- CSP) which concentrates sun rays to obtain high temperatures in order to produce electricity through water vapor (Observ'ER 2013). Most of the installed capacities are on-grid but many off-grid applications are rising too (for remote areas for instance). Both technologies account for 0.5% of the world electric generation mix (Observ'ER 2013).

3.2.6 Others

Renewables gather a wide array of power sources. Many of them have a promising future but have not yet reached a widespread diffusion, usually because the technology is not fully operational. Among these can be found tidal power, wave power and geothermal power (some are already at an operational stage but still marginally developed in Latin America).

3.3 Sustainability in Brazil

3.3.1 Greenhouse gases targets

In December 2009, Brazil adopted Law 12.187 which established the country's National Climate Change Policy (NCCP) and defined a voluntary GHG reduction target between 36.1% and 38.9% by 2020 relative to Business As Usual (6 to 10% relative to its 2005 levels). This would later be confirmed by the country's pledge at the Copenhagen summit in 2010. Though the bulk of emissions mitigation will be achieved by deforestation reduction, the country has also set ambitious targets for the energy sector. Both energy efficiency measures and increased renewable power generation are expected to help the country curb its GHG emissions (Energy Defend Fund, 2013). According to the Observatório do Clima, emissions linked to the production and consumption of energy represented 30.2% of Brazil total GHG emissions in 2013 (Sistema de Estimativa de Emissões de Gases de Efeito Estufa, 2013). Therefore the expansion of renewable energies in the country is expected to go along the country's goal to curb pollution.

3.3.2 International commitments

For the COP21 climate conference held in December 2015, Brazil already described its commitments. The country aims at reducing its greenhouse gases emission by 37% in 2025 (compared to 2005 historical level). The country eventually targets a 43% reduction in 2030 (compared with 2005).

Three actions will be taken to reach this goal. First, the development of investments in low-carbon agriculture, then through the end of illegal deforestation in the country and the restauration and reforesting of deteriorated land, and finally by increasing the share of renewables in the energy matrix. Brazil's commitment specifies at least a 23% increase in the use of non-hydro renewables for electricity generation (solar, wind, biomass…). The development of renewable is a strategic priority for the Brazilian government in order to contribute to the mitigation of global warming (Valor, 2015).

3.3.3 Green energies development capability

3.3.3.1 Natural potential

Brazil has a promising future for alternative energy with untapped potential for most green energies. For hydropower, the total estimated current potential reaches 260GW (von Sperling, 2012) with only 86GW of installed capacity (Ministério de Minas e Energia & EPE). Wind power potential is even higher with over 300GW (Brazil Windpower, 2015) but only 6,3GW of installed capacity (Associação Brasileira de Energia Eólica, 2015). Solar potential also remains largely untapped as solar installed capacity is still marginal (Spatuzza, 2015).

Not only does the country boast an extraordinary future for renewable, it also has a great complementarity between green energies. Most of the country's hydroelectric generation is based on hydropower which slowdowns its electricity generation during the drought season, while other energies can work a full power during this season such as wind (Amarante, O *et al.*, 2001) and biomass (Khatiwada, D. *et al.*, 2012).

3.3.3.2 Renewable energy social support

Over 70% of the electricity in Brazil is already generated through renewable sources and the country has set ambitious goals to further develop green energies. Nevertheless, as Brazil is a democracy, any further shift in the energy matrix and the development of renewables will need the support of the public opinion.

First, regarding climate change, it is striking to see that Brazilians tend to be really concerned. In a 2015 poll by the Pew research center, 75% declared to be very concerned about global climate change, which is more than Argentina (57%) or Chile (62%). This figures should mean that further actions against global warming should be understood by Brazilians.

Renewable energy support also seems to be quite strong among Brazilian population. According to a 2015 poll from DataSenado in partnership with Columbia University. 85% of the respondents agreed that Brazil should invest more in renewables (wind and solar) even though they are more expensive. For 68% of them energy companies should be required to invest in renewable energies even if it drives up their electricity bill. This poll confirmed the concerns of Brazilians about the environment as 86% declared to be very worried about climate change and 88% very worried about pollution (Portal PCH, 2015).

These figures tend to demonstrate that strong public support can be expected in the development of renewables in Brazil.

3.4 Corporate growth strategies

3.4.1 Foundings of corporate growth

The common thread of this thesis is to understand how a foreign firm can enter the Brazilian renewable energy market and to give a better perspective on this topic, it is essential to go back to the core theories of corporate growth strategies.

Business growth is a particular trend in which there is an increase in the activity. In the *Theory of the Growth of the Firm* (1959), Edith Penrose offered a very relevant definition of corporate growth as "the continual extension of the range and nature of the activities of an organization".

Expanding business is a key objective for every management team which has to maximize shareholder value (i.e. increase share price and / or dividends). Shareholders are looking for maximum returns from the shares they own and therefore will support managers that will improve the firm's performance using appropriate growth strategies. Strategies that maximize shareholder value center on targeting growth opportunities (Doyle, 2000).

Corporate growth for a firm can be defined as "a situation where an organization raises the level of its objectives from what it had achieved in its immediate past in terms of its market share, sales revenue…" (Talloo, 2007). Therefore, any firm looking to improve its past performance, be it by launching a new product or expanding to a new market, is undertaking corporate growth initiatives.

This way, it is rational for managers to act, with the support of shareholders, towards growth initiatives that expand the business.

However, beyond the maximization of shareholder value, scholars have highlighted several other strategic incentives for companies to grow.

The transaction cost framework can give a relevant key of understanding. It was first introduced by Commons (1931) and then further developed by Coase (1960) and Williamson (1989). The main idea is that any exchange on a market has a cost which may include the information costs, bargaining costs or contracts enforcing costs. In a firm internationalization perspective these costs can be analyzed as an incentive for a firm to expand. The transaction costs for the transfer of products and services on a given market might be expensive therefore encouraging the

growth of the firm (even across borders) in order to internalize such transactions (Kogut & Singh, 1988).

3.4.2 Corporate growth strategies

Most scholars distinguish two types of growth: internal and external growth, each of them carrying benefits and drawbacks.

First, internal growth is the most traditional form of expansion for a firm. The company is going to invest through its internal channels to expand its activity. It can happen through diversification with the launch of a new product or service (using research and development to innovate for instance), or another option is to increase the customer base. This can be achieved through the entry on new markets with geographic expansion or simply by increasing the revenue from each customer (Söllner, 2009). According to McGrath (2006), who empirically tested the number of firms growing internally, this type of expansion is a minority. Among the 931 companies tested (583 US firms and 348 non-US), internal growth only accounted for 6% of their corporate growth.

External growth corresponds to an expansion through the acquisition (or merger) of another company's resources and capabilities. This strategy provides the same outcomes as the internal growth: diversification of the product or service or expansion of the customer base. An acquisition gives rise to one larger company (one of the company being absorbed after the purchase) whereas a merger implies a combination of two firms resource to form a new entity. External growth allows the company to scale up its operations adding new resources to the firm in a situation where growth forecast are positive (Andrade & Stafford, 2004).

When it comes to choosing one type of growth, several factors are to be taken into account. First, regarding time horizon, external growth is more rapid as the company can benefit from the target firms assets immediately and does not have to go through an investment scheme to build new capacities. Therefore, cash flow will be generated much more rapidly in an external growth situation (Margsiri, Mello & Ruckles, 2006). Regarding cost it is hard to mention a rule as it depends on each situation and the ability for a company to negotiate a purchase price that is competitive in relation to the internal growth option. When entering a new market, external

growth is often interesting as there is no need to capture business from competitors. It also allows to overcome some entry barriers (legal, cultural, regarding intellectual property).

For many energy firms in the renewable industry this expansion strategy has been a two-step move. First there has been a diversification initiative to shift from a traditional energies centered model (oil & gas, coal, nuclear...) in order to add renewable energies to their portfolio. This evolution has been guided first by business considerations. Most large energy multinationals have seen in the development of renewable energies (often financially supported by governments) an attractive business option. Then to maximize the benefits of this diversification and to increase their performance they started to enter new markets. For instance, China itself aims to reach a 15% share of renewables in its energy mix by 2020 for which the government is willing to invest more than $200 billion US (Escobar & Vredenburg, 2010), representing a strong incentive for companies to both diversify into renewables and enter developing markets.

3.4.3 Sustainable initiatives to corporate growth

Though for decades, most leaders believed that there was an opposition between competitiveness and ecology, recent trends in the economy show this is not so radical.

Pollution is too often considered as a lesser evil to accept in a trade-off between economic considerations and sustainable objectives. Several research tend to prove wrong this assumption, considering that polluting substances rejected in the environment are rather a sign of inefficiency. When looking at the production process of several companies, it turns out that several byproducts or waste are considered as lost and consequently discarded. Managers too often fail to take into account the opportunity cost of these wastes while they could improve their productivity. This new model aims to “frame environmental improvements in terms of resource productivity” (Porter & van der Linde, 1995). Rethinking the way firms consider waste is often a winning strategy, allowing both to improve performance while reducing environmental impact. A very relevant example of this strategy would be the use of bagasse to produce energy in several southern countries, especially in Brazil. Bagasse is by-product of sugarcane which can be burned to produce electricity in the context of biomass power generation.

The idea that corporate performance and green strategies can go along has been widely developed by Renato Orsato (2006). He developed a diagram which encompasses the four types of green competitiveness strategies a firm may choose.

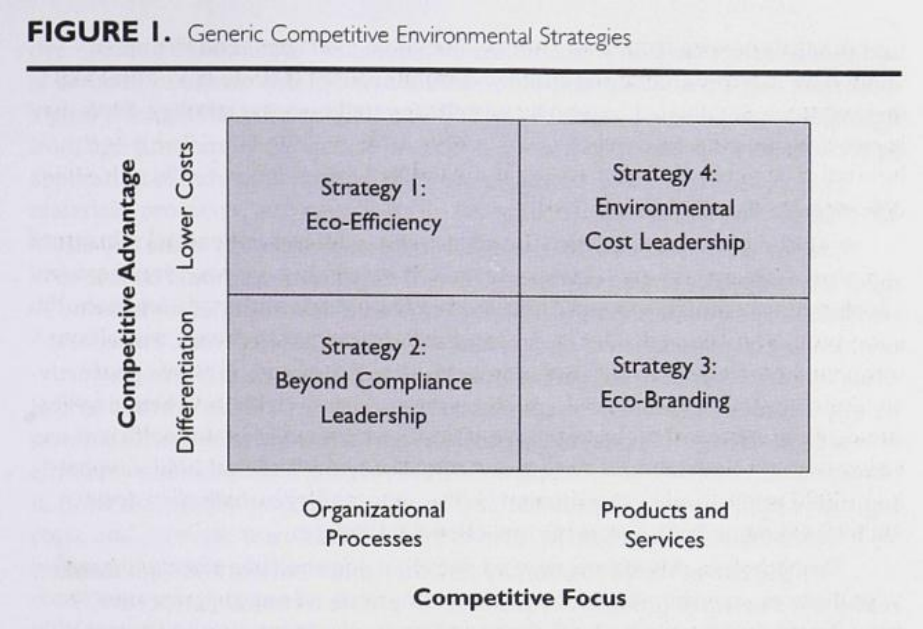


Figure 10 Green competitiveness strategies chart (Orsato, 2006)

The first is Eco-efficiency where firms look for concealed opportunities of investment in their production process which would allow them to increase efficiency while reducing their costs (especially environmental cost such as waste). Beyond Compliance Leadership refers to firms that make green efforts beyond required rules and try to show them to the public. Eco branding corresponds to creating ecology-oriented products and sell them at a higher price to consumers willing to pay this premium. Finally, Environmental Cost Leadership is a strategy designed for market with high competition on prices and low differentiation. In this context firms may try to focus on radical innovation regarding their product in order to both disturb the market and reduce their ecological footprint.

As mentioned above combining ecological ambitions with corporate growth strategies is everything but incompatible and many options are available for firms willing to engage on this path.

3.5 Business internationalization

When implementing a corporate growth strategy, internalization is a very common option for a company to expand. Internationalization may refer to several strategic options for a firm such as: direct exports, franchising licensing and foreign direct investments as green-field, acquisition or alliances (Peng, 2009). This part will only focus on the latter which is the more relevant regarding the renewable power generation industry which is at the core of this thesis.

3.5.1 Foreign market selection

Internationalization can be described as "either an attitude of the firm towards foreign activities or to the actual carrying out of activities abroad" (Vahlne & Wiedersheim-Paul, 1973). It is one strategic option for a firm to expand.

The foreign entry process is complex and difficult (Arnold, 2013) therefore companies usually proceed step by step, entering a few countries at a time. Picking the right market(s) involves a lot of research and investigation. Each company may have specific criteria depending on its product or business model but there are external criteria that can be considered as essential for any company. These are diverse and include: market demand, level of competition, country performance, trade barriers, political risk, distribution accessibility, climate and location, infrastructure, environmental concerns, currency convertibility, cultural factor and legal environment (Manzella, 1997).

An in-depth review of these external factors is not to be considered sufficient as both external (country specific) and internal (company specific) factors impact the outcome of the country review process (Koch, 1997). Indeed it is essential that the country's specific benefit match the strategic orientations of the firm. Pen (2009) offers a categorization firm strategic objectives to be matched with the country specific advantages: natural resource seeking, market seeking, efficiency seeking and innovation seeking. The more relevant in the scope of this thesis would be market seeking which corresponds countries that are supposed to have important demand for the firm's products and services (i.e. green electricity generation).

Ultimately the situation of the firm's competitors will be a decisive selection criteria. The follow-the-leader model (Knickerbocker, 1973) develops the idea that firms, especially in the situation of an oligopoly, will react to a competitor investment in another country by replicating the investment. This would avoid that one competitor gains and increase in market power on a

foreign market may disturb the industry in general. By the same token, the exchange-of-threat concept argues that in a firm n°1 from country n°1 invest in country n°2. Then the competitor in country, firm n°2, will follow suit and invest in country n°1 which should balance the competition (Dubin, 1975).

3.5.2 Barriers to foreign entry strategies

3.5.2.1 Informal barriers

The screening of potential countries where a market entry is intended should put an emphasis on possible barriers.

Entering a new national market is always a very particular challenge for a firm as it means going outside of its comfort zone. Scholars have described this situation as the liability of foreignness which can be defined as "inherent disadvantage foreign firms experience in host countries because of their nonnative status" (Pen, 2009). The first aspect of this liability would be the ignorance of informal business rules which are integrated by local competitors but cannot be known until the firm actually have operations in the country. Foreign companies also may be discriminated against as clients sometimes consider foreign products as suspicious or are incentivized to buy national production (Pen, 2009).

Cultural and institutional distances are a very strong hurdles that must be tackled. First cultural distance refers to "the difference between two cultures along some identifiable dimensions" (Pen, 2009). The fact that some cultures are further than others has been described by Hofstede (1980) who pointed four dimensions (power distance, uncertainty avoidance, individualism and masculinity) which highly influenced work-related values and therefore the ability of people from different culture to work together towards a common goal. These differences can harm the success of an international expansion. Li and Guisinger (1991) showed that US affiliates whose foreign partners came from distant cultural backgrounds were more exposed to failure. Cultural distance is also likely to increase transaction costs because precise information from subsidiaries become more complex and expensive to access (Roth & O'Donnell, 1996).

Institutional distance can be described as "the extent of similarity or dissimilarity between the regulatory, normative, and cognitive institutions of two countries" (Xu & Shenkar, 2002). This

idea takes roots in the contemporary institutional theory which assumes that to survive organizations must shape according to the norms and cultural system which dominates in its environment (DiMaggio & Powell, 1983). These institutional distance may increase transaction costs (see above) as a foreign player will generally face incurred cost when operating in an unknown institutional framework (Peng, 2009).

3.5.2.2 Formal barriers

As opposed to informal barriers, formal barriers are objective hurdles that prevent foreign firms to enter a national markets. They can be government driven such as tariffs or the result of a political / economic instability. They also might stem from local competitors strategies to prevent the entry of foreign firms.

Regarding government regulations several options are used of which the most common are tariff barriers which are taxes imposed on imports. Though major economists and in-depth research have proven these protections to be inefficient and costly, they tend to remain because of the political power of some industry lobbies that manage to convince government (Peng, 2009).

With the development of trade agreements around the world tariffs have become highly criticized. Therefore governments now more often resort to nontariff barriers which according to Peng (2009) "discourages imports using means other than taxes on imported goods. NTBs include subsidies, import quotas, export restraints, local content requirements, administrative policies, and antidumping duties". These forms of protectionism account for two third of the trade-restricting measures the World Bank identifies (The Economist, 2009). The most widely used are subsidies which correspond to financial aids to local producers and quotas corresponding to trade restrictions on the quantity of products to be imported. Administrative policies are another common form of foreign market entry barrier. For instance licensing is often used to forbid foreign competitors to enter some market segments. Argentina enforced several discretionary licensing rules for some consumer goods in order to protect local producers (The Economist, 2009).

Other strategic behaviors coming from local competitors may prevent a firm from entering a foreign market. Such actions include predatory pricing, exclusive agreements with suppliers or

switching barriers (to prevent customer from changing provider). Predatory pricing is a relevant example of strategy that can be used not only to prevent entry but also to drive competitors out of the market. The first step corresponds to selling at loss (below costs) to force competitors to make losses and leave. Then the firm will benefit from a higher market share that should compensate from its previous loss (Leslie, 2013). Exclusive agreements are also a common strategy for firms to block entry. Aghion and Bolton (1987) indicate that firms who face the risk of entry of competitors with lower prices on their markets will tend to enter into longer term contracts in order to deter newcomers from entering.

3.5.3 Entry mode selection

Once a particular foreign market has been targeted, the company needs to make a choice on the entry-mode to penetrate this geography. Scholars usually distinguish two main types of entry options: acquisition and greenfield investment.

Acquisition is defined as "the purchase of stock in an already existing company in an amount sufficient to confer control". Greenfield investment represents a "start-up investment in new facilities". There is an alternative entry option which corresponds to an in between solution, the joint venture. It can be described as "the pooling of assets […] by firms who share joint ownership and control over the use and fruits of these assets" (Kogul & Singh, 1988). To be relevant with the scope of this thesis we will put a particular emphasis on the two most common options acquisition and greenfield investment.

These entry strategies have been thoroughly studied by academic literature which have highlighted for each of them benefits and drawbacks.

Regarding acquisition, various positive points have been underlined by scholars. First it is the most common type of foreign investment, representing close to 80% of Foreign Direct Investment flows according to the United Nations Conference on Trade and Development (Klimek, 2011). Acquiring a well-established firm can allow to overcome the weaknesses to being a foreigner on the market (Demirbag, Tatoglu, & Glaister, 2008). Acquisition are also considered to meet shorter timelines as the target company is already operating on the market and there is no need to start operations from scratch (Georgopoulos & Preusse, 2009). There is also an opportunity for firms to benefit from synergies which corresponds to a situation "when

the value of the combined firm is greater than the sum of the values of the individual firms" (Bradley *et a.l*, 1988). These synergies generally correspond to an improvement of efficiency or a stronger market power through the support of the mother company (Singh & Montgomery, 1987). In an international acquisition, the transfer of knowhow is also a powerful synergy between the firms and a strong incentive (Seth, Song & Pettit, 2002). Nevertheless cross border acquisitions are a path full of pitfalls. The main risk is the cultural clash with the acquired entity as the integration of a foreign firm is always a challenge. According to Shimizu *et al.* (2008) "Differences in national culture, customer preferences, business practices, and institutional forces, such as government regulations, can hinder firms from fully realizing their strategic objectives". This situation has been described as "double-layered" acculturation, describing the context when the recently integrated company must deal not only with a foreign national culture but also with a freshly imported corporate culture (Barkema, 1996). To this should be added information asymmetry which is a risk for both the realization of synergies and the ability to conduct business (Shimizu *et al.*, 2004).

Greenfield investments starts on bare ground and the firms have to build everything. As key benefits it allows first to have a total control of the new entity which permits an efficient overview of all business operations as well as complete freedom on long term strategy (Irwin, 2012). There also allow firms to transfer their firm-specific advantage in another country, as opposed to an acquisition (Dunning, 1988). These advantages may include immaterial assets such as "management practices or firm-embedded technological knowledge" (Szalucka, 2010). Nevertheless high costs are to be associated to greenfield investments, in particular the conformity cost as the firms needs to adapt to the foreign framework and suffers both the liability of newness and of foreignness (Slangen & Hennart, 2008). Finally, as opposed to an acquisition, the newly formed entity needs to create everything and especially strategic assets defined as "the set of difficult to trade and imitate, scare, appropriable and specialized resources and capabilities" (Amit & Schoemaker, 1993). The process of creating strategic assets allowing to efficiently compete with other local firms is by far one of the main challenges of the liability of newness.

There is a strong link between a firm's country of origin and the entry mode it might choose. This relation is double as both the country of origin and the country of entry's culture will have an impact on the decision. Wilson (1980) demonstrates that there are very different propensity to acquisitions on foreign markets depending on the nationality of the parent companies he analyzed in the Germany, UK, Japan and the US. This relation has been established more

generally by the researchers from the University of Uppsala with the "psychic distance" concept. This corresponds to the level of uncertainty regarding the specificities of the foreign market (in particular language and culture). The concept was first developed by Vahlne and Wiedersheim-Paul (1973) through the study of the internationalization of four Swedish firms. They define it as "factors preventing or disturbing the flow of information between firm and market" such as "differences in language, culture, political system, level of education, level of industrial development…". They found that to a certain extent firms would gradually enter countries which have a higher psychic distance. Kogut and Singh (1988) used Hofstede's culture dimension model to outline the relation between cultural distance and uncertainty avoidance with the choice of an entry strategy.

Experience is also a key concept when looking at entry mode options. Joohanson and Vahlne (1977) explained that a company goes from exporting to wholly owned subsidiary as its experience of the market grows and its perception of risks decreases.

Davidson (1980) has gone further and highlighted significant trends regarding firms entry mode selection. Firms often adopt a follower attitude as they tend to invest more often where their direct competitors have invested. They also select countries with supposed cultural similarity for their priority investments. A firms experience in a country influences the chance of an acquisition.

The entry mode choice can also be influenced by the strategic situation of the firm in relation with its competitors. If a firm is acting on a defensive response to a competitor's move (for instance following the industry leader in a foreign expansion), it is more likely to proceed by acquisition as it allows a quick entry (Dubin, 1975).

4 METHODOLOGY

4.1 Introduction

For Degu & Yigzaw (2006), research is a "systematic collection, analysis and interpretation of data to generate new knowledge and answer a certain question or solve a problem". Therefore, answering a particular academic question means going through a research process.

As mentioned above the question this thesis is looking to answer is: How do foreign firms enter the Brazilian renewable power generation market? In order to perform this exercise the case study methodology has been chosen. The next paragraphs should lay explanations on both the relevance of the methodology and the choice of a particular entity to study.

4.2 Research methodology

As research's results are highly linked to the methodology employed (Myers, 2009), the methodological approach selection and design are essential. There is a choice to make for the research willing to undertake a new work in order to define the right "methodological option" which is a "research strategy appropriated for the problems that need to be solved, for the aims and objectives assumed through that research" (Zait, 2009).

In the context of this thesis, a case study has been chosen to explore the subject of foreign market entry in the green electricity generation sector.

First, it is important to precisely explain the outlines of a case study methodology in an academic approach. Case studies should be considered as a complete method (Yin, 2009) which distinguishes itself from other social science methodologies. The case study based methodology has been well detailed by Starr (2014), and it should include a limited scope (few cases of communities, firms, regions) and a gathering of information from several sources. In the end, one of the results should be the confrontation of the actual theoretical advances and the main findings from the cases. Yin has offered a very rich description of the case study methodology and according to him, there are five key components: research question, propositions, units of analysis, an explanation of the relation between data with the propositions and a criteria for the interpretation of the research findings (Yin, 1994). Regarding data collection, Stake (1995) has listed several sources that are particularly relevant to a case study methodology: documents, interviews, field observations, participant observations and physical artifacts.

This methodology has several strengths which explain its wide use among various fields of academic research. According to Gil (2007), the study of few selected cases allows to broaden and deepen the understanding of a particular topic. One of the case study based methodology's main asset is the ability to examine a phenomenon within its context as opposed to other types of research framework that would tend to isolate the process from its environment (Zainal, 2007). Cases are also praised for the variety of approaches they allow to explore a single topic, as they offer "a variety of lenses which allows for multiple facets of the phenomenon to be revealed and understood" (Baxter & Jack, 2008). Case study method is also considered as dynamic and practical and proves really helpful to explore complexities of real situations that would be hard to describe in another methodological context (Zainal, 2007).

Case studies are therefore well suited to some situations when the context and the phenomenon to be explored are complex and related. Yin (2003) describes several situations where a case study is a convincing methodology. One of them is when the focus of the research is to answer the "how" and "why" questions, which is relevant with the research framework of this thesis as it is looking to explore the stakes of corporate strategies in a particular industry and geography.

All the components of the case study methodology as defined by Yin (1994) have been integrated in this thesis in order to follow a relevant methodological approach.

Case study methodology components	
1. Research question	How do foreign companies enter the Brazilian renewable energy market?

2. Propositions	Acquisition is the preferred mode of entry of foreign firms as it is the relevant regarding this geography / industry
3. Unit of analysis	Strategic entry modes in the Brazilian renewable energy sector
4. Relation data / propositions	1. Financial performance Operational performance Corporate growth 2. Entry mode consequences
5. Findings interpretation criteria	Theoretical background Case context Relevance of data Competing explanations

Figure 11 Methodological components table (Author)

In the particular context of this thesis topic, a case study approach was the most suited to encompass the ins and outs of the subject. Regarding the aim of this thesis a qualitative approach has been selected with a case study based methodology.

4.3 Analytical framework

4.3.1 Framework definition

A specific framework will be used to identify the strategy of the studied firm and analyze its performance.

Understanding the underlying factors of company's performance is an essential consideration to build this framework. When looking at a firm's performance, two main theoretical paths can be taken. First, the industry structure view for which the main factor are the conditions of the sector in which the company operates (Porter, 1980). The resource-based view considers that the performance results from the firms owns resources (Penrose, 1959). However, both these approaches are limited to single country analysis. Christmann, Day and Yip (1999) have extended the analysis by adding country characteristics to measure subsidiary performance.

Their results showed that country conditions were a determining factor to a subsidiary's performance.

This thesis focuses on green power firms' foreign subsidiaries and therefore a specific framework was created relevant to this particular industry. It was built to take into account both considerations on the firms' performance factors and particular characteristics of the green power sector. This framework is based on two analytical perspectives: the entry mode and the share of green activities. Regarding the entry mode, as mentioned previously, two main strategies have been identified by academic literature: acquisition and greenfield investment. Both are essential keys of understanding to most firms' strategies to enter and grow on a foreign market. The share of green activities relates to the proportion of renewable business in a company's output which can be measured by turnover or the amount these activities represent in total production capacities. Estimating the degree of sustainability of a business is a highly debated topic among academic research (Stubbs & Cocklin, 2008) as it can impact many fields; environmental, social, political… In the design of this framework, "green activities" have been defined using existing frameworks (Pojasek, 2007) as "meeting the needs of the organization and its stakeholders while sustaining the environmental […] resources needed for the future".

This framework can be synthesized through a four-cell matrix representing the main strategies for companies with sustainable activities looking to enter a foreign market.

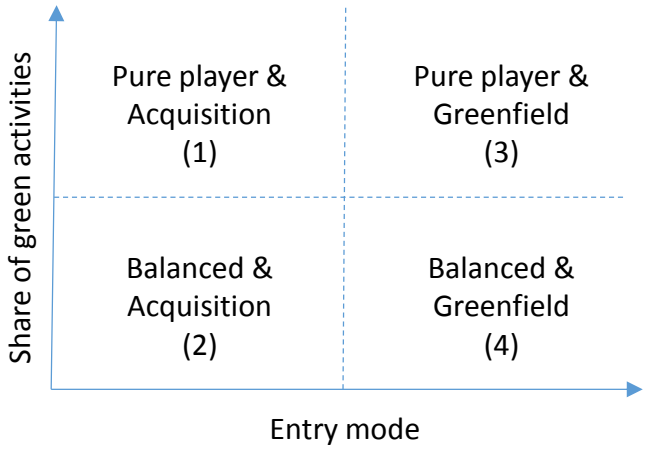


Figure 12 Market-entry matrix (Author)

(1) Pure player & acquisition

- A firm for which all the output can be considered as sustainable (i.e 100% of electricity generated through renewable sources)
- Its preferred entry mode was an acquisition.

(2) Balanced & acquisition

- A firm for which the output is a mix between conventional and sustainable practices (i.e distribution between traditional generation sources such as nuclear or fossil fuels and renewables). The share of green production must represent a material amount (firms with marginal sustainable production initiatives shall be excluded).
- Its preferred entry mode was an acquisition.

(3) Pure player & greenfield

- A firm for which all the output can be considered as sustainable (cf supra)
- Its preferred entry mode was a greenfield investment

(4) Balanced & greenfield

- A firm for which the output is a mix between conventional and sustainable practices (cf. supra)
- Its preferred entry mode was a greenfield investment

4.3.2 Results analysis

The company's historical performance analysis will be performed through a four-level grid. This grid represents a broad approach to firm's performance and encompasses various aspects the company's achievements. Four levels of performance have been selected for analysis in order to offer the most accurate view on the company's evolution.

HR performance will be taken into account as a significant relationships exist between HR practices effectiveness and firm performance (Huselid, Jackson & Schuler, 1997).

Production capacities are also to be analyzed as both the volume and the distribution of the output are critical for a firm in the electricity generation industry (Meunier, 2010).

Operations regarding both firm's efficiency and project development will be analyzed as they have a significant impact on the firm's general performance (Krasnikov & Jayachandran, 2008).

Financial data (accounting-based and market-based) is ultimately the most widespread approach to evaluate a company's success (Al-Matari *et al.*, 2014) and will therefore be thoroughly studied.

The following table represents the 4 levels of performance to be analyzed as well as the analytical tools to be used.

Workforce	- Skills and expertise of employees - Employee turnover
Production	- Level of output - Distribution of products / production process
Operations	- Efficiency measured by selected key performance ratios - Recent and new projects
Finance	- Sales & EBITDA - Market capitalization

Figure 13 Analytical tools grid (Author)

This dynamic grid combines both qualitative and quantitative tools which allow to extensively analyze the company's performance.

4.4 Case selection

According to Yin (2004), one of the earliest stages of a case study approach is the selection between single or multiple cases studies. This thesis is based on the first approach, studying a unique case in order to go as deep as possible in the research process. Once this methodological choice has been made comes the selection of cases which can be considered as "the most critical step" in designing a case study research (Stake, 1994). Case selection process is essential to test the "viability" of the case for the full research process. Some key criteria should be met for the screening of cases, such as the likely diversity of data to collect and some evidence that the case contains the phenomena that are to be studied in the research objectives (Yin, 2004).

In this research work, the company Tractebel Energia was selected as one of the most relevant case to study in order to explore the dynamics of market entry strategies in the Brazilian

renewable electricity industry. Several elements have proven the suitability of this case to the research objectives. Indeed, this company was an emblematic player in Brazil, as one of the first to enter the country's newly liberalized electricity generation market. It is also one of the largest electricity generators in Brazil which allows an important richness of information as well as diversity of data sources.

4.5 Data collection and analysis

In the context of a case study the multiplicity of the sources of information is a strength to the validity of the results. This "methodological preference" of varying sources is a key strategy to improve the robustness of findings and results (Yin, 2010). The data collection process should follow a rigorous approach in order to both ensure the quality of the data and to manage the flow of information properly. Yin (2010) has outlined a few principles for the success of the process. First, relying on various sources of information (documents, interviews, observations…), then, the design of a rigorous database with comprehensive references to the sources used and eventually, the application of a rigorous approach for the use of information from collection to evidence in the research project.

In the context of this thesis, the case studied provided several alternative data sources which could be easily traced. As Tractebel Energia is a listed company at the Brazilian BOVESPA, it has a lot of information to disclose regarding its finance and operations in order to meet the financial regulation standards. Tractebel is also a subsidiary of ENGIE, one of the largest energy group in the world about which regular news articles and reports are written regularly. Ultimately, Tractebel acts on the energy generation sector which means it has numerous interactions with public entities (such as Brazilian Agência Nacional de Energia Elétrica) which have to make public many information on their activity.

Therefore, various data sources have been found for this thesis, coming from three main types of sources with examples described in the following tab.

Source	Information type
From Tractebel (or ENGIE)	- Annual reports

	- Investor presentations - Press releases
From public entities	- Empresa de Pesquisa Energética - Agência Nacional de Energia Elétrica - Ministerio de Minas y Energía
From independent sources	- Newspapers (articles, interviews…) - Sector federations (Associação Brasileira de Energia Eólica...) - One interview with an industry specialist (Joisa Saraiva - FGV professor[(1)])

Figure 14 Sources table (Author)

(1) Pr. Joisa Campanher Dutra Saraiva holds a doctorate in Economy from Fundação Getúlio Vargas. She has been director of the Agência Nacional de Energia Elétrica from 2005 to 2009 and is now a FGV professor in charge of the Mestrado Profissionalizante em Finanças e Economia Empresarial.

Professor Saraiva's interview was conducted on July 2nd 2015 in order to discuss the Brazilian power industry functioning as well as its latest evolutions and challenges. The exchange allowed to develop a better understanding of the legal and operational framework of the Brazilian electricity market. The most recent trends on this market as well as feedback from Pr. Saraiva's experience at the ANEEL were also discussed during the exchange.

This information has been very useful to build this thesis, in particular to describe precisely the electricity market in Brazil and address the main challenges faced by power companies in this sector.

5. ANALYSIS

5.1 Company presentation

5.1.1 General aspects

Tractebel Energia is Brazil number one private generating firm with over 7 044 MW of installed capacity, representing 6% of Brazil's total capacity. The company is operating 28 plants across Brazil's five regions in the following states: Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Minas Gerais, Mato Grosso do Sul, Mato Grosso, Goiás, Tocantins, Maranhão, Piauí and Ceará.

The workforce in Brazil includes more than 1 100 employees and the firm is headquartered in Florianópolis (Santa Catarina). Tractebel energia also delivers energy-related services such as maintenance or power quality control (Company website, 2015)

As most generating companies in Brazil, its client base comprises electricity traders, power distributors and free customers (which have the right to buy their electricity directly from power generating companies, see 3.2.1.1 Regulation model evolution).

Tractebel energia is a subsidiary of global energy giant ENGIE (formerly GDF Suez) which is the number one independent power producer in the world with over 115.3 GW of installed capacity, including 19 GW of renewable energy (16.5% of the complex). ENGIE counts more than 152 900 employees in 70 countries. The core businesses of the company are power, natural gas and energy services.

In 2014, the group achieved a €74.7bn revenue. ENGIE's strategy aims at building upon its strong natural gas business, developing energy related services and grow on the independent energy generation market (especially from renewable sources). The group increased its renewable-energy capacity by 50% between 2009 and 2015 (Corporate website, 2015). The Brazilian branch highly contributed to this growth as Tractebel Energia is rapidly adding new renewable power capacities to its generating complex.

5.1.2 Business model and clients in Brazil

In Brazil, Tractebel is operating in both electricity generation and commercialization of energy to various types of customers. The company provides both Conventional Energy (i.e.

conventional sources are hydro and thermoelectricity) and Incentivized Energy which is generated through renewable sources and which entails a 50% discount on the tariff to use the distribution system. The company revenues are driven both by the price of electricity which is generally a market price and the energy sold which depends on the volume of power needed by clients.

As mentioned above, Tractebel has three kinds of customers: trading companies, distribution companies and free customers.

Electricity trading companies act as intermediaries between generating companies and consumers from the free market. They assemble products between the two parties that mitigate the risks (credit risk from the consumer and security of supply from the generator). Trading companies represented 6% of Tractebel client breakdown in 2014.

Distribution companies are responsible for the sale of electricity to consumers. They buy large quantities of electricity on the long term and then dispatch it to consumers. In 2014, they accounted for 48% of Tractebel client breakdown.

Finally, Tractebel acts on the free markets where it deals directly with commercial and industrial clients to supply electricity. Agreements are negotiated freely between the company and its clients. The agreement covers several terms such as the time horizon of the supply (short term to long term) and the flexibility of the energy allocation. In 2015, the group served 179 corporate groups representing about 420 commercial and industrial units. They represented 46% of Tractebel client breakdown (Investor presentation, 2015).

5.1.3 Direct competitors

In Brazil, Tractebel evolves in a complex competitive landscape as the competition comes from both national and international firms which compete intensively on the electricity generation market.

However, Tractebel still remains by far the largest private player and third of all on the Brazilian market representing 5.6% of the country's installed capacity. On the market, Eletrobrás (the Brazilian federal government owns the majority of the stakes) maintains a leading position with 27.9% of the installed capacity, followed by CEMIG (Companhia

Energética de Minas Gerais – controlled by the government of MG) with 6.2% (Investor presentation, 2015)

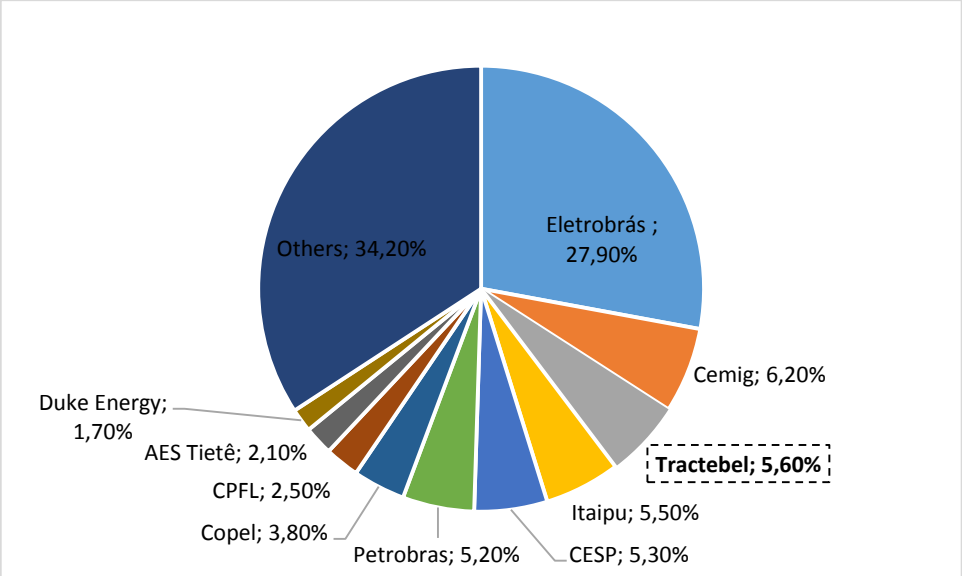


Figure 11 Distribution of electricity generation capacity in Brazil in 2015 (Investor presentation, 2015)

When focusing on the private sector, Tractebel Energia is by far the largest player. Even taking into account installed capacity under construction, Tractebel is leading the way with a total of 9.3 GW expected installed capacity according to the firm's Q3 2015 investor release. Strong competitors include both Brazilian and foreign companies. Brazilian competitors include CPFL (Companhia Paulista de Força e Luz), AES Tietê, Neoenergia or Eneva. Main foreign competitors are EDP (Energias de Portugal), Duke Energy (US firm) and ENEL (Ente Nazionale per l'Energia Elettrica - Italian firm).

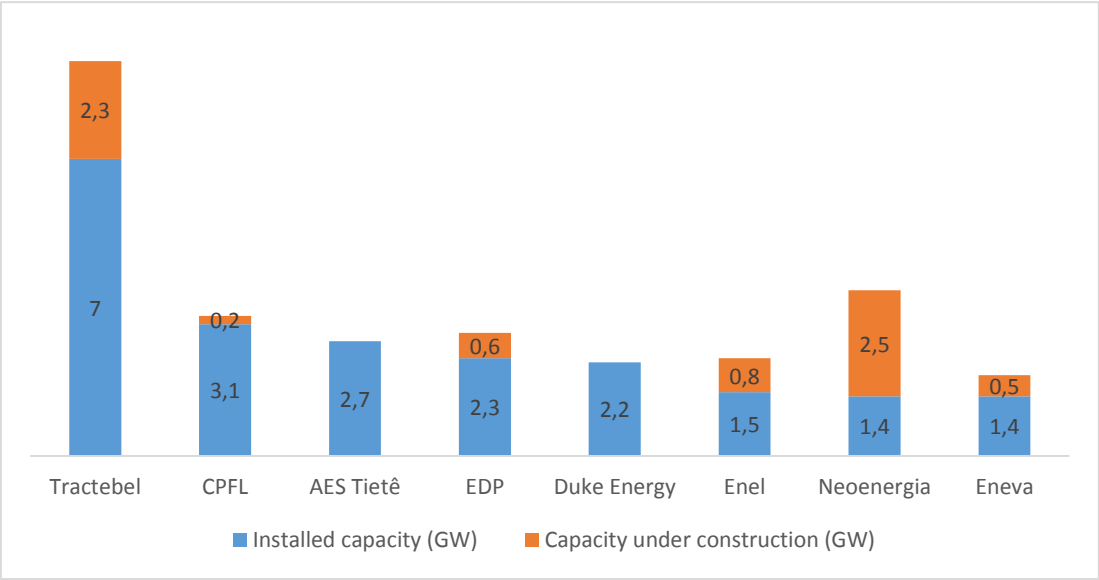


Figure 12 Installed and expected capacity for electricity generation In Brazil

(Investor presentation, 2015)

5.1.4 Energy mix in 2015

The company has a very diversified energy matrix. Tractebel is operating 28 plants across Brazil.

Tractebel Energia electricity complex in Brazil			
Hydroelectrics			
Production Unit	River	State	Rated Capacity (MW)
Cana Brava	Rio tocantins	Goiás	450
Estreito	Rio Tocantins	Maranhão and Tocantins	436
Itá	Rio Uruguai	Santa Catarina and Rio Grande do Sul	1 127
Machadinho	Rio Pelotas	Santa Catarina and Rio Grande do Sul	404
Passo Fundo	Rio Passo Fundo	Rio Grande do Sul	226
Ponte de Pedra	Rio Correntes	Mato Grosso and Mato Grosso do Sul	176
Salto Osório	Rio Iguaçu	Paraná	1 078
Salto Santiago	Rio Iguaçu	Paraná	1 420
São Salvador	Rio Tocantins	Tocantins	243
Total Hydro			5 560
Thermoelectrics			
Production Unit	State		Rated Capacity (MW)
Charqueadas	Rio Grande do Sul		72
Jorge Lacerda A, B and C	Santa Catarina		857
William Arjona	Mato Grosso do Sul		190
Total Thermo			1 119
Complementary			
Production Unit	State	Type	Rated Capacity (MW)
Areia Branca	Mato Grosso	Small hydro	20
Beberibe	Ceará	Wind	26
Ferrari	São Paulo	Biomass	81
Fleixeiras I	Ceará	Wind	30
Fotovoltaica Cidade Azul	Santa Catarina	Solar	3
Guajiru	Ceará	Wind	30
Ibitiúva	São Paulo	Biomass	23
José Gelazio	Mato Grosso	Small hydro	24
Lages	Santa Catarina	Co-Generation	28
Mundaú	Ceará	Wind	30
Pedra do Sal	Piauí	Wind	18
Rondonópolis	Mato Grosso	Small hydro	27
Trairí	Ceará	Wind	25
Tubarão			2
Total Thermo			367
Tractebel Energia Total			**7 044**

Figure 13 Tractebel Energia generating complex (corporate website, 2015)

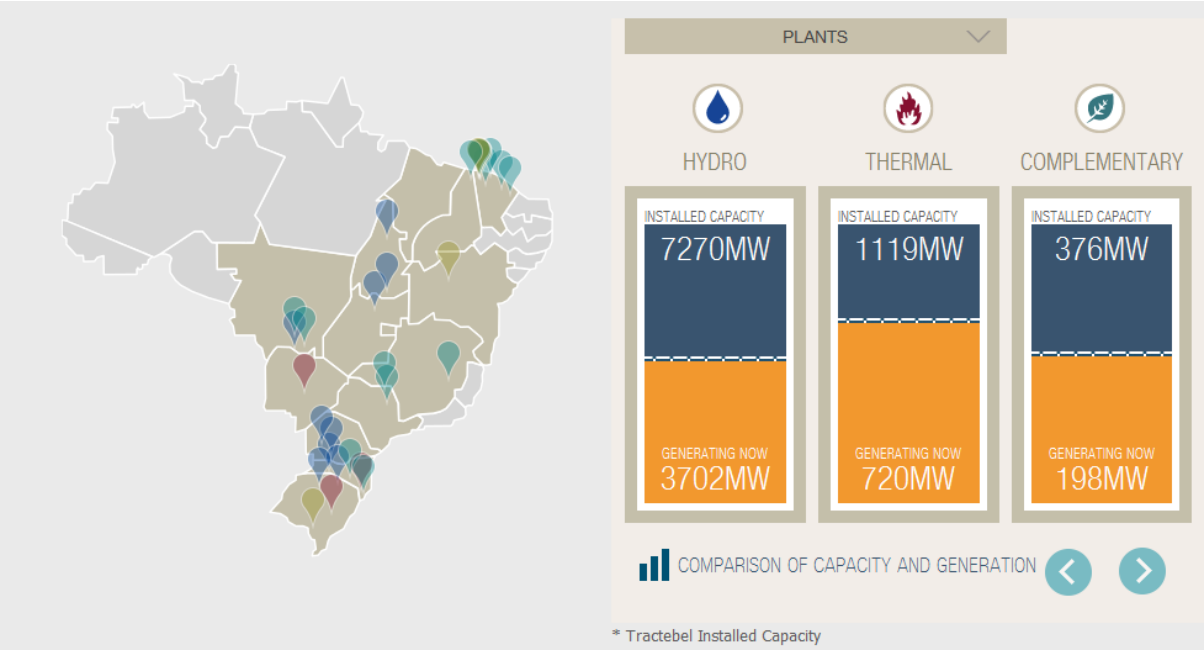


Figure 14 Tractebel's generating complex geographical distribution (corporate website, 2015)

5.2 Entry strategy

5.2.1 Entry process

To enter the Brazilian energy market Suez (which merged with GDF in 2008 and became ENGIE in 2014) made the decision of external growth buying a firm to set foot on the country rather than starting from scratch.

In 1998, the Brazilian government decided to start the privatization process in the energy industry with Gerasul (Centrais Geradoras do Sul do Brasil SA), one of the country's generating company operating in the South of the country.

Eletrosul (Eletrosul Centrais Elétricas S.A) had been created in 1968, under military dictatorship, as a regional branch of Eletrobras in order to supply electric power to Brazil southern states Paraná, Santa Catarina and Rio Grande do Sul (in 1980 Mato Grosso do Sul was added). In the wake of new liberal economic theories (as described in 3.1.1.2 Electricity Market Fundamentals), the Brazilian government decided in 1997 to spin off Eletrosul generating activities. Centrais Geradoras do Sul do Brasil S.A. (Gerasul) was thus created,

operating exclusively in the generating and trading of electricity. Eletrosul retained all the activities in relation with electric power transmission.

In 1998, after an auction in Rio de Janeiro's stock exchange (Bolsa de Valores), Suez Tractebel acquired 50.01% of Gerasul's capital for R$ 945,7 million. In 2002, Gerasul changed its name and became Tractebel Energia S.A (Enfoque, 2015).

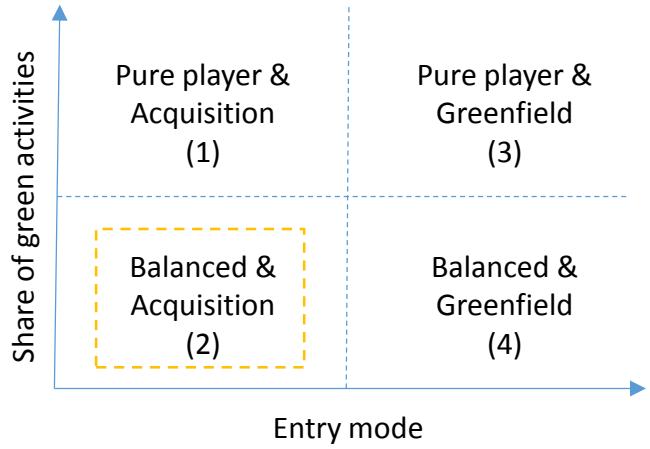
There was no formal barrier to this acquisition as private investments in energy generation were liberalized with the 1988 constitution, therefore the only obstacle Suez could face were linked to informal barriers.

In November 2000, Tractebel stepped out of a tender offer for 100% of Gerasul in response to demands from the Brazilian security commission, Comissão de Valores Mobiliários (BNamericas, 2001).

Installed capacity grew by 88.9% since privatization, from 3 719 MW in 1998 to 7 027 MW in 2015 (Investor presentation, 2015).

5.2.2 Strategical approach identification

The entry strategy of GDF Suez on the Brazilian renewable power market corresponds to the second category: (2) Balanced & Acquisition.



- GDF Suez preferred to take control of an existing generating company in Brazil rather than building its own production capacities from scratch.
- The group also decided to enter Brazil through a balanced model regarding its output. In 1999, renewable sources represented 73% of the generation mix and conventional sources 27%.

Based on this framework the outcome of the strategical approach of GDF Suez to enter the renewable power market will be analyzed.

It is important to mention that power firms have selected other strategical options within this framework in the recent years. For instance, in 2013, Voltalia, a French renewable power firm, entered Brazil through the strategic approach (3) Pure player & Greenfield. The firm built its first wind farms in Areia Branca (Rio Grande Do Norte) which started operating in 2015 (90MW total capacity). Voltalia aims at building 1096 MW of generation capacity in the country by 2019 only from renewable sources with 1031 MW of wind power and 65 MW of hydro power (Reference document 2014).

5.2.3 Strategic impacts of the acquisition

5.2.3.1 Workforce

One of the consequence from an acquisition is the opportunity for the new controlling firm to benefit from the experience and skills of former employees who know the markets, the products and the company itself. This is all the more true in the renewable energy sector as technical, regulatory and financial constraints are extremely strong. Skilled employees are an asset of choice in this regard.

Tractebel Energia (ENGIE) has been successful in this area as it has been part of its strategy, after the acquisition, to retain a large amount of the former engineers and technicians of Gerasul (Oscar, 2013). They ensured that knowledge could remain within the firm in order to remain competitive. Even today, most of the management board comes from the former public entity. This not only has a positive impact on core competencies within the company, it is also a positive signal for the market (as Tractebel Energia is listed in Brazil). This is confirmed by

analysts covering the stock as Victor Martins (Planner): “The market looks favorably at a highly senior team in a complex sector such as energy” (Oscar, 2013).

The length of the career employees make at Tractebel Energia is also a good sign of their importance for the firm. According to Oscar (2013), in 2013, out of rough total of 1000 employees, 380 had between 21 to 25 years spent within the company (including time before the acquisition). These numbers are extremely rare especially in Brazil where employee’s voluntary and involuntary turnover has been historically high (Mercer’s Workforce Metrics Survey, 2015).

Integration issues are common in the situation of acquisition as culture from the acquired company (Brazilian utilities in this case) can be different from the acquiring firm (French Belgian global energy group). Regarding this point the situation is mitigated.

First, regarding GDF Suez strategy, the main idea was to smoothen the transition by appointing managers that would facilitate the integration within the new group. This has been done through the appointment to key roles at GDF Suez in Brazil of the three advisers (Maurício Stolle Bähr, Gil Maranhão and Victor Paranhos from Banco Nacional) which had top responsibilities during the acquisition process. This option had a positive impact on the integration process as these three executives had essential roles for the acquisition process and therefore could implement efficient strategies to limit expected cultural and managerial issues. The proportion of employees with over 21 years in the company (as mentioned above) is also a very positive sign a large part of the workforce has not been affected by the integration process and chose to stay.

Nevertheless, the acquisition still had a negative impact on the workforce as turnover increased during the years right after the merger

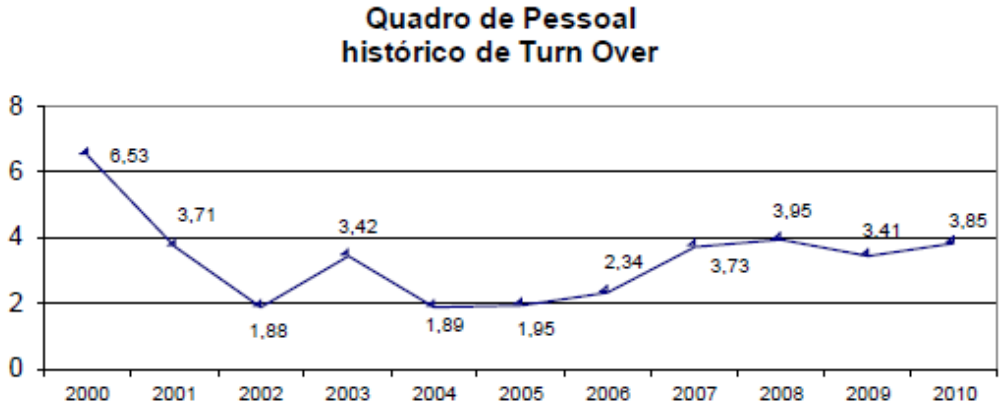


Figure 15 Employee turnover in % between 2000 and 2010

(Tractebel Energia 2012 sustainability report)

As shown in the table above, turnover reached a peak at 6.5% in 2000 right, after the acquisition. This demonstrates that though GDF Suez managed to retain a large amount of employees, several decided to leave the company after the transaction which would bring a new cultural and managerial framework (especially in this particular case as it was both an acquisition and a privatization).

5.2.2.2 Production capacities

When Gerasul was bought, the acquisition offered ENGIE a portfolio of operating electrical generation capacities. In 1998, at the time of the sales process, Gerasul had a capacity of 3719 MW (Investor prensentation, 2015). It consisted of three hydroelectric and five thermoelectric power plants which made of Gerasul the seventh largest generating company in Brazil at that time, representing 6% of the country's installed capacity (BNAmericas, 1998).

Therefore, through this acquisition, Tractebel gained a generation capacity and a market share it would have taken years to build through greenfield investments. It is all the more beneficial as the electricity generation sector is characterized by long lead times. It takes generally 2 to 3 years to build solar and wind plants, for hydropower (dams) thermoelectricity plants it usually takes at least 4 years (Energy Information Administration, 2015).

Therefore, acquisition was clearly an asset on this aspect as the new branch benefited from large up and running capacities as well as a solid market share.

The other aspect is the ability for Tractebel Energia to grow and to diversify its energy portfolio. With already several running plants in hydro and thermoelectric generation, it could invest directly in renewables. First of all, a diversified electricity portfolio is a lot less risky than a focused one as it mitigates the various risk a power company may face (fuel price increase, regulation change, climate-related disasters). A diversified generation mix is a clear asset to develop a renewable energy portfolio. It can be compared to a diverse stock portfolio as it brings similar benefits "preparing possible outcomes of future fuel prices and technological advances, utilities can minimize risk and deliver the best value to consumers" (GRNews, 2014). Another aspect of the benefit of this acquisition process is the expected complementarity between power sources. Several studies have highlighted the high level of complementarity between hydro and wind sources in Brazil. This complementary has been observed in various parts of the country such as Minas Gerais (Filho, Azevedo & Xavier, 2013) or the Northeast (Dutra & Szklo, 2008) where they noted that "the São Francisco River is the most important resource of electricity generation to the northeast of Brazil, and the largest wind speeds occur exactly when the flow of water of São Francisco River is at a low level". Therefore there is a clear benefit to build a green energies portfolio on an already existing hydro generation fleet. This is even truer with thermoelectric generation which can reach full capacity all year round and therefore mitigate the risks of renewable sources which all face seasonal volatility in their electricity output levels.

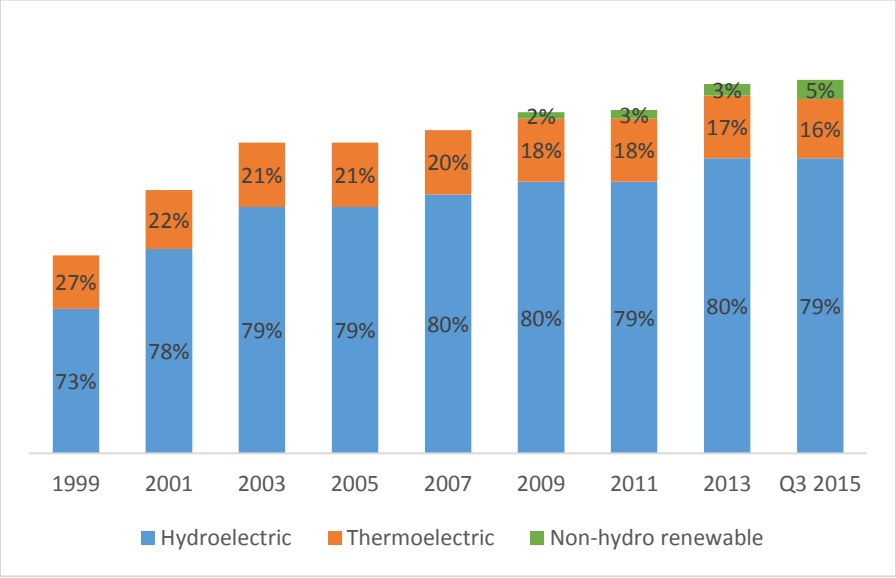


Figure 16 Tractebel Energia generation mix evolution from 1999 to 2015

(Investor releases and Annual reports 1999 – 2015)

In 1999, one year after the acquisition of Gerasul, newly formed Tractebel energia had installed capacities of 3729 MW with 73% of hydro and 27% of thermoelectricity. In Q3 2015, total capacity had grown by 89% to reach 7044MW. Beyond this expansion a huge change has taken place within Tractebel energy matrix as renewables which accounted for 73% of generation capacities in 1999 (exclusively hydro) now represent over 84% of the mix. Alternative energy sources have been steadily introduced (essentially wind power) and now account for more than 5% of generating capacities.

5.2.2.3 Operational synergies

As the acquisition of Gerasul was made by a larger group operating in the same sector, synergies were expected. This is particularly true in the energy sector where high costs are needed to operate (such as R&D activities) and technical knowledge is essential to remain competitive. In this regard Tractebel Energia has widely benefited of the synergies developed after the acquisition.

First, regarding large projects (such as dams building) which were before supported by Gerasul but with its limited financial and technical capabilities, the risk to bear was high and the incentive to enter ambitious project rather limited. With the acquisition by GDF Suez, many project development activities were merged with the headquarters where the group has a consequent team of technicians, engineers and legal employees which have the capability to deal with very large projects. The Jirau dam in Rondônia (where ENGIE holds a 40% participation) is a good example as according to Maurício Stolle Bähr, the head of Tractebel Energia: “we only transfer [from ENGIE] to Tractebel when all risks have been mitigated and the asset is already generating cash” (Oscar, 2013). This has allowed Tractebel Energia to undertake numerous ambitious projects, indeed as mentioned above it has in 2015 the largest generating capacity under construction among private companies with over 2.3GW to be built in the coming years.

Figure 17 Shareholder structure of the Jirau dam (Q3 2015 Tractebel Energia investor presentation)

Another aspect to mention is the ability to benefit through an acquisition of the acquiring group expertise. In the case of Tractebel Energia, main key performance indicators have shown an impressive upward trajectory. The most remarkable is probably the ratio between the number of staff and the volume of electricity generated. It is extremely striking to see that between the acquisition in 1998 and today (as of Q3 2015), the electricity generation capacity has almost doubled from 3719MW to 7044MW while the number of employees decreased substantially and remains lower than in 1998 (1084 in Q3 2015 vs 1227 in 1998). This shows the extent of the synergies and expertise that were brought by the transaction which allowed to generate more electricity with less staff.

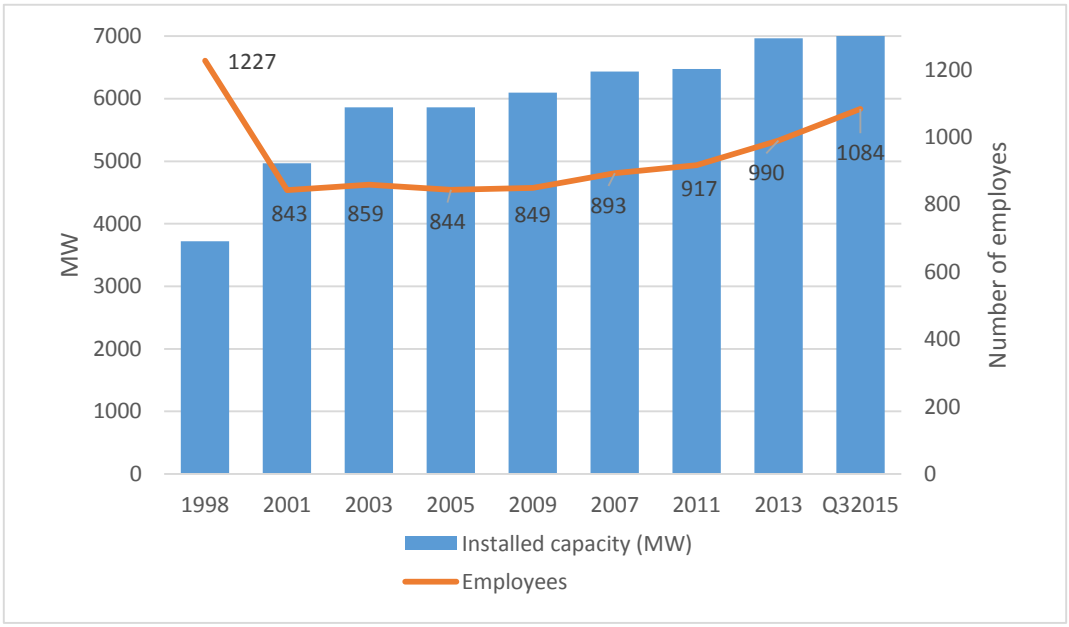


Figure 18 Evolution of generation capacities compared to number of employees from 1998 to 2015

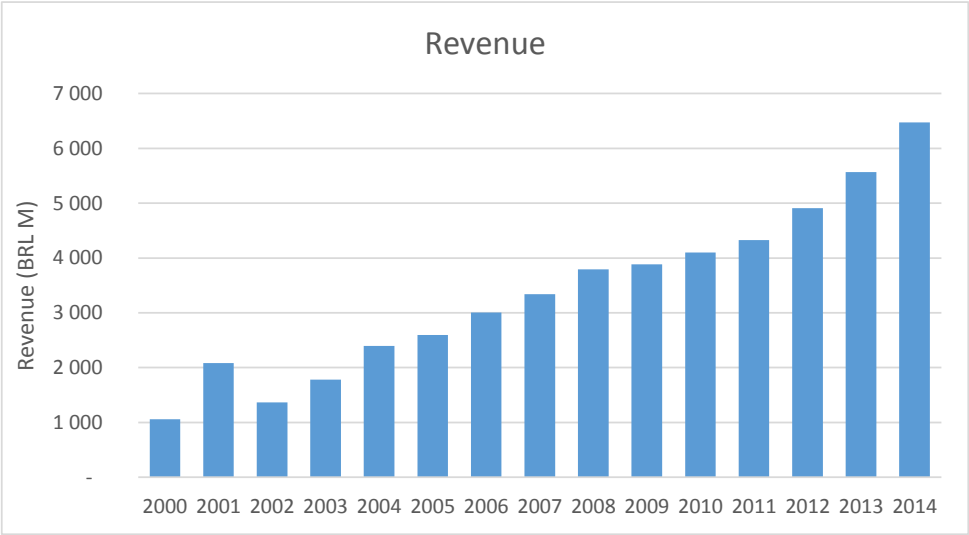
(Investor presentations and annual reports 1998 – 2015)

Nevertheless, one point should be mentioned regarding corporate social responsibility as this acquisition made no exception with many others. As many international firms, ENGIE has very high social and environmental standards as well as well-established process which are to be enforced in every branch of the group. The integration within the ENGIE has therefore been a double-edged sword. First, it imposed a full review of Gerasul operations and higher compliance standards to meet with the group's CSR objectives. However, it has also been a time-consuming process in order to meet the requirements set by the group to its branches as well as to implement all the mandatory procedures. One of the example of this shift is the importance given to corporate social responsibility norms (Group's Brazil report, 2013). According to the group's CSE policy since 2006, 100% of dams built by ENGIE have to be certified with ISO 9001 (Quality Management), ISO 14001 (Environmental Management) and OHSAS 18001 (Health & Safety). These standards are positive based on an social and environmental responsibility view but at the same time they incur costs and time consuming processes that the firm would have avoided operating on a standalone basis.

5.2.2.4 Financial aspects

When looking to assess the effectiveness of a firm's strategy to enter a defined industry and country, the most relevant criteria is the financial outcome as it is at the heart of the company's objectives when penetrating a market. In the case of Gerasul – Tractebel Energia, financial data seem to validate the strategy that has been implemented, both the choice of the acquisition as a mode of entry and the set of strategic orientations made since then.

Two essential data are to give a consistent overview of the new entity financial results since acquisition: revenue and EBITDA



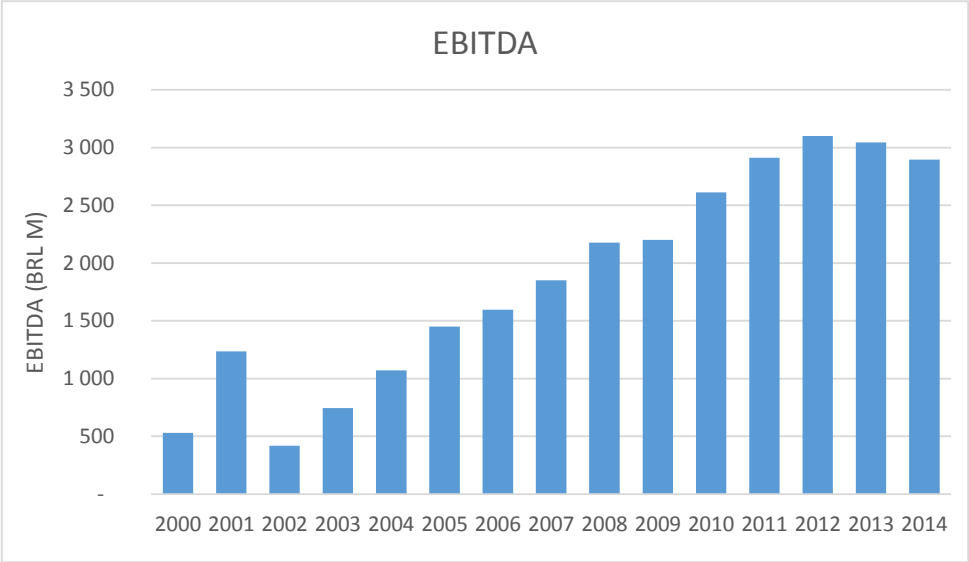


Figure 19 Evolution of Sales and EBITDA from 2000 to 2015 (Annual results 2000 – 2015)

Results for 1998 and 1999 were not publicly available when this thesis was written. Since 2000, a clear upward trend can be observed for both Revenu and EBITDA. Tractebel revenue has grown by more than 6 times between 2000 and 2014 and EBITDA grew by more than 5 times over the same period. First, the steady growth in revenue means that the company has managed to increase its business volume both through generation capacity extension and optimization of the electricity sale price. EBITDA figures are really complementary to complete sales figures. In the case of Tractebel not only did the company manage to increase its sales, it managed at the same time to keep its costs at a reasonable level as EBITDA grew almost as fast as revenue. Still, in 2013 and 2014, sales grew steadily while EBITDA slightly decreased, showing some

recent difficulties for the company to hold down its costs as revenue keeps increasing year after year.

The other relevant data to analyze to assess a company's financial performance is its market capitalization as it should reflect its ability to generate profits. In the case of Tractebel since 2005, it is a "true listed company" as Suez began to trade some of its shares on the Novo Mercado through a secondary share offering (Dynamo report, 2010). Though this transaction highly increased freefloat, as of 2015 ENGIE still owns more than 68% of the shares of Tractebel. Nevertheless it is possible to observe the company's performance on a financial point of view through the total value of its listed shares. On the December 31st, 2005 Tractebel shares were trading at R$15.05, representing a market capitalization of R$9,824m. As of December 4th, 2015, the shares were trading at R$34.01 for a total market capitalization of R$22,193m. In less than ten years, Tractebel Energia total market capitalization grew by 2.3 times.

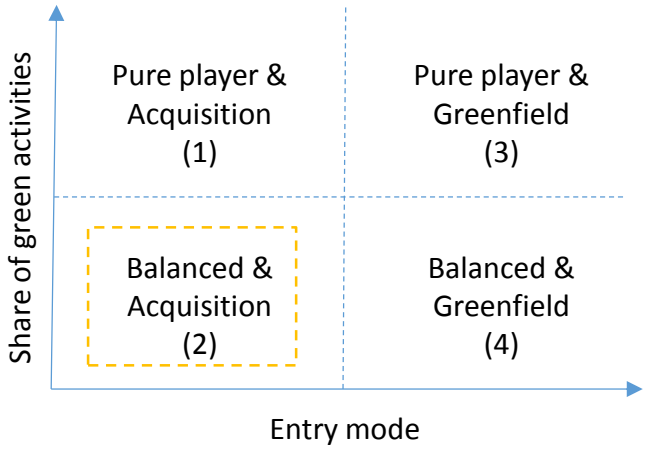
From a financial point of view, Tractebel has shown an impressive growth story since its acquisition, as financial results (Revenue and sales) as well as market capitalization have been growing at a tremendous pace. Nevertheless, regarding financial performance, there has been issues in 2013 and 2014 to maintain the EBITDA level compared to sales, showing some problems to limit costs increase.

6. CONCLUSION

The aim of this study was to better understand the market dynamics and strategic takeaways of the entry of a firm in the renewable energy market, illustrated by evidence from the case of Tractebel Energia in Brazil. The conceptual framework helped address the specific challenges regarding market entry strategies in the very particular green electricity generation industry

which combines strong national regulation, technical challenges and fierce competition linked to the liberalization reforms.

In this context, this study has established a framework for market entry strategies relevant with the characteristics of the renewable energy industry. Four main options were brought forward in this model, depending of the entry process (acquisition versus greenfield investment) and the level of sustainability of production (i.e. share of renewable electricity generation in this situation). This matrix offers a new framework to understand the dynamics of market-entry strategies within the renewable energy sector. It is designed to be used as an analytical tool for further studies within this area and shall be considered as one of the main contribution of this research paper.



The analysis positioned Tractebel Energia's strategy within this framework and studied its performance accordingly. The results highlighted that the strategic option taken by Tractebel (Acquisition & Balanced output) impacted rather positively the performance and development of the firm within the green power industry. The choice of the acquisition as an entry mode in this sector in a foreign country allowed GDF Suez to immediately use important generating capacities in Brazil. In the context of the acquisition, the choice to retain a vast majority of staff over the long term allowed to benefit from their expertise regarding all aspects of the activity (technical, legal and operational). Having a balanced electricity generation portfolio also benefited the firm as they could rely on several sources in case of unexpected events. Finally, the ability to generate a high level of synergies using the group competencies allowed them to bring down costs, and its financial support helped engage in large projects. Financial and operational data of the company demonstrate the success of this approach in this particular sector. Tractebel Energia has been able improve the share of green energies in its portfolio as

well as introduce diversification among alternative sources with solar, biomass and wind power. From a financial point of view, the company has demonstrated an impressive growth story after the acquisition with a continued increase in revenue. Nevertheless, two elements should qualify the success of this market entry. First, an increase in employee turnover at the beginning of the 2000's demonstrated frictions to the integration within the larger group of GDF Suez (now ENGIE). In the last two years, some financials have been relatively disappointing for Tractebel Energia as sales kept growing but the company saw a decrease of its margin linked to cost increases, thus showing some of the obstacles to its success over the long term.

Two main limitations are to be raised regarding this work. First the study was conducted based on the particular case of a French firm entering in Brazil. The cultural background of the acquirer could have an impact on the result of the market entry through acquisition. Indeed the cultural distance, as measured by Hofstede's cultural dimensions (1980), between the acquiring company and the target have a significant impact on the success of the transaction. The other key limitation is the timeframe used for this thesis. From the acquisition in 1998 to 2014, Brazil has recorded a tremendous growth with a GDP compound annual growth rate of 5.2% (World Bank, 2015). The sustained economic development of the country has surely been a favorable factor for the success of the market entry. In 2014, Brazil started to face a severe economic crisis which is expected to affect all industries. These two limitations would offer interesting new fields of study to cover, exploring the situation of the market entry in this sector of a firm with a radically different culture as well expanding this research to timeframes where economic conditions were not as supportive. Ultimately, it would be very relevant to explore the strategic challenges of the alternative modes of entry described in the analytical framework such as greenfield investment, as it would open up the possibilities of a comparative analysis.

Green power generation is one of the main hopes to fight climate change and preserve the environment. In this context the findings of this thesis should bring useful information to academic research and stakeholders in this industry committed to the development of renewable energies.

7. REFERENCES

Associação Brasileira de Distribuidores de Energia Elétrica. (2015). Visão Geral do Setor. Retrieved 10 December 2015, from http://www.abradee.com.br/setor-eletrico/visao-geral-do-setor

Aghion, P., & Bolton, P. (1987). Contracts as a Barrier to Entry. *American Economic Review*, 77(3), 388.

Al-Matari, E. M., Al-Swidi, A. K., & Fadzil, F. H. (2014). The Measurements of Firm Performance Dimensions. *Asian Journal of Finance and accounting*, 6(1), 24-49.

Andrade G. and Stafford E. (2004). Investigating the Economic Role of Mergers. *Journal of Corporate Finance*, 10(1), 1-36

Myers, M. (2009). Qualitative Research in Business & Management. London: Sage

Arnold, D. (2004). The mirage of global markets. Upper Saddle River, NJ: FT Prentice Hall.

Barkema, H., & Bell, H. (1996). Foreign entry, cultural barriers and learning. *Strategic Management Journal*, 17, 151-166.

BNamericas, (2015). Tractebel Doesn't Plan New Gerasul Tender Offer. Retrieved 26 September 2015, from http://www.bnamericas.com/news/electricpower/Tractebel_Doesn't_Plan_New_Gerasul_Tender_Offer

BNAmericas,. (2015). Tractebel, Southern Team-up for Gerasul Sale. Retrieved 22 November 2015, from http://www.bnamericas.com/news/electricpower/Tractebel,_Southern_Team-up_for_Gerasul_Sale

Bourcier, N. (2015). Belo Monte, le barrage géant du Brésil qui a vaincu les Indiens. Retrieved 22 November 2015, from http://www.lemonde.fr/planete/visuel/2014/04/24/sur-le-chantier-du-barrage-de-belo-monte_4406467_3244.html

Bradley, M., Desai, A., & Kim, E. (1988). Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms. *Journal of Financial Economics* 21(1), 3-40.

Business Dictionary. (2015). What is a market?. Retrieved 10 December 2015, from http://www.businessdictionary.com/definition/market.html

Carle, J. (2015). Climate Change Seen as Top Global Threat. Retrieved 4 October 2015 from Pew Research: http://www.pewglobal.org/2015/07/14/climate-change-seen-as-top-global-threat/

Centro da Memoria da Eletricidade no Brasil,. (2015). Memoria da Eletricidade no Brasil. Retrieved 10 December 2015, from:

http://memoriadaeletricidade.com.br/Default.asp?pagina=destaques/linha&menu=368&iEmpresa=Menu#368

Dassie, A. (2011). Indicadores Nacionais do Setor Elétrico. Retrieved 17 September 2015, from UFRJ - Grupo de Estudos do Setor Eletrico: http://www.nuca.ie.ufrj.br/gesel/publicacoes/conjuntura/Abr2011/indnacAbr2011

Degu, G., & Yigzaw, T. (2006). Research Methodology. Gondar, Ethiopia: University of Gondar.

Deloitte (2015*),* Brazil's Energy Matrix and Prospects for Energy Integration with South America. (2015). Retrieved 17 September 2015, from: http://www.deloitte.com.br/publicacoes/2007/Brazils_Energy_Matrix

Demirbag, M., Tatoglu, E., & Glaister, K. W. (2007). Factors affecting perceptions of performance: The case of Western FDI in an emerging market. *International Business Review*, 16(1), 310–336.

DiMaggio. P.J., Powell. W., "The iron cage revisited" institutional isomorphism and collective rationality in organizational fields", *American Sociological Review*, 48 (1983), 147-60

Doyle, P. (2008). *Value-based marketing : marketing strategies for corporate growth and shareholder value*. Chichester: Wiley. 2008.

Dubin, M. (1975). Foreign Acquisitions and the Growth of the Multinational Firm. Doctoral thesis. Harvard Business School.

Dunning, J.H. (1988). The Theory of International Production. *The International Trade Journal*, 3(1), 21-66

Duran, R. (2015). Hydro Electricity in Brazil. Retrieved on 17 September 2015, from The Brazil Business: http://thebrazilbusiness.com/article/hydro-electricity-in-brazil

E-education (2015). The Fundamentals of Electricity Markets. Retrieved on 10 December 2015, from https://www.e-education.psu.edu/ebf200wd/node/151

Eletrobras. (2015). As grandes empresas do setor eletrico. Retrieved 22 November 2015 from: http://www.eletrobras.gov.br/historia/historia_ing.asp?empresa=eletrosulAppendix

Empresa de Pesquisa Energética (2015), Balanço Energético Nacional. Retrieved on 11September 2015, from: https://ben.epe.gov.br/

Energy Information Administration. (2015). Forecasts. Retrieved 22 November 2015, from http://www.eia.gov/forecasts/aeo/assumptions/pdf/table_8.2

Enfoque, (2015). Relatório Anual. Retrieved on 26 September 2015, from: http://www.enfoque.com.br/infocias/infocias_doc/017329/08/ian01732912312008360

Engie, (2015). Summary. Retrieved on 26 September 2015, from Engie: http://www.engie.com/en/group/summary/

Escobar, L., & Vredenburg, H. (2010). Multinational Oil Companies and the Adoption of Sustainable Development: A Resource-Based and Institutional Theory Interpretation of Adoption Heterogeneity. *Journal of Business Ethics*, 98(1), 39-65.

Fares, R. (2015). An Introduction to Electricity Markets. Retrieved on 10 December 2015 from Scientific American Blog Network: http://blogs.scientificamerican.com/plugged-in/an-introduction-to-electricity-markets/

GDF Suez. (2013). Brasil, nossas actividades, nosso compromisso. Retrieved on 10 December 2015 from http://www.tractebelenergia.com.br/wps/portal/internet

Graham, E. (1990). Exchange of threat between multinational firms as an infinitely repeated noncooperative game. *The International Trade Journal*, 4(3), 259-277.

Hofstede, G. (1980). *Culture's consequences*. Beverly Hills, Calif.: Sage Publications.

Huselid, M. A., Jackson, S. E., & Schuler, R. S. (1997). Technical and strategic human resources management effectiveness as determinants of firm performance. *Academy of Management Journal*, 40(1), 171-188.

International Association for Energy Economics. (2012). Fostering Wind Power Through Auctions: the Brazilian Experience. Retrieved on December 10 2015, from IAEE: https://www.iaee.org/en/publications/newsletterdl.aspx?id=167

International Hydropower Association, (2015). Hydropower Status Report. Retrieved on 17 September 2015, from: https://www.hydropower.org/2015-hydropower-status-report

Irwin, T. (2012). Acquisitions and greenfield investments – the pros and cons. Retrieved on 4 November 2015, from TCII: http://www.tcii.co.uk/2012/10/23/acquisitions-and-greenfield-investments-the-pros-and-cons/

Joskow, P. (2008). Lessons Learned from Electricity Market Liberalization. *The Energy Journal*, 29(01).

Klimek, A. (2011). Greenfield Foreign Direct Investment Versus Cross-Border Mergers and Acquisitions. *Eastern European Economics*, 49(6), 60-73.

Knickerbocker, F. (1973). *Oligopolistic reaction and multinational enterprise*. Boston: Division of Research, Graduate School of Business Administration, Harvard University.

Koch, A. J. (2001). Factors influencing market and entry mode selection: developing the MEMS model. *Marketing Intelligence & Planning*, 1(5), 351.

Kogut, B., & Nath, R. (1988). The Effect of National Culture on the Choice of Entry Mode. *Journal of International Business Studies*, 19(3), 411-432.

Krasnikov, A., & Jayachandran, S. (2008). The Relative Impact of Marketing, Research-and-Development, and Operations Capabilities on Firm Performance. *Journal of Marketing*, 72(4), 1-11.

Larrea, S. (2006). Brazilian Electric Power Sector: Changes in Regulatory Framework. Retrieved on 12 October 2015, from IDB: http://www.eba-net.org/sites/default/files/meeting_materials/Energy_Bar_Ass_Brazilian_Power_Sector_Chang

Leslie, C. R. (2013). Predatory Pricing and Recoupment. *Columbia Law Review*, 113(7), 1695-1771.

Li, J., & Guisinger, S. (1991). Comparative Business Failures of Foreign-Controlled Firms in the United States. *Journal of International Business Studies*, 22(2), 209-224.

Mandel, B. (2014). Performance-Based Regulation to Improve Upstream Energy Efficiency. *The Electricity Journal*, 27(9), 20-35.

Manzella, J. (2015). The Manzella Report. Retrieved on 10 October 2015, from: http://www.manzellareport.com/index.php/strategies-section/311-assessing-foreign-markets-selecting-the-right-markets-can-make-your-company-a-fortune

Margsiri, W., Mello, A. S., & Ruckes, M. E. (2008). A Dynamic Analysis of Growth via Acquisition. *Review of Finance*, 12(4), 635-671.

McGrath R. (2006). *The Search for Organic Growth*. Cambridge, UK: Cambridge University Press.

Meunier, G. (2010). Capacity choice, technology mix and market power. *Energy Economics*, 32(6), 1306-1315.

Mercer, (2015). Workforce Metrics Survey. Retrieved on 17 December, from https://www.imercer.com/products/workforce-metrics-surveys-and-reports.aspx

Ministério de Minas e Energia - Núcleo de Estudos Estratégicos de Energia (2015) - Capacidade Instalada de Geração Elétrica Brasil e Mundo. Retrieved on 13 September 2015 from: http://www.mme.gov.br/documents/10584/1143612/00

Newbery, D. and Pollitt, M. (1997). The Restructuring and Privatisation of Britain's CEGB-Was It Worth It?. *The Journal of Industrial Economics*, 45(3), pp.269-303.

Observatoire Méditerranéen de l'Energie, (2007). The Drivers of Electricity Demand and Supply. Retrieved on November 18, from: http://www.ome.org/home/about-us/ome-presentation-1.html

Oscar, N. (2015). Como a Tractebel escapou da crise. Retrieved on 2 December 2015, from O Estado de S. Paulo: http://economia.estadao.com.br/noticias/negocios,como-a-tractebel-escapou-da-crise,149056e

Parkinson, G. (2012). Electricity retailers: Do we really need them?. Renew Economy. Retrieved on 27 July 2015, from: http://reneweconomy.com.au/2012/electricity-retailers-do-we-really-need-them-95152

Penrose, E., 1959. *A Theory of the Growth of Firms*. Blackwell Press: Oxford, UK.

Peng, M. (2009). *Global business*. Mason, OH: South-Western Cengage Learning.

Pojasek, R. B. (2007), A framework for business sustainability. *Environmental Quality Management*., 17(1), 81–88.

Pollitt, M. (2008). Electricity reform in Argentina: Lessons for developing countries. *Energy Economics*, 30(4), 1536-1567.

Portal Brasil. (2015). Em 2015, Brasil duplica sua produção de energia eólica. Retrieved on 18 September 2015, from: http://www.brasil.gov.br/infraestrutura/2015/08/em-2015-brasil-duplica-sua-producao-de-energia-eolica

PortalPCH, (2015). 24/04/2015 - Pesquisa do Senado mostra que brasileiros apoiam hidrelétricas, mas querem mais investimentos em renováveis. Retrieved on 4 October 2015 from: http://www.portalpch.com.br/noticias-e-opniao/5054-24-04-2015-pesquisa-do-senado-mostra-que-brasileiros-apoiam-hidreletricas-mas-querem-mais-investimentos-em-renovaveis.html

Porter, M.E., (1980). *Competitive Strategy*. New York, NY: Free Press.

PwC,. (2015). Renewable Energy Brazil. Retrieved on 9 October 2015, from: http://brazilianchamber.org.uk/sites/brazilianchamber.org.uk/files/Castello%20Branco

Roth, K. & O'Donnell, S. (1996). Foreign subsidiary compensation strategy: An agency theory perspective. *Academy of Management Journal*, 39(3): 678-703.

Seth, A., Song, K., & Pettit, R. (2002). Value creation and destruction in cross-border acquisitions: an empirical analysis of foreign acquisitions of U.S. firms. *Strategic Management Journal*, 23(10), 921-940.

Shimizu, K., Hitt, M., Vaidyanath, D., & Pisano, V. (2004). Theoretical foundations of cross-border mergers and acquisitions: A review of current research and recommendations for the future. *Journal of International Management*, 10(3), 307-353.

Slangen, A. H. L., & Hennart, J.-F. (2008). Do foreign Greenfields outperform foreign acquisitions or vice versa? An institutional perspective. *Journal of Management Studies*, 45(7), 1301–1328.

Söllner, B. (2009). *Internal versus external growth of a company*. Vienna, Austria: University of Vienna.

Stoft, S. (2002). *Power system economics: Designing markets for electricity*. Piscataway, NJ: IEEE Press

Stubbs, W., and Cocklin, C. (2008) Conceptualizing a "sustainability business model". *Organization & Environment*, 21 (2). pp. 103-127.

Sweeney, J. (2002). *The California electricity crisis*. Stanford, California: Hoover Institution Press.

Szalucka, M. (2010). Acquisition versus greenfield investment-the impact on the competitiveness of polish companies. *Journal of Business Management*, 1(3), 5-13.

Talloo, T. (2007). *Business Organisation & Management*. Delhi, India: Tata McGraw-Hill Education.

The Economist. (2009). The nuts and bolts come apart. Retrieved on 11 December 2015, from: http://www.economist.com/node/13362027

Tractebel Energia. (2015). The Company. Retrieved on 26 September 2015, from: http://www.tractebelenergia.com.br/wps/portal/internet/en/a-companhia

United Global Asset. (2015). Official Site. Retrieved 10 December 2015, from http://www.unitedglobalasset.com/index.php?id=spot

United Nations Foundation. (2015). Achieving Universal Energy Access. Retrieved on 10 December 2015, from: http://www.unfoundation.org/what-we-do/issues/energy-and-climate/clean-energy-development

Vagliasindi, M., Besant-Jones, J. (2009). *Power market structure*. Washington, D.C.: World Bank.

Valor Econômico, (2015). Dilma: Brasil vai reduzir em 37% suas emissões de gases-estufa em 2025. Retrieved on 30 September 2015, from: http://www.valor.com.br/internacional/4244076/dilma-brasil-vai-reduzir-em-37-suas-emissoes-de-gases-estufa-em-2025

Valor Econômico. (2014). Operation of nuclear plant Angra 3 faces further delays. Retrieved on 18 September 2015, from:

http://www.valor.com.br/international/news/3608840/operation-nuclear-plant-angra-3-faces-further-delays

Wilson, B. D. (1980). The Propensity of Multinational Companies to Expand through Acquisitions. *Journal of International Business Studies*, 1(1). 59.

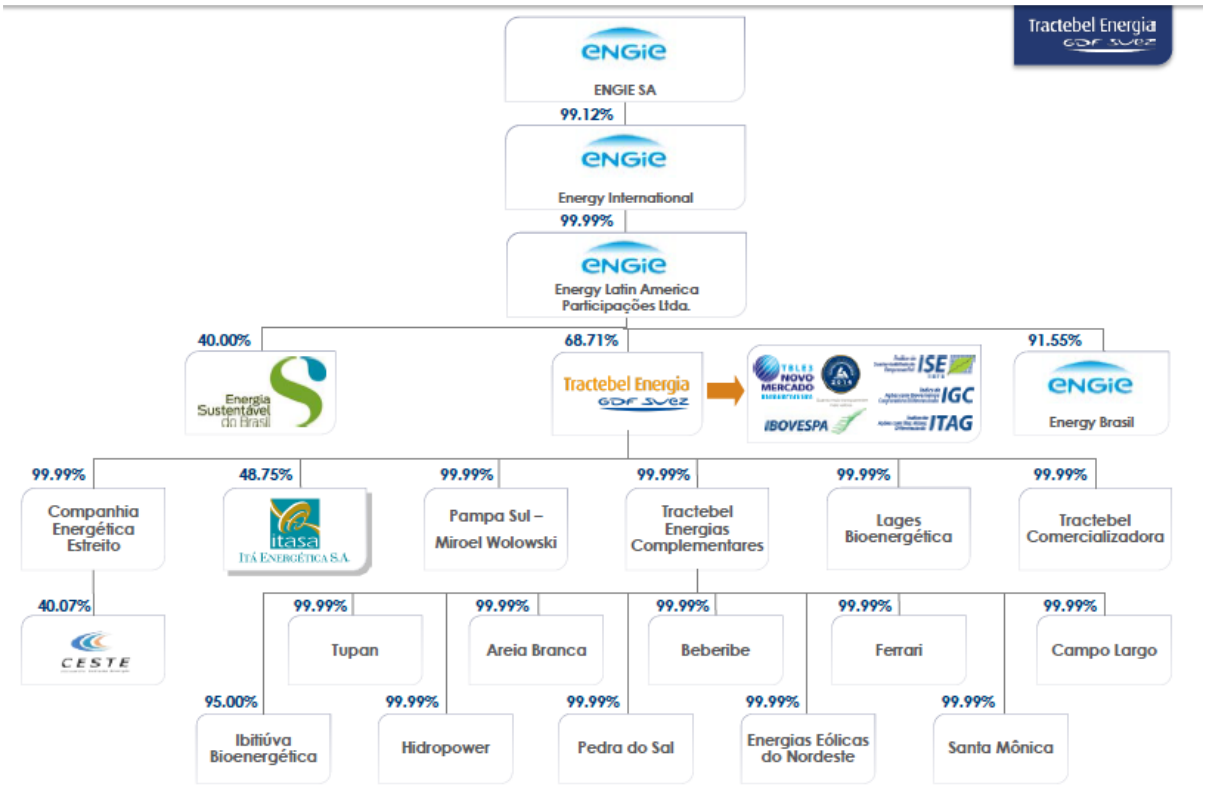
Woo, C. (2001). What went wrong in California's electricity market?. *Energy*, 26(8), 747-758.

Dean Xu, & Shenkar, O.. (2002). Institutional Distance and the Multinational Enterprise. *The Academy of Management Review*, 27(4), 608–618.

Zait, D., & Zait, A. (2009). Research Anticipation: the Methodological Choice. *Review of International Comparative Management*, 10(5), 902-909.

8. APPENDICES

Shareholding structure of Tractebel Energia (Investor presentation, 2015)



Corporate governance of Tractebel energia (corporate website, 2015)

CONSELHO DE ADMINISTRAÇÃO

TITULARES	SUPLENTES
Maurício Stolle Bähr Presidente	Patrick Charles Clement Obyn
Philip Julien De Cnudde Vice Presidente	Pierre Victor Marie Nicolas Devillers
Roberto Henrique Tejada Vencato Conselheiro	Luiz Antônio Barbosa
José Pais Rangel Conselheiro	José João Abdalla Filho
Antonio Alberto Gouvêa Vieira Conselheiro	Luiz Leonardo Cantidiano Varnieri Ribeiro
Manoel Arlindo Zaroni Torres Conselheiro	André de Aquino Fontenelle Canguçu
Luiz Eduardo Simões Viana Conselheiro	-
Dirk Achiel Marc Beeuwsaert Conselheiro	Gil de Methodio Maranhão Neto
Willem Frans Alfons Van Twembeke Conselheiro	José Carlos Cauduro Minuzzo

DIRETORIA EXECUTIVA

Nome	Cargo
Manoel Arlindo Zaroni Torres	Diretor-Presidente
Edson Luiz da Silva	Diretor de Planejamento e Controle
José Carlos Cauduro Minuzzo	Diretor de Produção de Energia
José Luiz Jansson Laydner	Diretor de Desenvolvimento e Implantação de Projetos
Marco Antônio Amaral Sureck	Diretor de Comercialização de Energia
Eduardo Antonio Gori Sattamini	Diretor Financeiro e de Relações com Investidores
Júlio César Lunardi	Diretor Administrativo