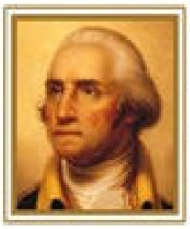


THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON DC

School of Business and Public Management

Institute of Brazilian Business and Public Management Issues – IBI

Minerva Program

Spring 2009

Transmission Lines and Substations Auctions for the Expansion of the National Interconnected System in Brazil

Author: André Luiz Tiburtino da Silva

April 2009

TABLE OF CONTENTS

1 INTRODUCTION 4

2 BACKGROUNDS 6

3 THE NATIONAL INTERCONNECTED SYSTEM 8

4 REGULATORY FRAMEWORK IN BRAZIL REGARDING THE POWER TRANSMISSION NETWORK AND ITS KEY PLAYERS 12

4.1 FRAMEWORK 12

4.2 CNPE 13

4.3 MME 13

4.4 CMSE 13

4.5 EPE 13

4.6 ANEEL 13

4.7 ONS 13

4.8 CCEE 14

4.9 ELETROBRÁS 14

4.10 TRANSMISSION COMPANIES 15

4.11 GENERATORS 15

4.12 DISTRIBUTION COMPANIES AND CAPTIVE CONSUMERS 15

4.13 FREE CONSUMERS 15

5 AUCTION THEORY 16

5.1 INTRODUCTION 16

5.2 TYPES OF AUCTIONS 18

5.3 TYPE OF AUCTION USED FOR TRANSMISSION UNDERTAKINGS 22

6 TRANSMISSION AUCTIONS AND DEVELOPMENT 23

7 TRANSMISSION AUCTIONS AND THE GUARANTEE OF RETURN ON INVESTMENT 25

8 FINAL CONSIDERATIONS 26

9 REFERENCES 28

1 INTRODUCTION

All over the world in the recent decades an idea has become a commonplace issue: governments are no longer able to finance by themselves the necessary infrastructure building, operation and maintenance which are crucial to keep the economy growing and thus naturally allow the wealth growth and improve the standards of living of the population.

As a result, the only way out for the public administration is to transfer such undertakings for the private sector. A question that arises is if should a conceding authority auction off or negotiate the contract for infrastructure building. Advocates of negotiation often argue that a formal competition may take too long, that the costs of preparing bids may be excessive, and that innovation may be discouraged. But proponents of competitive bidding argue that there are ways to address these concerns without sacrificing the bidding process. Moreover, they argue, competition may yield a better deal for the conceding authority and enhance the transparency of the process, making the transaction more politically sustainable (Klein, 1998).

In Brazil that issue was addressed by a set of Federal Laws, which will be shown later, which, in a nutshell, synthesize ideas like transparency, equal opportunities for private agents and minimum reasonable costs for the public administration and therefore for the taxpayer.

Some infrastructure issues were considered so important that they were embedded in the body of the Brazilian Constitution. Particularly electricity services from utilities such as generation, transmission and distributions are constitutional responsibility of the Federal Government, which can do it directly or by delegation to other public agents or even to private agents.

When it comes to transmission lines and substations auctions for the expansion of the National Interconnected System in Brazil, a special kind of bidding process, called reverse auction, has turned out to be the best way to provide products and services. The process has been used and improved over the last decade, several auctions have taken place and the results have shown that the choice was successful, since the market demand is well supplied and the cost for the consumer is reasonable.

This paper aims to introduce the reader to the bidding process for transmission lines and substations that are necessary for the expansion of the Brazilian Electric Grid also known as National Interconnected System or Basic Grid. In the beginning some backgrounds will be exposed, and then will follow a brief description of the Auction Theory after which overall results will be shown yielding to the conclusion that an appropriate model is being used and the goals (e.g. expansion of the grid at a reasonable cost) are being achieved.

A parallel conclusion will be that participating in those auctions, winning them and implementing the proposed undertakings is also an effectively good investment for companies and investors given the stability of the rules and the returning rates for the entrepreneurs, which can be national or international companies, investment funds or pension funds.

2 BACKGROUNDS

The Brazilian Constitution states that the development, use and sale of electric energy can be performed directly by the federal government or indirectly through the granting of concessions, permits and authorizations for other public agents as well as for private companies.

The Brazilian electric power industry has historically been conducted by utilities from the generation, transmission and distribution sectors, controlled by federal and state governments.

In the last decade and a half, the Brazilian government took a series of measures to reform the power sector. These acts have been done with a view to strengthening the role of private investment and eliminate barriers to foreign investment, thereby increasing competition in this important sector of the economy.

Transmission auctions encompass transmission lines and substations auctions that contribute to the expansion of the Brazilian National Interconnected System – SIN.

The transmission of electric energy in Brazil takes place at increasingly higher costs due to the increasing distance from sources (generators) to the load (consumer). Most of electrical energy used in the country comes from large hydro power plants, generally located far away from the large cities. The Amazon region is currently the holder of the greatest hydropower potential to be exploited. Furthermore, the use of energy occurs on a larger scale in the southern and southeastern regions and coastal regions of northeast and north, where the industrial clusters as well as most of the Brazilian population are located. This allows us to predict that the system will continue growing in coming years or even decades.

The transmission system of electric energy or power has the particular ability to simulate "virtual power plants" that can be placed close to consumer centers. It also allows making possible the energy balance between the various regions of the country in view of the

occurrence difference of rainy season, which fills the reservoirs of hydroelectric plants. Hydroelectricity is currently approximately 85% of the country electrical power and must remain the basis of the hydrothermal system for many years, leading to continued need for expansion of the Basic Network, the Interconnected National System, as defined by Resolution 067/2004-ANEEL.

The expansion of the Basic Network is currently carried out by the Brazilian Electricity Regulatory Agency (ANEEL) through delegation from Ministry of Mines of Energy (MME). After a bidding process, the construction, operation and maintenance of the new power transmission lines and substations are turned into a new concession, for a period of thirty years.

Such bidding processes start when the planning sector of the federal government defines the best alternative among all the technically and economically feasible ones and send it to ANEEL, via MME. ANEEL then analyzes the documents received according to its legal guidelines and split them into bidding lots, according to their characteristics, which is one of the most strategically important tasks when preparing the auction, in order to get to a reasonable investment estimate.

The participation in the those auctions is franchised to any interested company, even to investors or companies that do not operate in the electricity sector, since they demonstrate technical qualification to operate and keep the undertaking by assigning a qualified technical person.

3 THE NATIONAL INTERCONNECTED SYSTEM

The Brazilian NATIONAL INTERCONNECTED SYSTEM (SIN) is a grid consisting of several individual power systems normally operating with a number of connecting tie lines, known as transmission lines.

Figure 1, below, presents a map of the National Interconnected System.

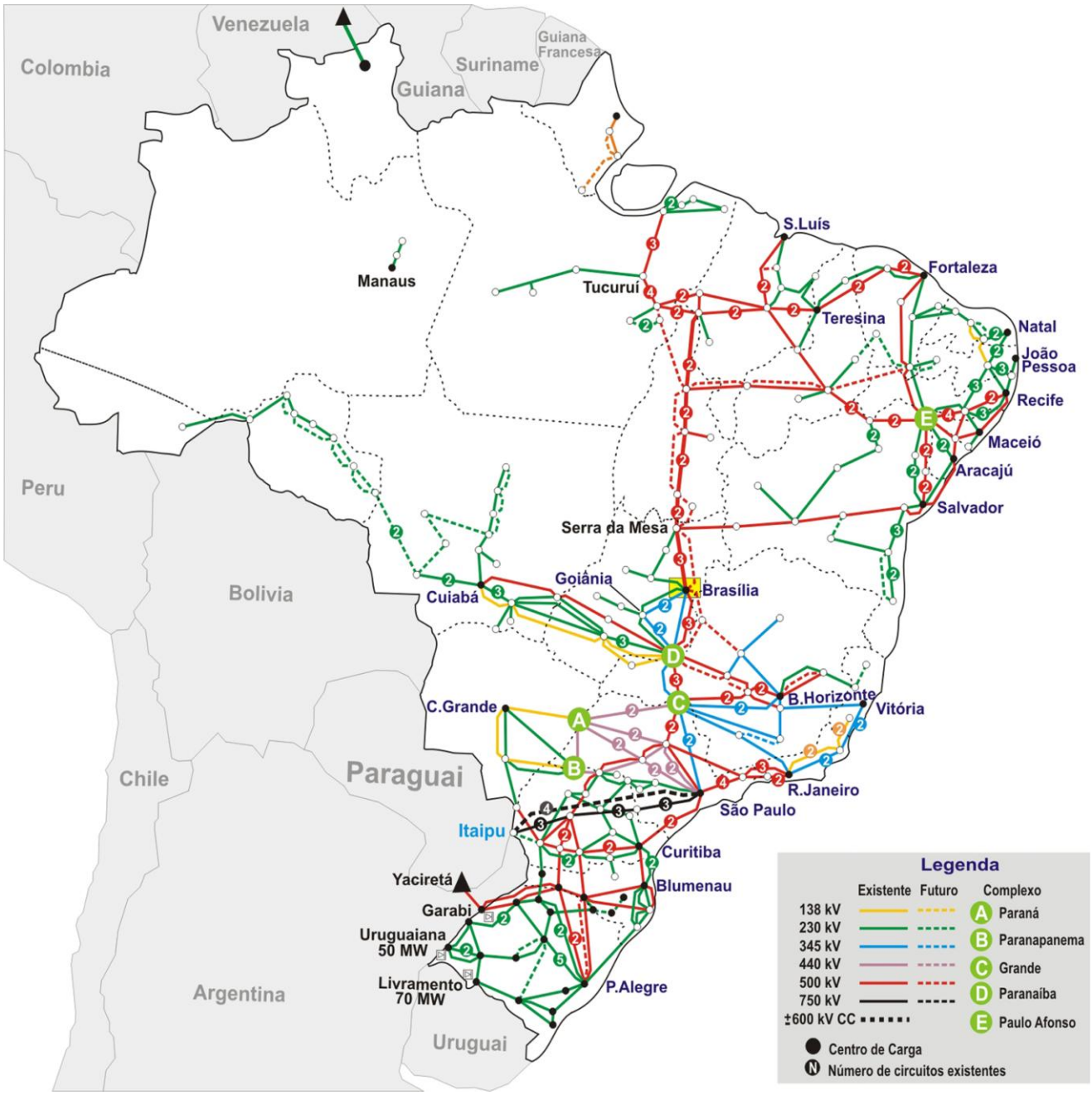
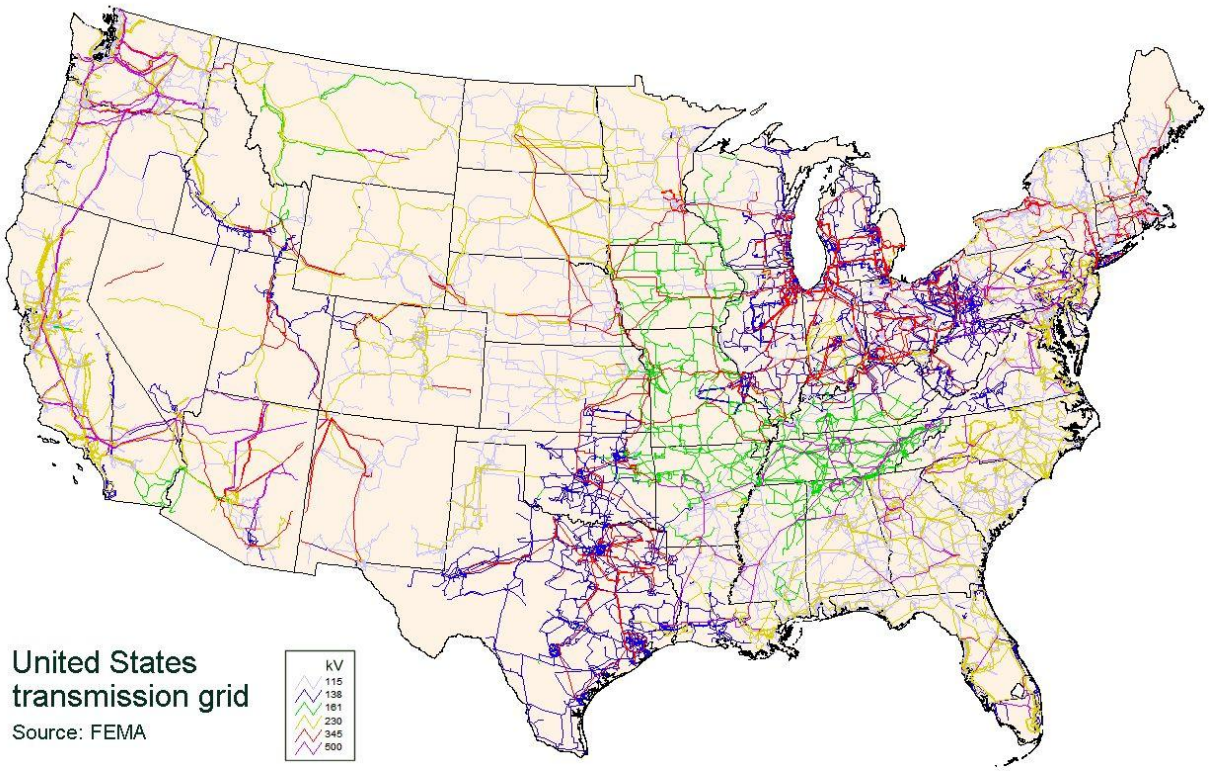


FIGURE 1, SIN: CONFIGURATION EXPECTED FOR 2009 – SOURCE: ONS

The National Interconnected System is equivalent in size to the whole of Europe, from Portugal to Russia. Moreover the consumption of electricity is still only the equivalent of France.

For comparison the United States power grid is shown below. Although the U.S. grid is actually more extensive and denser in some areas than the Brazilian one, it is not effectively connected

in such a way that power shortages in New York could be avoided by extra generation in California. In Brazil such hypothetical situation could currently be met relatively easily. And, in fact, it happens every year when the south region suffers from a drought period and the north and southeast regions are able to transfer power to the states of Rio Grande do Sul, Paraná and Santa Catarina through several extra high voltage transmission lines.



In the United States Transmission Grid above it is noticeable that there are many “smaller” 345 KV and 500 kV grids which are intended for large bulks of power transmission. Compare to the Brazilian grid in which there is clearly a central 500 kV backbone which is surrounded by several smaller 500 kV and lower voltages rings. Another difference is that there is a continuous and planned expansion of the Brazilian grid that allows investors to make their plans to participate in a future auction and build a part of the expanding system.

The selection of power trading frameworks affects significantly broader institutional designs in managing the entire transmission and distribution of electricity. An important design issue is, for example, the role of system operators, as interregional electricity trade which increases under decentralized power systems. As mentioned by Borenstein et al. (2002) under the bilateral trading model, each power supplier is responsible for constructing its own schedule and self-dispatching according to its made contracts, and the independent system operator (ISO) has a limited role to play, such as procuring reserve capacity and auctioning tradable transmission rights. On the other hand, if pool-typed power markets are adopted, the ISO usually operates power markets and directly controls dispatch orders, coordinating the usage of transmission grids. The ISO also is responsible for ensuring system security by providing ancillary services (Ilmi, 2004). ONS is the Brazilian ISO and operates in a pool-typed power market.

4 REGULATORY FRAMEWORK IN BRAZIL REGARDING THE POWER TRANSMISSION NETWORK AND ITS KEY PLAYERS

4.1 FRAMEWORK

The following diagram illustrates the institutional framework in the electric energy sector and gives an idea of its hierarchy, although interactions can take place in several other ways. The next items explain the acronyms and summarize the agents' responsibilities

4.2 CNPE

CNPE stands for Conselho Nacional de Política Energética (National Council of Energy Policy), its function is proposing energy policies for approval by the President of the Republic.

4.3 MME

MME stands for Ministério de Minas e Energia (Ministry of Mines and Energy), its function is planning and assurance of the balance between energy supply and delivery.

4.4 CMSE

CMSE stands for Comitê de Monitoramento do Setor Elétrico (Electric Sector Monitoring Committee), it is responsible for the evaluation to assure the reliability and security of the supply.

4.5 EPE

EPE stands for Empresa de Pesquisa Energética (Energy Research Company), its function is researching and performing studies for the planning of the energy sector.

4.6 ANEEL

ANEEL stands for Agência Nacional de Energia Elétrica (Brazilian Electricity Regulatory Agency), it is the Regulatory Body and receives some delegations of power from MME, besides its legal responsibility stated in Federal Law 9,427 from December 26th, 1996, which created ANEEL, the Regulator for the Electricity Sector, with power to regulate and oversee the electric energy production, transmission, distribution and commercialization.

4.7 ONS

ONS stands for Operador Nacional do Sistema Elétrico (National Operator of the Power System), it is responsible for the overview, control and operation of the National Interconnected

System and all the generators equal to or above 50 MW. It is regulated and overseen by ANEEL.

4.8 CCEE

CCEE stands for Câmara de Comercialização de Energia Elétrica (Chamber of Commercialization of Electric Power) and is responsible for accounting and clearing the electric energy trade.

4.9 ELETROBRÁS

ELETROBRÁS stands for Centrais Elétricas Brasileiras S.A (Brazilian Electricity Power Plants Inc.) It is the biggest company of the electric power sector in Latin America. It was created in 1962. In the capacity of holding, Eletrobrás controls great part of the electric power generation and transmission systems of Brazil through six subsidiaries: Chesf, Furnas, Eletrosul, Eletronorte, CGTEE and Eletronuclear. In addition to being the principal stockholder of those companies, Eletrobrás, in the name of the Brazilian federal government, holds 50% of the capital of Itaipu Binacional.

The holding also controls the Electric Power Research Center (Cepel) and Eletrobrás Participações S.A. (Eletropar). In distribution, Eletrobrás controls the companies Eletroacre (Acre), Ceal (Alagoas), Manaus Energia (Amazonas), Cepisa (Piaui), Ceron (Rondônia) and Boa Vista Energia (Roraima)

The generating capacity of Eletrobrás System, in addition to 50% of the power of Itaipu belonging to Brazil, reached 39,402 MW, corresponding to 38% of the total power nationwide. The transmission lines belonging to the system have approximately 59,765 kilometers of extension.

4.10 TRANSMISSION COMPANIES

Transmission Companies are the ones that build, operate and maintain the National Interconnected System, or Basic Grid, which includes the 230 kV and above voltage transmission lines and substations. There are currently 59 transmission companies, but that number is expected to increase as new companies enter the market seeking the relative good and interesting stable returns on investments. The risk is low and can be minimized through a specialized management of the factors or production.

4.11 GENERATORS

Generators are the power plants, mostly hydroelectric ones and a small but significative number of thermoelectric ones. Usually they sell power to a pool-market represented by the Distribution Companies. These long-term contracts are the core of the financial stability of the whole electrical sector, since they allow long-term planning for both the government and the private companies as well.

4.12 DISTRIBUTION COMPANIES AND CAPTIVE CONSUMERS

Distribution Companies are the utilities that bring the electricity power to households or to businesses other than those classified as free consumers, as seen below. These companies may be connected directly to the Basic Grid or indirectly via another Distribution Company.

4.13 FREE CONSUMERS

Free Consumers are generally big electricity intensive industries which are connected directly to the Basic Grid in a voltage of 230 kV or higher. Currently there are 38 large consumers in this category.

5 AUCTION THEORY

5.1 INTRODUCTION

Not all aspects of Auction theory will be discussed here, only the qualitative approach that links it to government procurement is of interest in this paper, since there is an abundant literature that covers this issue thoroughly.

Auction theory tells that under the standard private value circumstances intensifying competition at an auction would induce bidding firms to reveal their true preferences—i.e., their true costs in our low-price procurement auction context—whence achieving efficient auction outcomes. It is arguable whether each empirical auction is characterized as the independent private value or common value paradigm. Nonetheless, even in the latter setting, competition is still expected to play a partial but important role in lowering the equilibrium bid. In large-scale infrastructure projects, an alleged concern is the limited competition among firms that repeatedly participate in the procurement process (Estachi and Iimi, 2008).

What are the benefits from intensified competition? First, it is expected to not only lead to lower procurement costs but also prevent corruption and collusion. In theory, it becomes more difficult to agree on and sustain a collusive arrangement, as the number of potential players in a market increases. Particularly it is true when new entrants are involved. A nontrivial probability of not being awarded would significantly weaken bidders' collusive incentive. If competition makes collusion less likely to occur, the risk of corruption is also alleviated because corruption normally necessitates successful collusion among bidders (Estachi and Iimi, 2008).

Tendering and traditional auctions have become increasingly common in the context of regulated industry. The application of auction theory to regulated firms is very new, and there has been very little written in this area. An understanding of the basics of auction theory is essential for understanding how regulated firms might react in the face of different auction formats. But, again, it is recommended to the interested reader to search through the references or the extensive literature available for that purpose.

The most important issues in auction design are the traditional concerns of competition policy—preventing collusive, predatory, and entry-deterring behavior.

Ascending and uniform-price auctions are particularly vulnerable to these problems. The Anglo-Dutch auction—a hybrid of the sealed-bid and ascending auctions—may perform better. Effective antitrust is also critical. Notable fiascoes in auctioning, mobile-phone licenses, TV franchises, companies, electricity, etc., and especially the European ‘‘third-generation’’ (UMTS) spectrum auctions, show that everything depends on the details of the context. Auction design is not ‘‘one size fits all’’ (Menezes, Pitchford & Wait, 2003).That fact only highlights the success of the transmission line and substations auctions for the expansions of the National Grid in Brazil

Evidence is mounting that private involvement in infrastructure produces net benefits for customers, investors, and countries

Brazil’s transmission system is gaining growing importance since adequate transmission capacity is essential to manage the effects regional droughts, allowing moving power from areas where rainfall is plentiful. As a matter of fact, the rationing that occurred in Brazil during 2001-2002 (2001-2002 power shortage crisis), could have largely been averted if there had been adequate transmission capacity between the south (excess supply) and the southeast (severe deficit).

Transmission has remained almost exclusively under government control through both federal (Eletrobrás) and state companies (mainly Sao-Paulo-CTEEP, Minas Gerais-Cemig, and Parana-Copel) until recently. However, under the new sector regulatory model, there are about 40 transmission concessions in Brazil. Most of them are still controlled by the government, with subsidiaries under federal company Eletrobrás holding 69% of total transmission lines.

5.2 TYPES OF AUCTIONS

ENGLISH AUCTION

In this kind of auction the price increases again and again until only one bidder remains and the winner takes the object of the auction paying the last price announced. This auction may be represented in several ways. It may happen with the auctioneer announcing the prices or with the bidder telling their own prices or maybe an electronic system may submit the bids and then select the best one. One of the most preferred forms used by the theory is that known as Japanese Buttons. In that auction prices increase continuously as the bidders give up the auction.

The auctioneer raises the price continuously as long as the purchasers that still want to purchase the good remain pressing a button accepting the current price announced by the auctioneer. When the ongoing prices are no longer attractive for a particular bidder, he must leave the auction by stopping pressing the button he was keeping pressed. If he keeps pressing the button it means that he still wants to purchase the good. When a bidder gives up he cannot return to the auction he just left. The remaining bidders are able to see their competitor leaving the auction. The reverse auction can be characterized by the continuous decreasing of the price of the good by the auctioneer.

DUTCH AUCTION

In the Dutch auction, the auctioneer begins with a high initial price and keeps decreasing it continuously, until one only player is emerging accepting to purchase by the price announced at a given time. The first player to accept the price in vogue takes the object for that same price. The reverse mechanics would be beginning with a very low price, which would be raised until everyone but one bidder remained.

Each player must choose at what time he will bid, subject to the fact that no player has bidden yet (because that would have closed the auction). Thus, the player to choose the highest price to say will end up winning

At the beginning of the auction, the players do not know the bids of the opponents. Even so, throughout the game, they may not know the bids of rivals, they will know only the winner's bid, which will be one that was first pronounced in the auction. After this bid, the auction is closed. The players know they will pay the price at which they win the auction.

If there is any difference between the winner's bid for the good it will be at maximum his valuation for that good. And the second best bid which will not be even pronounced in the auction, there will be no incentive to reveal the truth, that is, to bet in the real subjective valuation that is given to the good. This is because if the difference exists, the winner could still win the auction offering less than his valuation, since no less than the second highest bid

There is a trade-off between the probability of winning , which is rising with the bid amount, and the profit for the winner conditioned to the fact that he wins the auction, that will decrease as the bids does, once the winner will have to pay whatever price he has offered in order to win the auction. Telling the truth may not be the best strategy given the functions of distribution and number of players because the player must pay exactly the bid he proposed.

There is no dominant equilibrium, once the decision function depends on the expectations over the valuation for the good by the other competitors. Instead, this auction is according to the Nash equilibrium criterion: each player will come up with his best strategy possible, given the best strategies from the other players.

To conclude, the player will bet a smaller bid than his valuation, since he knows he will have to pay whatever price he bids. He tries to make an estimate of the bid that will just be enough to cover the second best offer, once the second best proposal will never be announced in the auction.

SEALED FIRST-PRICE AUCTION

It is also known as a first-price sealed-bid auction (FPSB). In this type of auction all bidders simultaneously submit sealed bids so that no bidder knows the bid of any other participant. The highest bidder pays the price they submitted. This type of auction is distinct from the English auction, in that bidders can only submit one bid each. Furthermore, as bidders cannot see the bids of other participants they cannot adjust their own bids accordingly. Sealed first-price auctions are commonly used in tendering, particularly for government contracts and auctions for mining leases. Obviously in the reverse case the winner bid would be the one lowest price for selling the good.

Strategically, under the conditions and hypothesis mentioned, this game is equivalent to the Dutch Auction. That means that the set of strategies available for each player is the same. Choosing any bid will yield to the same profit of the players as functions of the other players bid.

In both cases, in the beginning of the auction, the players do not know their opponents' bid. During the game, they will not be able to know their rivals' bid; only the winner's bid will be known. In both cases, the players know that they will have to pay in full for the price of the bid should they ever turn out winners. The optimization is the same and the expected payment from the winner is also the same and that will yield to the same revenue expected by the auctioneer.

SECOND BID SEALED AUCTION

Also known as Vickrey auction, it is identical to the sealed first-price auction except that the winning bidder pays the second highest bid rather than their own. This is very similar to the proxy bidding system used by eBay, where the winner pays the second highest bid plus a bidding increment (e.g., 10%). Although extremely important in auction theory, in practice Vickrey auctions are rarely used.

Within the initial assumptions chosen, such an auction is strategically equivalent to the English Auction. However, in the case of the Second Price Sealed Auction, bids are unknown during the auction.

CLOCK AUCTION

The clock auction represents the current state of the art in multi-product auctions. It can be run either as a "forward" auction, the familiar scenario in which a seller is the auctioneer and prospective buyers make competing bids, or as a "reverse" auction, in which the auctioneer is a buyer who takes bids from prospective vendors. Before the auction begins, the auctioneer announces lot-sizes, price-increments, and numbers of lots available (forward) or required (reverse) for each product.

In the forward auction, prices rise according to proprietary "perfect increment" technology: in each round, buyers indicate how many lots of each product they want to buy at the new, higher prices quoted that round. Buyers can change the distribution of their bids among the various products at each round, although an "activity rule," designed to stimulate participation throughout the auction, prohibits a buyer from increasing the value of its total quantity demanded, as prices rise. The auction ends, and final prices are established, when the market clears for every product: when, for each product, the total number of lots bid upon equals the total number available. The reverse clock auction follow the mirror image of this process, where the buyer-auctioneer's prices continue to fall until the number of lots offered at that price is equal to the number the buyer needs. Whether buying or selling, the clock auction allows the auctioneer to trade with whatever combination of bidders values the exchange the most

5.3 TYPE OF AUCTION USED FOR TRANSMISSION UNDERTAKINGS

REVERSE AUCTION

In the Reverse Auction there is only one buyer, but multiple sellers. That is the case of the Transmission Lines and Substations Auctions for the expansion of the National Interconnected System in Brazil

CLOCK AUCTION

Prices are descending so that they start high and continue to fall until only one supplier is left. Suppliers exit the auction as the price offered by at least one competitor is lower than the lowest he could bid. This is generally the second phase of Transmission Lines and Substations Auctions

Last but not least it must be stressed that one of the objectives of the auctioneer, maybe the main one, is to gather the greatest value for what is sold, or, for reverse auctions, spend the least possible in the purchase of an object or service. Although that may not be the only goal one must have in mind that it is always desirable when planning an auction or preparing to take part in one.

6 TRANSMISSION AUCTIONS AND DEVELOPMENT

In November 24th, 2008, the Brazilian Electricity Regulatory Agency (ANEEL) successfully concluded the transmission auction carried out in Rio de Janeiro. All the 36 lines 22 substations licenses offered were bought by companies and consortiums from Brazil and Spain. The offered proposals had discounts varying between 10% and 19.15%. The average discount was of 16.15%. The public session was conducted by BM&FBovespa. That arrangement will allow the implementation of plants which burn sugar cane bagasse in the states of Mato Grosso do Sul and Goiás and those auctioned lots will allow the flowing of energy generated by those plants.

The auctioned licenses are destined to the construction, operation and maintenance of approximately 2,000 kilometers of new transmission lines and 22 integral substations of the Basic Network, the Generation Centrals Exclusive Interest Transmission Facilities for Shared Connection (ICG) and the Generation Centrals Exclusive Interest and Individual Character Facilities (IEG). The transmission facilities will connect 27 biomass plants and small hydroelectric centrals (PCHs) in the states of Goiás and Mato Grosso do Sul to the National Interconnected System (SIN). The undertakings will generate nine thousand direct jobs and will be put in operation in 18 months after the signing of the license contracts. The total investments for construction of the lines were estimated in R$1 billion (some 500 million U.S. dollars).

In November 26th, 2008, ANEEL held with success the auction of the transmission facilities which will integrate the River Madeira Hydroelectric Complex, in Rondônia, to the National Interconnected System (SIN). It was contested by 15 Brazilian companies and a Spanish one, participating individually or integrating three habilitated consortiums. The auction regarding the licenses of the seven lots was carried out by the Brazilian Electricity Regulatory Agency (ANEEL), at the Rio de Janeiro Stock Exchange, in a public session conducted by BM&F Bovespa.

Rules – The auction of the river Madeira lines was carried out in two stages. The first one selected the technological option, between CC Alternative (characterized by direct current facilities) and HA Alternative (characterized by direct and alternating current facilities, denominated hybrid alternative). The winner was the option whose sum of the smaller bids, which will be delivered via envelope, for their respective lots (A to E) was the smallest. The second stage comprised the auction of the seven lots with the winning technological alternative of the first stage according to the criteria practiced by the Agency in transmission auctions: the winner was the one offering the smallest tax, i.e., the smallest Permissible Annual Income (RAP) for the transmission service.

The choice of two technological alternatives for that auction, established in the Decree no. 6.536, dated of August 11, 2008, of the Ministry of Mines and Energy (MME), was expected to contribute to encourage competitiveness and, consequently, tax moderateness. Legal, technical, economic-financial and fiscal habilitation would occur after the auction public session and only for the contest winners.

The Transmission Lines have an approximate extension of 2,375 kilometers (km) for connection to the National Interconnected System. The facilities are estimated to be put in operation in between 36 to 50 months after signing the license contracts. The estimate of investments for all lots, made by the Empresa de Pesquisa Energética (EPE), is of R$ 7.2 billion (3.6 billion U.S. dollars).

Summing up only these two recent transmission auctions the total amount of investment is of 4.1 billion U.S. dollar, to be used in the construction of 4,375 km of transmission lines plus 25 substations, including two HVDC converter substations. Together the two undertakings are expected to generate up to 30.000 jobs until 2013.

7 TRANSMISSION AUCTIONS AND THE GUARANTEE OF RETURN ON INVESTMENT

Guarantee of Receiving the Return on Investment

The Concession Contract states:

"The guarantee of payment of the installments of the Annual Permissible Revenue (RAP) relative to the BASIC GRID TRANSMISSION UTILITIES will take place through binding of the receivable accounts from all of CONSUMERS connected to the BASIC GRID (SIN), as is established in the GUARANTEE CONSTITUTION CONTRACT, attached to the TRANSMISSION SYSTEM USE CONTRACT (CUST), which is signed between ONS, representing all of the TRANSMISSION CONCESSIONAIRES and each CONSUMER user of the system."

So given that at the moment of the auction the winner still had a comfortable profit margin and that the income from the investment made in the Brazilian Electric Grid is going to be adjusted so that there is no economic loss (e.g. inflation), the investor can set his Return on Investment (ROI) for the next 30 years, which is the period of the concession.

8 FINAL CONSIDERATIONS

After two decades of reformulation in the infrastructure sector, several modifications were observed in various kinds of industries of public services. All over the world the main objective of the reforms has been the introduction of the competition verified in the marketplace structure in government procurement.

The search for competition within those sectors which have their own peculiarities that make it difficult to simply adopt the market structure made the consideration of auctions more and more important. Auctions are mechanisms of buying and selling through bid that may reproduce the competitive structures of commercialization, since fulfilling the right requirements. Besides auctions are mechanisms capable of dealing with issues such as avoiding collusion, attracting private agents and getting a reasonable valuation of the goods and services transactioned through interactions between supply and demand.

While the privatization of existing generation has been stopped by the Government of Brazil, the property rights of existing investors have been respected and private investors are encouraged to participate in new generation and transmission projects. Respecting contracts and property rights is one fundamental characteristic of the stable growth in the electrical sector in recent times, after the privatization process started to take place.

It is assumed that the Brazilian Federal Accounting Court (TCU) is willing to do its best when it recommends to ANEEL to reduce the Annual Permissible Revenue, that is, the Cap Revenue a bidder can bid in the auction. Maybe in the short term it looks like an attractive policy. But in the long run this is not for sure the first best policy because lower revenues tend to decrease the number of participants in the bidding process which will increase the bids value.

The ultimate goal of the Transmission Auctions is exactly to simulate a competitive market in this natural monopoly business of infrastructure. One of the actions that directly foster that competition is to increase the number of competitors for the same undertaking.

The goal of this paper is not a comprehensive study of auctions, but it clearly shows that that has been the best alternative available all over the world, especially in developing countries, to provide the construction, operation and maintenance of infrastructure projects by the private alone, or in partnership with governments.

9 REFERENCES

ANEEL. Brazilian Electricity Regulatory Agency. URL: http://www.aneel.gov.br. Accessed in: March, 2009

Almeida, E. L. F. and Pinto Jr., H. Q. (2005) - Reform in Brazilian Electricity Industry: The Search for a New Model - International Journal of Global Energy Issues 2005 - Vol. 23, No.2/3 pp. 169 – 187

Silva, J. O. et al (2007) Análise e crítica dos leilões públicos de concessão do serviço de transmissão de energia elétrica no Brasil, na perspectiva de modelo eficiente de regulação técnica e econômica. V Congresso Brasileiro de Regulação – ABAR. Recife – PE

Castro e Brandão – (2006) Os leilões de linhas de transmissão e o Risco Brasil – Article published in IFE n. 1.951 from December 18th, 2006

Klein, M. – (1998) Infrastructure Concessions -To Auction or Not to Auction? The World Bank Group b Finance, Private Sector, and Infrastructure Network. Note No. 159 November 1998

Schoenherr, T and Mabert V. A. (2007) Online reverse auctions: Common myths versus evolving reality. Business Horizons (2007) 50, 373–384

Borenstein, S., Bushnell, J., Wolak, F. 2002. Measuring market inefficiencies in California's restructured wholesale electricity market. The American Economic Review 92: 1376-1405

Iimi, A. (2004) Power Market Architecture In India. JBICI Working Papers, No. 15

Estache, A. and Iimi, A. (2008) Benefits from competition for infrastructure procurements and financial needs reassessed. World Bank Policy Research Working Paper 4662

Menezes, Pitchford & Wait: (2003) Tendering and Bidding for Access. Australian Journal of Management, Vol. 28, No. 3 December 2003