

## **Brazil**

# Interview with the Brazilian Energy Research Office, EPE

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## INTRODUCTION

In this article, the Deputy Head of the Swiss Business Hub Brazil, Letícia Caritá, interviews Erik Eduardo Rego, the Electric Energy Director at the Brazilian Energy Research Office, EPE, which is linked to the Ministry of Mines and Energy.

Besides his role at EPE, Erik is a Professor at University of São Paulo. He is Graduated in Production Engineering, Bachelor in Economics, and holds a Master and PhD in energy economics from USP. In the past years he has worked as a consultant, university professor and also as the President of the Energy Committee at American Chamber of Commerce.

## INTERVIEW: CLEAN ENERGY OPPORTUNITIES IN BRAZIL FOR SWISS COMPANIES

**Letícia Caritá / SBH Brazil - Brazil is known for a clean energy matrix, especially with hydropower and biomass. For the next years, what other renewable energy sources do you see as the most promising in the country and why?**

**Erik Rego / EPE** - In fact Brazil, is recognized for having either a high renewable energy matrix or an electricity matrix, the former is almost 50% renewable, mainly from biomass and hydroelectric sources, a privileged situation in relation to the world average, whose renewability is lower than 15%. The same can be observed in the electricity matrix, while Brazil reaches more than 85% of renewability, the world average is also lower than 15%. In this case, in addition to hydroelectricity and bioenergy, which together represent 70% of the electricity supply, there are still 17% from wind and solar power plants. Moreover, in the long term, EPE sees the same share of renewability of the electricity matrix. However, hydroelectric power plants may lose their share, from 62% to something around 48%. On the other hand, it is expected a high expansion of solar power plants, whose share of 6% in 2021 may rise to 18% by the end of the decade, because that is the cheapest electricity source, has low construction and operation risks, can be installed in rooftops and it is environmental friendly.

**Letícia Caritá / SBH Brazil - What are the main challenges faced by the Brazilian energy sector today, and where advanced technology could play a role in solving or minimizing them?**

**Erik Rego / EPE** - In most power systems, thermal power plants are the main electricity source, and fuel availability is usually not a problem, so, if the generation during peak demand is enough, to supply electricity during the day will be a piece of cake. Therefore, the power system is design to supply peak demand. On the other hand, in hydro dominated systems like the Brazilian, fuel is not always available because it depends on natural conditions. In such cases, the power system is design considering how much electricity could be generated in a dry season, so the installed capacity is usually large, and therefore it is not a problem to attend peak demand.

For example, in 2018, the average electricity demand in Brazil was 63 average GW - this was the demand for electricity during the year, an average of the values supplied. On the other hand, the peak demand reached 85 GW. In this way, the power system must be able to meet these demands, and have enough left over to compensate for eventual failures of either generation or transmission equipment.

In the past, this issue was “solved on its own” because the country has a hydroelectric based

system, where large reservoirs are able to “modulate” how much electricity should be generated at each moment. In addition, they are able to compensate for any sudden changes in demand or fluctuations in the generation of the so-called intermittent power plants, such as wind power.

Therefore, Brazilian adequacy mechanism was design considering just energy needs, because capacity was implicitly assumed available. However, as I said, the electricity matrix has been changing, hydroelectric power plants built in the last 20 years do not have large reservoirs, and also the hydroelectric generation share is diluting, while the share of intermittent sources has increased considerably. For example, ten years ago, hydropower plants supplied more than 90% of the electricity demand, and EPE projects that in 10 years hydro power plants will represent less than 50% of the system capacity; but wind and solar will represent more than 32% of the system capacity.

Therefore, regarding the Brazilian adequacy mechanism, just considering energy needs - typical of a hydroelectric power system with large reservoirs, it will nor more be enough to supply capacity, which is used implicitly assumed to be available.

So, Brazilian electricity market needs a new adequacy mechanism: capacity, and at this point, in order to keep the renewability share of the electricity matrix, advanced technology will play an important role, such as storage systems, pumped storage hydropower, and portfolio solutions coming from Independent Power Producers, are some examples.

### **Letícia Caritá / SBH Brazil - How does Brazil compare with Europe in terms of energy efficiency? What are the main gaps and opportunities for improvement?**

**Erik Rego / EPE** - The answer about international comparison is not as easy as it seems. All discussions in energy efficiency require, firstly, defining the concept and the boundaries of the systems. For instance, Brazil is significantly more energy efficient than Europe in the power generation system because Brazil has a huge share of primary electricity (hydro, wind and solar), while Europe has a large share of low efficient thermal power plants. When you look at energy efficiency in end-use equipment (such as air conditioning, refrigerator, washing machine, dishwasher, etc.), Europe is more energy efficient, even why its income level is higher than in Brazil. Notwithstanding if you look at energy use per household, Brazil may seem more efficiency because there will be less electrical appliances or less hours of use than in Europe. It is complicated, as I warning you.

The main gap in Brazil is income to afford to invest in more efficient equipment or processes. Lack of information is also a relevant gap in Brazil, as well as cost-effective investment opportunities. Although a lot of improvement has been done, there are still huge opportunities to improve energy efficient standards & regulations, access to funding and information are still a huge opportunity both in industry, commercial and household buildings, and transportation.

### **Letícia Caritá / SBH Brazil - What kind of products or services in terms of improving energy efficiency do you see as the most promising in Brazil for the next 5 or 10 years, and why?**

**Erik Rego / EPE** - We believe that digitalization will be a game changer, by providing timely and accurate information to improve energy management, including through "energy as a services" as a business model. In the end-use equipment level, more efficient air conditioning will be particularly promising because Brazil is a warm country, so that air conditioning stocks

and usage increases significantly with per capita income. Efficient stoves or cooktop will be also very important to deal with energy poverty and cooking needs of low-income families.

**Letícia Caritá / SBH Brazil - Are there any barriers for foreign providers to supply to the Brazilian energy sector (certifications, legislation or even market functioning / cultural differences)? How to overcome them?**

**Erik Rego / EPE** - First, I would like to point out that Brazil has always been very receptive to international investors, there are companies from all parts of the world, and in the electricity market, the participation of foreign companies is very relevant in the three main sectors: generation, transmission and distribution. This participation has been essential for domestic economic development, since foreign investors have always brought innovation, new knowledge, and state-of-the-art technology, and so promoting competition. Brazil is a country with a large and growing market, with many investment opportunities, you all are very welcome to invest in Brazil. Regarding some tips, first study in details the regulation of the Brazilian electricity market, and do not forget to know our culture.

**Letícia Caritá / SBH Brazil - If you could give 3 pieces of advice to a Swiss small or medium-sized company that wants to enter the Brazilian energy market with technological solutions, what would you say?**

**Erik Rego / EPE** - Well, what can I say, as I said before, first of all, I advise you to study the Brazilian electricity market, also talk to those who are already here, either other investors or consultants, learn from the mistakes of those who arrived before. You may consider do some partnerships with companies in operation in Brazil, and hire local professionals who will be a shortcut.

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