WHAT ARE THE CURRENT REGULATORY BARRIERS IN BRAZIL FOR SMALL RENEWABLE POWER PLANTS?

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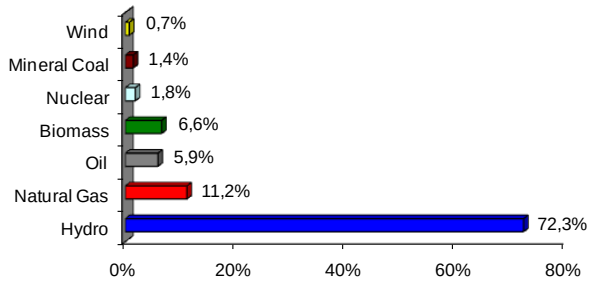
ABSTRACT

The objective of this paper is analyzing the current incentives for renewable energy in Brazil, identifying what are the regulatory barriers for small renewable generators connected into the distribution grid and how to minimize them.

INTRODUCTION

The Brazilian electric matrix is characterized by the strong participation of renewable sources in its structure, especially due to the availability of water resources. Wind power and Biomass sources still have weak participation, but with real perspectives of growing in the next years due to exclusive energy auctions that were organized to those sources and Small Hydroelectric Power Plant - SHP. But solar energy is still restricted to attending isolated communities and universities laboratories.

Picture 1 shows the electric matrix in Brazil, considering only the Brazilian part of Itaipu Binational Power plant.



Picture 1: Brazilian Installed Power

Hydroelectric power plants, which are considered with installed power above 30 MW, are responsible for 95.8% of the hydraulics sources. Therefore, Small Hydroelectric Power Plants - SHPs (with installed power ratings over 1 MW and equal to or less than 30 MW) and Mini Hydroelectric Power Plants - MHPs (under 1 MW) still have a small participation in the Brazilian energy market.

In order to increase renewable energy distributed generation in the country, legal and regulatory incentives were designed to stimulate those plants, allowing larger access to bank financings, reducing the energy commercialization costs and by creating power purchase contracts for long period, through specific energy auctions, public calls and a national program for renewable electric energy.

REGULATION FOR DISTRIBUTED GENERATION

Considering that the participation of wind power, biomass and SHP (<30 MW) is still small in the Brazilian electrical system and seeking to diversify sources of energy, several laws, decrees and ANEEL´s resolutions have created incentives for the installation of such plants.

The Brazilian Federal Law 10438/2002 created a national program designed to stimulate the use of renewable energy resources – Proinfa, especially: Small Hydroelectric Power Plants – SHPs, biomass and wind Power.

After that, Law 10848/2004 established a reform in Brazilian Energy Market, determining, among other things, that all distribution companies must contract sufficient energy to attend their whole market. Therefore, energy has to be contracted by public auctions, Proinfa and public calls for distributed generation.

According to Decree 5163/2004, if the distribution company wants to acquire energy from distributed generation, it must promote public calls, respecting the upper limit of 10% of their energy market (for contracting) and the price limit, which is calculated by ANEEL based on previous auctions.

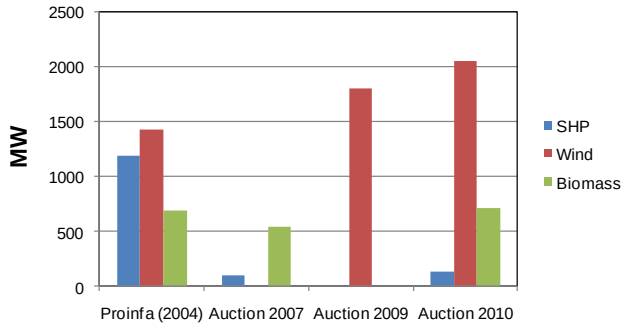
Based on Brazilian current legislation, the main incentives for distributed generation are:

- 50% reduction on distribution or transmission use of the system tariff applied to generators and their respective consumers;
- possibility of selling energy for free consumers (those with demand above 3 MW);
- possibility of selling energy for especial consumers (those with demand above 500 kW in the interlinked system and 50 kW in the isolated system);
- SHPs do not have the obligation to pay financial compensation to the cities that might be affected by theirs small reservoirs, which are not applied to hydroelectric power plants;
- possibility for SHPs getting into MRE, which is as

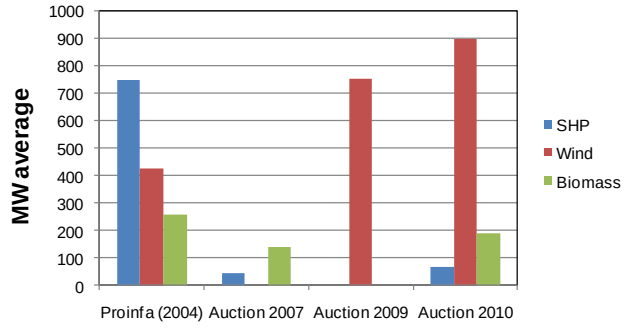
mechanism to reduce the hydrological risks for the participants in the interlinked system;
- exemption from annual investment on Resource and Development, which is an obligation for others generation that must apply 1% of their annual income;
- possibility of selling energy on annual public auctions for all distribution companies, that are promoted by the Mines and Energy Ministry - MME and organized by ANEEL;
- possibility of selling energy in especial auctions for alternative generation;
- possibility of selling energy directly to distribution companies through public calls, but this type of commercialization are limited to 10% of their energy market; and
- small power plants have simplified procedures to obtain access to the grid.

RESULTS ACHIEVED

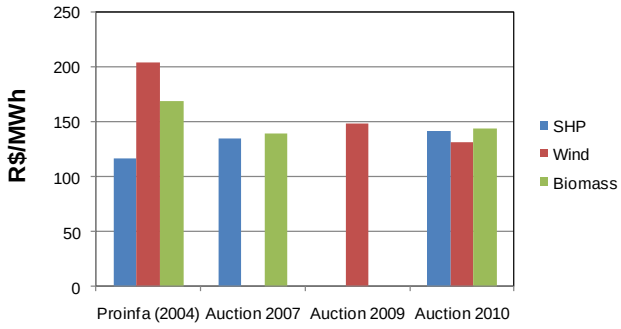
Pictures 2, 3 and 4 show the main results from Proinfa and exclusive energy auctions to wind power, biomass and SHP.



Picture 2: Addition of Installed Power



Picture 3: Energy Trade (MW)



Picture 3: Average Price (R$/MWh)

As presented in Pictures 2, 3 and 4, Proinfa was the first step to insert wind power and biomass (sugarcane) power plants into the energy market, and improve the SHP participation, giving a Power Purchase Agreement - PPA for 20 years. General speaking, the result was positive, but the market and the government expected more participation from biomass source.

The three auctions that were done between 2007 and 2010 can be considered successful for wind power, because it was sold more than 1600 MW average of energy, representing about 3850 MW of installed power, a PPA of 20 years, and with a very competitive prices, as presented in Picture 4.

On the other hand, SHP and biomass power plants didn´t have a good performance, especially because their prices were not so competitive as the wind power, despite the PPA of 15 years for biomass and 30 years for small hydro plants.

Therefore, those actions were an important incentive to the development of wind power industry in Brazil, and new auctions exclusives for renewable energy sources (excluding big hydro) are expected for the following years.

Besides the results presented in those pictures, SHP and biomass entrepreneurs still have the wholesale energy market to act and grow.

HOW ABOUT SMALL RENEWABLE DISTRIBUTED GENERATION?

Despite all the legal incentives for renewable power plants with medium size, there are few opportunities for the small ones (smaller than 1 MW), that are connect directly to the distribution grid, especially in the low voltage lines, like solar photovoltaic, small wind power and biogas plants.

These small generators face legal, technical and regulatory barriers for interconnections, energy trade and financial instruments to make their investment economically viable.

With the objective of reducing the barriers for connecting those small power plants to the grid, at least concerning to its legal competence as the regulator, ANEEL promoted a public consultation from September to November 2010 to know what exactly those barriers are and how to deal with them.

The main topic of this public hearing was a list with several questions that was designed to understand what entrepreneurs, utilities, universities, consumers and others players think about those small plants and how they figure out a way to reduce the regulatory barriers.

Those questions were divided into six major subjects, such as power plants characteristics, interconnections to the grid, regulation, energy trade, new proposals and general issues, in order to map the most important barriers and gather sufficient information to support ANEEL's decisions.

The result of this public consultation was very positive, because 39 different agents representing utilities, universities, consumers, class associations and engineers answered those questions, sending 577 contributions giving their opinion, experience and concerns about small renewable power plants.

These suggestions will be used as a guideline to review ANEEL's rules related to distributed generation, at least concerning to its role as the electricity regulator, in order to allow those small renewable energy plants to succeed, with a minimum tariff impact.

One topic that will be done in 2011 is a revision in the Distribution Code – Prodist, that should include the minimum conditions to allow small power plants to be connected in low voltage lines, and reduce the demands for others voltage levels in the distribution grid.

Another subject that will be studied is the opportunity and availability to implement the net metering system, especially because the tariff parity with some energy sources like micro hydro (less than 1 MW), small wind power (less than 1 MW) and even for solar photovoltaic is very close in some Brazilian concession areas, like in Minas Gerais State, that has one of the highest tariff after tax (R$580/MWh). Table 1 presents the average cost for those energy sources in Brazil.

Table 1: Average energy costs for small plants in Brazil

	R$/MWh
SHP	155
Biomass	144
Wind	131
Solar Photovoltaic	600
Urban Waste	200

It is also important gathering the main information (laws, decrees, resolutions and distribution procedures) at ANEEL's web site, because there are too many rules related to distributed generation that are spread in different documents and this is a barrier for entrepreneurs.

CHALLENGES FOR THE REGULATOR

ANEEL has many challenges to face in order to reduce regulatory barriers for small renewable generators, because many instruments that are used worldwide to incentive those plants can only be done by the Ministry of Mine and Energy or even by the National Congress, like establishing feed-in tariff and energy quotas, for instances.

On the other hand, ANEEL can revise its resolutions and technical procedures to define the main criteria that must be followed by utilities to connect small generators into the grid, including the low voltage level.

Therefore, technical restrictions must be overcome to allow intermittent energy sources that will be installed in residential and commercial facilities to export energy back to the grid, like:

- voltage level control;
- coordination of the protection devices already installed into the grid, in order to protect all electric equipments, including the generator, and guarantee the safety for people (electric shock);
- management of technical loss;
- increase of short-circuit level; and
- harmonic injection and other power quality aspects.

Besides technical issues that should be established, there are some commercial rules that need to be adapted, which could demand legal changes, such as:

- allow utilities to buy energy direct from these small generators without public calls, and paying a higher price;
- improve the wholesale market rules to reduce the barriers for small power plants;
- simplify contracts for connection, use of grid and energy trade; and
- implement net metering system.

In addition, there some administrative procedures that should be revised to reduce the time and cost to small energy producers to built, register the power plant at ANEEL, connect it into the grid and sell the energy.

At least, but not last, ANEEL has in its institutional mission the obligation of always search for the minimum tariffs for consumers, and it is a big challenge to insert intermittent

and high cost energy sources, higher than hydropower plants, with the minimum tariff impact.

CONCLUSION

The Brazilian Electric Matrix is well known by the strong participation of renewable energy, especially hydro. In the last years, wind power and biomass have had an expressive growth.

However, small distributed generation, which is connected to the distribution grid, still faces technical, legal and regulatory barriers.

To sum up, ANEEL has been working on a way to reduce the regulatory barriers, which are under its legal competence, and an public hearing is expected to happen in 2011 to discuss new technical procedures for distributed generation.

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