

SMART GRID FORUM LATIN AMERICA

SMART GRID[®]
FORUM / 13th edition

January 26 and 27, 2021

CENTRO DE CONVENÇÕES
FREICANECA
São Paulo - SP - Brazil

"Accelerating the energy services digitalization and modernizing the sector in Brazil and Latin America"

Digitizing electricity is the only sustainable path for truly accessible energy prices to the Brazilian society as a whole

*By Cyro Vicente Bocuzzi**

In the last decade, society has been digitizing several activities and services, with the increasing installation of smart devices. This trend has accelerated and continues to accelerate in the past five years, with an explosive creation of applications in the cloud.

And so many of this are the ubiquitous is the surveillance and security systems, even on the peripheries; smart TVs and other smart appliances; the increasingly popular "connected personal assistants"; the increasingly accessible systems and platforms for building and residential management and automation; the microgeneration and water heating systems; the smart elevators; the automatic and digital payment systems.

This year, with the advent of the Covid 19 pandemic, there was also an explosion in the use of apps for shopping and automatic contracting of goods and services, as well as the transformation of homes into multiple purpose places where people work, study, exercise and have fun. Suddenly, overnight, society's degree of dependence on the continuity and quality of essential services has escalated to a level never imagined. And this dependence on electricity and connectivity is the same and always high, either on a neighborhood of high or low income, because all people, regardless of their location or level of income, have come to depend on continuous services for their subsistence and work, with a minimum of comfort and safety. Digitizing electricity, therefore, is a path without return.

The advent of COVID 19, at the same time, brought the need for a new financial bailout to companies in the electricity sector through a bank loan worth around BRL\$ 14.8 billion. The loan is from a 16 banks consortium, 29% of which came from public banks, including the National Bank for Economic and Social Development (BNDES), which coordinated the operation. Most of these resources are intended to cover the fall in revenue stemming from distributors in the electricity sector, caused by the fall in sales (energy demand and consumption) and the increase in delinquency during the pandemic. The loan will be paid with funds that will come from a charge to be added on electricity bills from 2021, which will remain in the energy bill for as long as necessary to repay the entire loan, with an initial five-year forecast. According to ANEEL, the Brazilian Regulatory Agency, the loan also benefits consumers, as it will allow the postponement and installment of extra costs that would be charged to electricity bills as early as 2020. The cost increases are related, for example, to the increase in energy produced by the bi-national (Brazil and Paraguay) Itaipu hydroelectric plant (because of the significant increase in prices quoted in dollar, due exchange rates in recent months), and the increase in the amount paid to remunerate the new energy transmission lines entry into operation and service recently. In practice, therefore, the loan anticipated to distributors the extra amounts that would already be paid by consumers in electricity bills from 2020, while allowing consumers to pay this bill only from 2021. The loan will also pay for the cost of postponing tariff adjustments in the first half of 2020. Despite the loan, companies may request an economic and financial rebalancing of the



concession due to losses caused by the pandemic. The rules of this rebalancing will still be defined by ANEEL.

Always aiming to avoid financial imbalance and protect consumers this is the fifth billionaire bailout to the sector in the last 25 years. The first was due to the RESEB Project - Reform of the Brazilian Electricity Sector, in 1995, which de-verticalized companies and utilities and implemented competition rules and free initiative in the activities of generation and commercialization, keeping transmission and distribution regulated services. At that time, intra-sectoral financial sanitation measures resulted in the National Treasury's assumption of debts of the order of US\$ 20 billion, remaining for future compensation another US\$ 6 billion. The initial US\$ 20 billion, brought to December 2019 values, currently amounts to around BRL\$ 145 billion. In 2002 we had the National Energy Rationing agreement, audited by the Federal Court of Auditors – TCU, which cost another about BRL\$ 78 billion, also in amounts of December 2019. In 2012 we had the Provisory Act MP 579, which caused an impact, also estimated by the National Account Tribunal (TCU), of the order of BRL\$ 147.7 billion in December 2019 values. Then in 2014 occurred another three anticipation and rescue loans for Distribution Companies regarding effects from MP 579, called "The ACR account", which in cash from December 2019, would be another BRL\$ 27.2 billion. Finally we now arrived in 2020 with the Covid 19 account, of BRL\$ 14.8 billion, totaling the incredible figure of BRL\$ 412.7 billion! If we consider an average annual expenditure of these aids, we will have BRL\$ 16.5 billion per year, always seeking to rescue the balance of the sector and, mainly, maintain affordable tariffs for the final costumers.....

Now, after Covid Account 19, the government has just issued Provisory Act MP 998/2020, to address "structural issues "of" the electricity sector. The MP 998 seeks, once again, to reduce tariff pressures on electricity final consumers in the context of the pandemic and post-pandemic. The intention, in theory, seeks to preserve investments in innovation, clean energy and sustainability of distribution concessions, but takes resources devoted to these purposes to distribute as subsidies to avoid unwanted tariff impacts... It aims to accelerate actions of the Modernization of the Electricity Sector, improving the more efficient allocation of costs in the sector, with attention to the consumer, but, in fact, does the opposite, bailing out to address the cost of energy from 2020 onwards. The MP998 seeks to rationalize subsidies, on one hand, but in practice is creating others, of the other hand, appropriating resources for mandatory the Energy Efficient and R&D Programs without specific destination, just to mitigate tariff pressures. Another mistake, in the same direction, which will certainly lead us to the next aid package, in the next crisis.

Because, in fact, the entire proposed modernization is based on the discussions of necessary developments in the current rules and models, initiated by the Public Consultation Number 33 - CP 33, of the previous government, and concerns a new set of rules aimed at expanding access to the free market, reducing subsidies, and defining new necessary rules, such as the implementation of a capacity market (today we have an "all energy market") and implementing hourly pricing mechanisms in the wholesale market. There is no investment effectively planned or stimulated for the modernization of the infra-structure itself, like systems or equipment: it is only paper and change of market and regulation rules, that is, there are no objectively planned investments in the necessary modernization of infrastructure. On the contrary, incentives for

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energy efficiency and technological development for R&D projects have been captured to directly promote tariff restraint in some regions and for some time. Same story repeating itself, from other sector packs of the past.

Meanwhile, Brazil's electricity infrastructure remains the same and technologically outdated in relation to many other countries in the world, where incentives for a more efficient, robust, secure, reliable and low-cost operating networks have been implemented by policymakers and regulators, encouraging companies to make qualified investments to work with distributed energy resources and the integration of digital platforms, increasingly adopted by consumers. This more advanced network allows the adoption of pricing modalities and services impossible to be implemented by conventional networks, in conventional monopolistic systems, where all costs are covered by a single measurement of consumption volume accumulated in the month and the costs and subsidies must be prorated proportionally to all customers.

Smart metering allow the provision of models of supply and pricing of intelligent services and will enable a new competitive market of energy services, where supply and demand will be established increasingly by bilateral transactions, where the regulated tariff is only adopted as a price reference and calculation of the discount. This already works this way for customers eligible for the free market: the comparison of price offers is made between agents and always parameterized in terms of economy compared to the prices charged in the captive market, through the regulated tariffs of the distribution concessionaires.

This bilateral pricing also exists and is increasingly and progressively being used in other markets and previously regulated sectors, such as telecommunications and transportation for example. In transportation services (airplane, taxi and bus, for example), this is through price search platforms specifically devoted to these acquisitions, such as Uber, Cabify, and others, where pre-qualified drivers compete with agencies` regulated transportation, offering estimates and prices bilaterally agreed upon at the time of hiring, where regulated fares are only references over which true prices are offered, negotiated and defined. These prices also consider distances, demand, schedule, traffic forecast and several other factors. The outcome is the possibility of practicing significantly lower prices and the inclusion of a large number of citizens previously excluded from private transport, who have seen in this modality a possible access to a more qualified and affordable transport service, compared to its only alternative until then, the public transportation alternatives. Even in the most sophisticated and expensive services, such as air transportation, fares vary in a wide range, depending on the airports involved, desired flight schedules and the anticipation of purchase, always depending on demand and supply, not to mention loyalty plans and frequency of use, which give access to progressive discounts for more frequent users, promoting effective economic inclusion in practice, differently than subsidies, which generate more dependence and inefficiency, as the story proves.

In the telecommunications market this has also been increasingly practiced: depending on the interest and characteristics of use (voice or video connections, local, interstate or international), internet services, streaming, bandwidth, speed, mobility required, etc..., there are a multitude of plans covering a wide range of reliability, speed, hiring deadlines and uses, from different providers, which compete with each other and for this offer increasingly affordable prices. The telecom sector is also a practical example of social inclusion and universal access in all layers and income ranges, as there are even popular and prepaid plans for all tastes and pockets.

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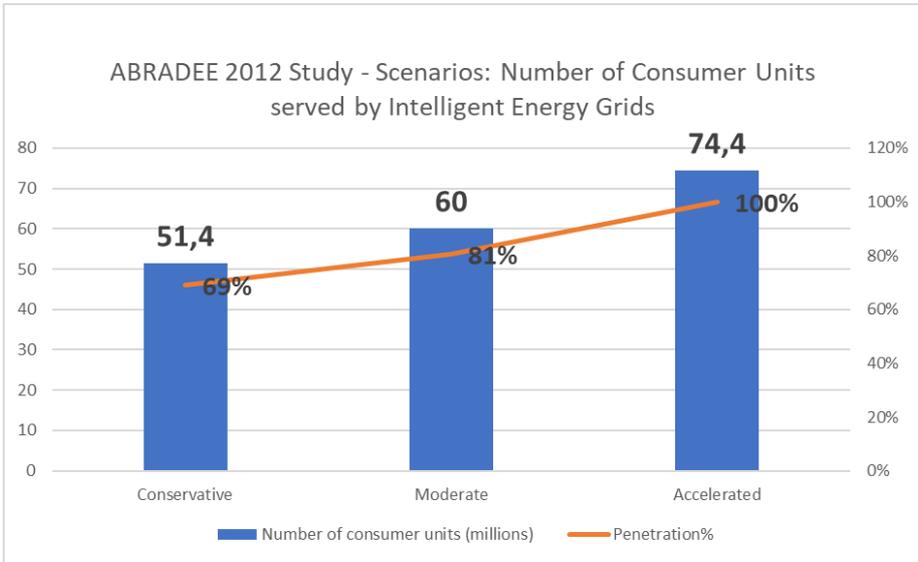
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In the electricity sector, however, and unfortunately, we follow the paradigm and the traditional view that tariffs need to be modest and exclusively defined by policymakers and regulators, which is a mistake.

But when we propose the implementation of innovations in automation, connectivity and intelligent measurement in Brazil, the first question that arises is: "who will pay for this?" These are high investments that will impact costs and tariffs for "poor" consumers.

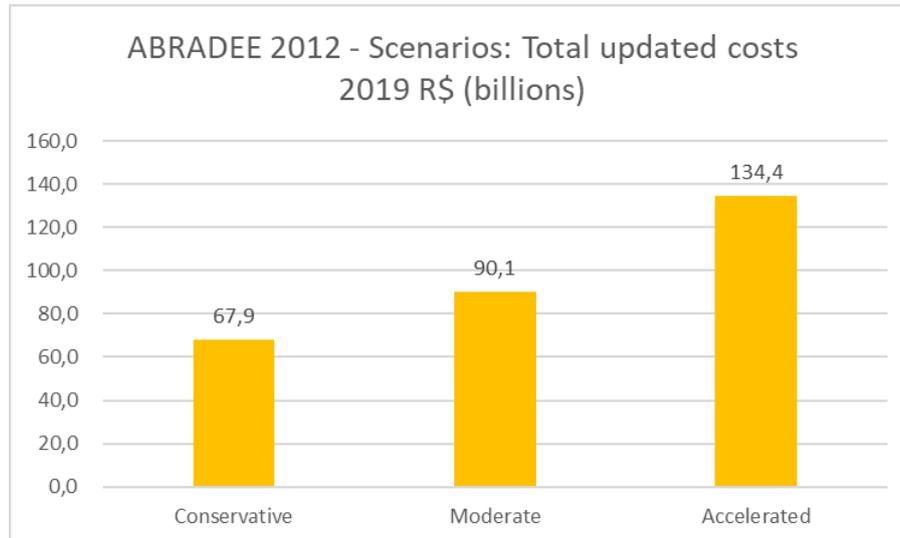
Currently, for example, PLS ACT 232 is being discussed and processed in the Federal Senate, aiming to improve the regulatory and commercial model of the electricity sector with a view to the expansion of the free market, and giving several other measures to reform and modify various laws of the sector. It establishes a period of up to 42 months from the entry into force of the new law for the Executive Branch to present a plan for the complete termination of the minimum load requirement so that consumers can act in a completely liberalized market. In the same period, the Executive Branch should also, among other arrangements, develop a proposal for regulation and actions to improve the infrastructure for metering, billing and modernizing electricity distribution networks, focusing on reducing technical barriers and equipment costs. Once again, an approach looking exclusively at the regulated tariffs paradigms, even if more modern, covering energy and power availability, as well as hourly prices, completely disregarding the new current reality addressed in this article.

Studies developed at the end of 2012 by ABRADÉE – The Brazilian Association of Distribution Utilities for the implementation of the smart grid in Brazil demonstrated investments required in the order of BRL\$ 46 to 91 billion reais at the time for the implementation of systems between conservative, moderate and accelerated scenarios, according to the following graphs, which present the monetary values already updated for the comparative basis of December 2019.



At the time, the conservative, moderate and accelerated scenarios predicted, respectively, degrees of penetration of new technologies by the year 2030 to 100%, 81% and 69% of customers so far existing, 74 million consumer units.

The total costs, estimated at the time, for the implementation of the 3 scenarios, already updated for December 2019, are presented in the following figure:



We propose to disregard, on the one hand, the growth in the number of consumer units to be covered (from 74 million to 85 million, or about 15% in the period), and, on the other hand, the cost-cutting effect of the technologies involved, which would be, by simplification, also estimated at 15% in the period 2012 to 2019. Thus, adopting simply as reference cost for the implementation of smart grids in Brazil the updated value for the accelerated scenario, of about BRL\$ 135 billion reais by 2030, or 13.5 billion per year in ten years, it is possible to realize that it would still be about 18% lower than the average aid that has historically been poured annually in the sector in the last 25 years, as subsidies disguised as tariff modesty and sustainability, but leaving a legacy of dependence and obsolete systems. The implementation of a technologically advanced infrastructure would undoubtedly allow the country's productivity and economic and social inclusion to be leveraged to another level in this essential service.

Also redeeming the costs estimated in these ABRADÉE studies, the following table presents the investments in each scenario, divided into the following main categories: metering; telecommunications; Integration of GD/ VE's; and other costs such as automation and IT:

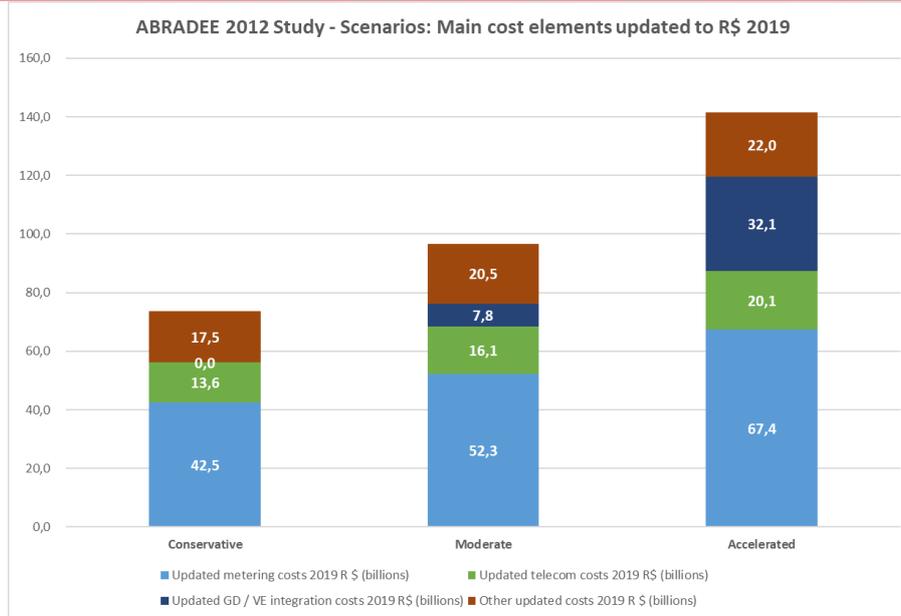
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How then would it be possible to enable the modernization of energy systems, in order to absorb and take effective advantage of the new technologies that customers themselves are implementing in their homes, offices, stores and factories?

That is, a law in slow progress still provides that after its approval it will take 42 months to formulate a plan that should already be implemented in practice in the present, as in many other countries. It is necessary to raise the the Government awareness in all its instances and mobilize public agents policy makers, regulators and industry agents to a new approach and action: in addition to regulatory reforms, undoubtedly necessary and timely, it has passed the time to take effective action to establish and implement the foundations of the real country's electricity infrastructure modernization.

If we do not do this for real, we will increasingly be a society of the excluded of the 21st century and without minimal national security and without economic competitiveness, in our most critical infrastructure and sovereign interest, in the new world reality. Urgently, new paradigms should take place in the retrograde thinking of traditional approaches to the sector, summarized in the following table:

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Traditional and Obsolete Paradigm	New 21st Century Paradigm and DERs
Government as a Provider	Government as a Facilitator
Regulated moderate tariff	Tariffs are for reference only - tariff options - bilateral negotiations
Moderate tariff	Consumer education for the free market and negotiation
Energy policy based on introspective vision and conventional technologies	Energy policy based on advanced technologies and best practices and experience of the international community - align our energy agenda with the international community
Determinative regulation	Regulation based on the new energy policy and principles, goals and consolidated vision of the future - SANDBOXES
Compensation model for distributors based on investments and sales volumes	Compensation models based on energy efficiency, operational efficiency, service maximization and integration and hosting capacity.
Captive and exclusive market models	Inclusive and competitive market models

The framework itself summarizes a number of approaches and visions, but its discussion and detailing, together with the approach that other countries are adopting, are material enough for another article.

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****About the Author and the Latin American Smart Grid Forum.***



Cyro Vicente Boccuzzi is an electrical engineer at Mackenzie University, a post-graduate degree in Business Administration from Fundação Getulio Vargas - FGV and an MBA in Finance and Business Controllershship from São Paulo University - USP. He has worked on a career for more than 28 years in energy companies and held Engineering, Operations and Planning Management and Vice President positions at Brazilian Utilities like former AES Eletropaulo (current ENEL São Paulo) and ENERSUL (Current Energisa Mato Grosso do Sul). He was also Executive Director of former Andrade & Canellas consulting (Current Thymos Energia) and held other positions and directive functions in various entities in the sector and on Boards of Directors throughout his career.

Since 2007 Cyro is Managing Partner of ECOee, an engineering and consulting company focused on energy and technology management, being the Brazilian company pioneer in intelligent energy systems technologies. ECOee works to improve energy services by employing better technologies, innovation, contract intelligence and regulatory knowledge, seeking to offer greater efficiency, profitability and cost reduction in the end use of energy by society. Most of its customers operates on three main markets:

- Companies and associations in the energy sector (G, T, D and C);
- Large energy consumers.
- Energy Innovation, Manufacturing, Services and Technology providers.

To share his experience and knowledge in a broad international network, Cyro structured, organized and chairs the Latin American Smart Grid Forum, which aims to put into practice and to accelerate the introduction of new technologies and innovations in energy, in a sustainable way, in Brazil and Latin American countries.

In 2020, the Forum completed thirteen years of operation, aiming to put into practice and accelerate the introduction of new technologies and innovations, in a sustainable way, in the energy services of Brazil and other Latin American countries.

The Latin American Smart Grid Forum is a collaborative initiative and a NEUTRAL, INDEPENDENT and INCLUSIVE vehicle to mobilize the widest possible stakeholder matrix. It focuses on articulation and synthesis and seeks to develop global collaboration with other entities with the same focus of modernization of electricity and energy services. It advocates the sustainable modernization of current systems, considering technical, economic, environmental, political,



legal and social aspects. It operates in a business-oriented perspective for the implementation of innovative technologies and focus on the next necessary steps.

The Forum seeks maximum excellence and timeliness in each annual meeting, and therefore is already part of the worldwide roadmap for business evaluation and validation on the subject, being the reference focus for studies in development in Latin America. It works closely with other similar entities in the world and represented the region and has worked together with networks of action on the subject under the organization of the International Energy Agency.

Locally, the Forum has worked to raise the objective of increasing engagement and official collaboration of technology companies, governments, legislators, regulators and professionals, Brazilian and Latin American, to enable the advance in the modernization of electricity and energy systems in Latin America and Brazil. It also seeks to facilitate the engagement and participation of energy consumers and society in general in the discussion of the theme in a transparent, balanced and responsible way.

The 13th LATIN AMERICAN SMART GRID FORUM was originally scheduled to be held at the end of September 2020, but the face-to-face edition was rescheduled for January 26 and 27, 2021, at the Frei Caneca Convention Center in São Paulo, Brazil.

This 13th. Edition of the Forum has the official support of ANEEL - National Electric Energy Agency, ANATEL - National Telecommunications Agency and CEPEL - Eletrobrás and has as its central theme: "Accelerating the digitization of energy and the modernization of the sector in Brazil and Latin America".

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