DOI 10.26807/rfj.vi.463

The distributed generation regime in Brazil: The electricity compensation system in Federal Law No. 14,300 of January 2022

O regime de geração distribuída no Brasil: O sistema de compensação de energia elétrica na lei federal nº 14.300, de janeiro de 2022

El Régimen de generación distribuida en Brasil: El sistema de compensación de energía eléctrica en la ley federal n° 14.300, de enero de 2022

Vitor Rhein Schirato
Sao Paulo University (correspondent author)
City: Sao Paulo
Country: Brazil

Felipe de Almeida Ribeiro Campos
Independent legal researcher
City: Sao Paulo
Country: Brazil

Original Article (Legal analysis)
RFJ, No. 13, 2023, pp. 257 - 288, ISSN 2588-0837

ABSTRACT: Federal Law No. 14,300, of January 6, 2022, introduced substantial changes to the Energy Compensation System (SCEE) applicable to consumers with small-sized distributed generation in Brazil until then governed by Normative Resolution No. 482, of April 17, 2022, of the National Electric Energy Agency (ANEEL). The SCEE enables consumer units participating in any of the compensation modalities to reduce the amount of energy consumed with energy injected into the distribution network. It was reformed under the new

Law to update the requirements applicable to consumers to frame the categories of micro and mini distributed generators and of potential beneficiaries; the modalities of energy surplus compensation, the legal framework for energy credits, and the methodology for compensation for electricity consumed, with the creation of transition regimes for the incidence of new tariff components on compensated energy and changes in the application of the availability tariff on the consumer unit that is part of the SCEE and of the contracted demand on the consumer unit with micro or mini distributed generation.

KEYWORDS: Distributed generation, electric power, compensation system.

RESUMO: A Lei Federal nº 14.300, de 6 de janeiro de 2022, introduziu alterações substanciais no Sistema de Compensação de Energia Elétrica (SCEE) aplicável aos consumidores com pequena geração distribuída no Brasil, até então regido pela Resolução Normativa nº 482, de 17 de abril de 2022, da Agência Nacional de Energia Elétrica. O SCEE, que possibilita às unidades consumidoras participantes de alguma das modalidades de compensação o abatimento na fatura do valor da energia consumida com a energia injetada na rede distribuição, teve novidades com a Nova Lei relativas ao enquadramento de consumidor como micro e minigerador distribuído e como beneficiário, às modalidades de compensação do excedente de energia elétrica, ao regime jurídico dos créditos de energia elétrica, e à metodologia de compensação da energia elétrica consumida, com a criação de regimes de transição para a incidência de novas componentes tarifárias sobre a energia compensada e mudanças na aplicação do custo de disponibilidade sobre a unidade consumidora integrante do SCEE e da demanda contratada sobre a unidade consumidora com micro ou minigeração distribuída.

PALAVRAS-CHAVE: geração distribuída, sistema de compensação, energia elétrica.

RESUMEN: La Ley Federal N° 14.300, de 6 de enero de 2022, introdujo modificaciones sustanciales al Sistema de Compensación de Energía (SCEE) aplicable a los consumidores con pequeña generación distribuida en Brasil hasta entonces regido por la Resolución Normativa N° 482, de 17 de abril de 2022, de la Agencia Nacional de Energía Eléctrica (ANEEL). El SCEE permite a las unidades consumidoras participantes en cualquiera de las modalidades de compensación reducir la cantidad de energía consumida con la energía inyectada a la red de distribución. Se reformó bajo la nueva Ley para actualizar los requisitos aplicables a los consumidores para enmarcar las categorías de micro y mini generadores distribuidos y de potenciales beneficiarios; las modalidades de compensación de excedentes de energía, el marco legal de los créditos de energía y la metodología de compensación de la energía eléctrica consumida, con la creación de regímenes transitorios para la incidencia de nuevos componentes tarifarios sobre la energía compensada y cambios en la aplicación de la tarifa de disponibilidad sobre la unidad consumidora que forma parte del SCEE y de la demanda contratada sobre la unidad consumidora con micro o mini generación distribuida.

PALABRAS CLAVE: generación distribuida, sistema de compensación, energía eléctrica.

JEL CODE: O13, P28.

INTRODUCTION

On April 17, 2012, the Electric Energy Compensation System - SCEE was introduced in Brazil, by force of Normative Resolution No. 482 of the National Electric Energy Agency -

ANEEL, which for the first time enabled consumers of electricity from the captive market to compensate in the electricity bill for the energy consumed from the distribution network with energy produced locally or remotely, in small generating plants, connected to consumer units of the same ownership or members of a joint venture, such as shared generation or the venture with multiple consumer units – EMUC. The captive or regulated market is the one in which consumers purchase the energy consumed through the concessionaire or permissionaire of electricity distribution (the "distributor") under regulated conditions. The distributor, in turn, should serve the entire regulated market assigned to it under the terms of its respective instrument granting the public distribution service. Then, the provisions of article 2, caput, of Federal Law no. 10,848, of March 15, 2004: Art. 2 The concessionaires, permissionaires, and authorized public service of electric power distribution of the National Interconnected System - SIN must guarantee the service to the totality of its market, through regulated contracting, using bidding, according to the regulation, which, observing the guidelines established in the paragraphs of this article, will dispose on: (...)

REN 482 thus introduced the two categories of distributed mini generators and microgenerators, according to the installed power of the generating plant connected to the holder's consumer unit, through which regulated consumers were given the possibility of joining the SCEE (Ioan and Dorin, 2014). Originally, the distributed microgeneration corresponded to the generating plant with an installed capacity lower or equal to 100 kW (one hundred kilowatts), and the distributed mini generation corresponded to the generating plant with an installed capacity higher than 100 kW (one hundred kilowatts) and lower or equal to 1 MW (one megawatt). However, these

limits had already been changed by later resolutions of ANEEL. Distributed microgeneration had its maximum limit of installed power reduced to 75 kW (seventy-five kilowatts) by ANEEL Normative Resolution No. 687 of November 24, 2015, while distributed mini generation had its maximum limit extended to 5 MW (five megawatts) by ANEEL Normative Resolution No. 786 of October 17, 2017.

Until the publication of REN 482, the electricity sector in Brazil presented a strong dichotomy between generation and consumption. Generators corresponded to concessionaires, permissionaires, and those authorized to generate electricity through formal concession instruments delegated by ANEEL, with few exceptions. The figure of the Auto producer of Electric Energy is the one that came closest to overcoming the generator-consumer dichotomy since its production of energy is intended primarily for the exclusive use of the producer. However, it still requires a concession instrument granted by ANEEL in the form of authorization. Article 2, II of Federal Decree No. 2,003 of September 10, 1996:

> Art. 2 For the provisions of this Decree, it is considered:
>
> (...) II - Auto-producer of Electric Power, the individual or legal entity or companies gathered in a consortium that receives a concession or authorization to produce electric power for their exclusive use.

The concept of distributed generation itself did not mean, for the regulatory order then in effect, a legal regime specific to the generation that was completely different from the others. Rather, distributed generation was a technical concept: the production of electricity from facilities directly connected to the distribution system. Furthermore, the provisions of

article 14, caput, of the Federal Decree nº 5.163, of July 30th, 2004: Art. 14 For this Decree, distributed generation shall mean the production of electric power originating from undertakings of concessionaires, permissionaire, or authorized agents, including those dealt with in Art. 8 of Law No. 9,074, of 1995, directly connected to the buyer's electrical distribution system, except for that which originates from undertakings.

In these terms the provisions of the original wording of article 3 and its paragraphs, of REN 482. Thus, the same enabling legal titles applicable to traditional centralized generation, connected to large consumer centers through transmission grids, were applied to distributed generation.

The generator-consumer dichotomy was finally mitigated with the introduction of mini generation and distributed microgeneration by REN 482. In addition to the main technical concept of the distributed generation then in effect, mini generation and distributed microgeneration (we will refer to them jointly as small, distributed generation) effectively introduced a special legal regime for the consumption and generation of electricity in Brazil.

The REN 482 introduced a special consumption regime because it allowed the regulated consumer class of small generators distributed exclusively through the SECS to deduct from the amount charged for the electricity consumed in their bills the corresponding amount of electricity generated by their small generating plants (Sosnina, 2019).

Complementarily, the REN 482 introduced a new legal regime for the generation of electricity in Brazil, since small, distributed generators were authorized to generate electricity without the need for an enabling legal title (concession,

permission, or authorization), as long as they applied to the distributor for the connection of the generating plant and fulfilled the other regulatory requirements. In these terms the provisions of the original wording of article 3 and its paragraphs, of REN 482.

However, the legal regime of small, distributed generators and the SECS presented, until recently, a relevant factor of legal uncertainty for its adherents. Unlike other legal regimes for generation, guaranteed and provided for directly by law, small, distributed generation was still provided for exclusively by regulation - REN 482 - and could, in theory, be amended at any time by ANEEL or even lose its effectiveness by a law that would be enacted to the contrary.

Resolving the issue of insecurity, Federal Law no. 14,300 was finally enacted, on January 6, 2022, which established the SECS and the special legal regime for small, distributed generators in national law. Besides this simple, but main change promoted by the new Law, new features were also introduced in the operation of this regime and the SECS, which will be the object of the following chapters.

Before moving on to a detailed analysis of the main points of the new legal framework, it should also be noted that the enactment of this framework seeks to respond, albeit in a transitional manner, as will be seen below, to a demand by different economic agents involved in the electricity sector for greater distribution of costs and charges for the maintenance of the electricity distribution system.

These agents include, on the one hand, the consumer-generators themselves (small, distributed generators), which after the enactment of REN 482, began to receive relevant

discounts on their electricity bills for the energy compensated by the injection of their energy into the distribution grid.

On the other hand, however, there is a portion of the other consumers in the regulated market without their generation - who are afraid of being proportionally more responsible for certain charges and maintenance costs of the distribution and transmission grid -, and especially the distributor, which has observed a reduction in the distribution market in recent years, since, with distributed generation, the distributor sells less electricity to consumer-generators.

1. FRAMING AS DISTRIBUTED GENERATION IN THE NEW LAW

The New Law introduced some changes in the framework of consumers as consumer-generator (or small distributed generators) for adhesion to the SCEE. Two hypotheses of classification were maintained: the holder of a consumer unit with distributed microgeneration or minigeneration. So provides Article 1 of Federal Law No. 14,300/2022: Art. 1 For the purposes and effects of this Law, the following definitions are adopted: (...) V - consumer-generator: holder of a consumer unit with distributed microgeneration or minigeneration.

The basic characteristics of the distributed microgeneration category were not changed by the New Law. Thus, it is classified as an electric power generating plant with installed power lower or equal to 75 kW (seventy-five kilowatts), whose energy source is qualified cogeneration or renewable sources of electric energy. Qualified cogeneration is a type of energy generation provided for in ANEEL Resolution No. 235 of November 14, 2006, which consists of the combined production of heat and mechanical energy, which is totally or

partially converted into electricity, provided that the process meets the minimum energy rationality requirements outlined in the regulation. This is provided by Article 1, item XI, of Federal Law No. 14,300/2022.

Distributed minigeneration, in turn, has undergone some changes. According to the REN 482, as updated, the generating plant with an installed capacity greater than 75 kW (seventy-five kilowatts) and less than or equal to 5 MW (five megawatts) was classified as mini generation, and these limits apply to both traditional and renewable sources of electricity. That was the provision of article 2, item II, of REN 482, as amended by ANEEL Normative Resolution No. 786, of October 17, 2017.

The New Law established some differences in the maximum installed capacity of the generating plant according to the source of generation. The maximum power of 5 MW (five megawatts) was maintained for hydroelectric plants, qualified cogeneration, biomass, and biogas, but for generating plants from wind, solar or other sources not listed in the law, the maximum power limit for classification as mini generation was reduced to 3 MW (three megawatts). This is provided by Article 1, items IX and XIII, of Federal Law No. 14,300/2022.

However, as a transition mechanism, the New Law determined that consumer units with a distributed generation already existing on the date of publication of the Law (January 7, 2022) and those that file their request for access to the distribution grid within 12 (twelve) months of the date of publication of the Law may maintain the 5 MW installed power limit until December 31, 2045. Therefore, the maximum limit of 3 MW (three megawatts) for the installed power of distributed

mini generation will only be applied to units that request access to the distributor as of January 8, 2023. Thus, the generating plants that exceed the limits of installed power foreseen by the New Law, observing the transition rule, will be forbidden to join the SECS. In this case, these generating plants may have their energy destined for the commercialization of energy in the free market or the participation in energy auctions of the regulated market.

In any case, to prevent interested consumers from artificially seeking the most beneficial classification of a plant with greater installed power as distributed microgeneration or minigeneration, the New Law prohibited the division of a generating plant into smaller units for classification purposes, a procedure known as "dismemberment of a plant". So provides Article 11, paragraph 2, of Federal Law No. 14,300/2022.

In this regard, it should be noted that the New Law did not impose a limit on the number of mini or micro-distributed generation plants that the same consumer-generator my own, and the consumer's autonomy should prevail on this point. In this way, the prohibition to dismember the plant does not translate into the imposition of a general maximum limit of installed power per consumer-generator, but only in the maximum limit of installed power per consumer plant for classification purposes.

Thus, the same consumer-generator may be the holder of different consumer units with the mini or micro-distributed generation, provided that such units cannot be considered the result of the dismemberment of a larger plant. ANEEL has not regulated, to date, the exact criteria for considering smaller plants as a split of a larger plant. However, the stipulation of

such criteria will likely be related to the physical proximity between the plants, the contiguity of the properties where they are installed, and/or the sharing of network infrastructure (such as the same power substation).

Additionally, the New Law allowed that the public lighting installations of a municipality may be considered a consumer unit with distributed generation for adhesion to the SCEE, provided that the regulations on the subject to be issued by ANEEL are observed. Article 20 of Federal Law No. 14,300/2022 provides in this regard.

On the other hand, the New Law prohibited free and special consumers who exercise the option to purchase electricity in the Free Contracting Environment - ACL from joining the SCEE and prohibited the classification as a small, distributed generation to generation projects that already have legal titles (concession, permission, or authorization) to sell energy in the ACL or the Regulated Contracting Environment - ACR, whose generated energy would already be committed with any distributor. This is provided by Article 9, sole paragraph, of Federal Law No. 14,300/2022.

2. THE SECS

The Electric Energy Compensation System or SCEE is what enables consumers in the regulated market (who buy energy directly from the distributor) with mini and/or micro-distributed generation to compensate, in their electric energy bill, the amount to be paid for electric energy consumed from the distribution network with the amount of electric energy injected from the generating plant. In this way, the electric energy injected into the distribution network is ceded as a free loan to the distributor, and the distributor must compensate the

consumer-generator by reducing the amount charged for the energy consumed from the distribution network in the same billing cycle or subsequent billing cycles. This is provided by Article 9, sole paragraph, of Federal Law No. 14,300/2022.

According to the New Law, the measurement and calculation of the amount of electric power injected into the distribution network, the amount of active electric power consumed, and the eventual surplus of electric power verified (positive difference between the energy injected and the energy consumed) must be conducted by the distributor at each billing cycle, and must be performed by tariff station, when applicable. This is provided by Article 12 of Federal Law No. 14,300/2022. Then, at each billing cycle, for each tariff station, the electric power distribution concessionaire must calculate the amount of active electric power consumed and the amount of active electric power injected into the grid by the consumer unit with distributed microgeneration or minigeneration in its respective concession area. This is provided by Article 9, sole paragraph, of Federal Law No. 14,300/2022.

The compensation described above may occur by up to four distinct and successive mechanisms. In the first two mechanisms, the compensation occurs in the same consumer unit to which the generating plant with distributed micro or mini generation is connected and in the same billing cycle. These four procedures, which we refer to here as mechanisms, are not systematically set out in Federal Law No. 14,300/2022 but can be inferred from the analysis of its provisions. These mechanisms should not be confused with what the New Law calls compensation modalities, which, as we will see below, are conditioning categories of what we call here tertiary and quaternary compensation.

Firstly, the electric energy injected into the distribution grid by the consumer unit with mini or micro-distributed generation will compensate for all the active electric energy consumed by the same consumer unit calculated in the same tariff station of the same billing cycle (in the same month). If the amount of electric energy injected is lower than the amount of energy consumed, the energy injected will be completely compensated only by this first mechanism, with no advance for the following ones. In this case, the consumer will have an immediate discount (in that same billing cycle), equivalent to the energy injected, in the amount charged in the invoice for the energy consumed in that same tariff station and must pay the distributor the residual value corresponding to the energy consumed that was not compensated. Moreover, the provisions of the first part of Article 12, § 1, of Federal Law No. 14,300/2022:

> Art. 12 (...)
>
> § 1 The surplus electricity from a tariff station must be initially allocated to the same tariff station and sequentially to other tariff stations of the same consumer unit that generated the electricity and, subsequently, to one or more of the following options.

In the shared generation and EMUC compensation modalities, which will be analyzed below, the New Law seems to allow an exception to this rule. Along these lines, in the two modalities mentioned above, all the electric power injected could, at the holder's discretion, be distributed as a surplus to other connected consumer units, even if energy consumption was calculated in the consumer unit to which the generating plant is connected. In this regard, check the provisions of the second

part of article 1, item VIII, of Federal Law no. 14,300/2022. In the shared generation and EMUC compensation modalities, which will be analyzed below, the New Law seems to allow an exception to this rule. Along these lines, in the two modalities mentioned above, all the electric power injected could, at the holder's discretion, be distributed as a surplus to other connected consumer units, even if energy consumption was calculated in the consumer unit to which the generating plant is connected. In this regard, check the provisions of the second part of article 1, item VIII, of Federal Law no. 14,300/2022.

Although the New Law does not conceptualize each of the four mechanisms, this first mechanism could be called, due to its characteristics and operation, primary compensation or compensation of the energy injected in the same tariff station.

This is provided by the first part of Article 1, item VIII of Federal Law No. 14,300/2022:

> Art. 1 (...)
>
> VIII - electric power surplus: the positive difference between the electric power injected and the electric power consumed by the consumer unit with distributed microgeneration or minigeneration owned by the consumer-generator, determined by tariff station at each billing cycle.

This mechanism could be called secondary compensation or immediate compensation of the surplus in the other tariff posts of the unit with generation. It is the provision of the second part of article 12, § 1, of Federal Law No. 14,300/2022:

> Art. 12 (...)
>
> § 1 The surplus electricity from a tariff station must be initially allocated to the same tariff station and sequentially to other tariff stations of the same consumer unit that generated the electricity and, subsequently, to one or more of the following options.

On the other hand, if the electrical energy injected is higher than the electrical energy consumed in the same tariff station, all this consumed energy will be compensated and the remaining difference will constitute surplus electrical energy. This is provided by the first part of Article 1, item VIII of Federal Law No. 14,300/2022:

> Art. 1 (...)
>
> VIII - electric power surplus: the positive difference between the electric power injected and the electric power consumed by the consumer unit with distributed microgeneration or minigeneration owned by the consumer-generator, determined by tariff station at each billing cycle.

Initially, this surplus electricity shall be allocated to the other tariff positions of the same consumer unit to which the power plant is connected. This mechanism could be called secondary compensation or immediate compensation of the surplus in the other tariff posts of the unit with generation. It is the provision of the second part of article 12, § 1, of Federal Law No. 14,300/2022:

> Art. 12 (...)
>
> § 1 The surplus electricity from a tariff station must be initially allocated to the same tariff station and sequentially to other tariff stations of the same consumer unit that generated the electricity and, subsequently, to one or more of the following options.

In sequence, if the energy consumption verified in all the tariff posts of the consumer unit with distributed generation is completely compensated with the calculated surplus, and there is still a surplus not compensated, the residual value of this surplus may have different destinations, depending on the compensation modality chosen by the consumer. The compensation modalities presented by the Law could properly be called tertiary and quaternary compensation modalities or simply surplus destination modalities, to differentiate them from the first two compensation mechanisms that apply, as a rule, regardless of the modality chosen.

The modalities will establish the way and the possibility of application of the tertiary compensation mechanism (compensation by other consumer units in the same billing cycle). About the tertiary compensation and the destination of the surplus, the third part and the clauses of article 12, § 1, of the Law:

> Art. 12. (...)
>
> § The surplus electricity from a tariff station should be initially allocated to the same tariff station and sequentially to other tariff stations of the same consumer unit that generated the electricity and, subsequently, to one or more of the following options:

> I - same consumer unit that injected the electric power, to be used in subsequent billing cycles, transformed into electric power credits;
>
> II - other consumer units of the same consumer-generator, including parent company and branches, served by the same electric power distribution concessionaire or permissionaire;
>
> III - other consumer units located in the undertaking with multiple consumer units that injected the electric power; or
>
> IV - consumer units of the holder of shared generation served by the same electric power distribution concessionaire or permissionaire.

Firstly, the surplus may be destined for the same consumer unit that generated it, becoming electric energy credits, to be used for compensation of energy consumed in future billing cycles. This modality is called local self-consumption. This is provided by Article 1, the item I of Federal Law No. 14,300/2022:

> Art. 1 (...)
>
> I - local self-consumption: modality of microgeneration or minigeneration distributed electrically close to the load, participant of the Electric Energy Compensation System (SCEE), in which the surplus electric energy generated by a consumer-generator consumer unit, natural or legal person, is compensated or credited by the same consumer unit. This compensation modality may be useful when a high seasonality index is verified in the generation of electric energy of the power plant.

> In this way, the energy generated in the summer could generate electric energy credits to be deducted from the energy bill consumed during the winter.

Alternatively, the surplus may be destined for another consumer unit owned by the same individual or legal entity that owns the consumer unit as micro or minigeneration, provided that both or all the participating consumer units are located in the concession area of the same distributor. To this second modality, the New Law attributes the denomination of remote self-consumption. So provides Article 1, item II of Federal Law No. 14,300/2022:

> Art. 1 (...)
>
> II - remote self-consumption: modality characterized by consumer units owned by the same legal entity, including parent and branch offices, or individuals who own consumer units with distributed microgeneration or minigeneration, with all consumer units being served by the same distributor.

In this case, the surplus may compensate the electric energy consumed by the beneficiary unit of the holder in the same billing cycle in which it was generated, contributing to the corresponding discount or rebate in the electric energy bill, or, if the surplus is higher than the energy consumed by the beneficiary unit in that billing cycle, it will be transformed into electric energy credits to be used for compensation in future billing cycles, following the mechanism exposed above. So provides Article 1, item II of Federal Law No. 14,300/2022:

> Art. 1 (...)
>
> II - remote self-consumption: modality characterized by consumer units owned by the same legal entity, including parent and branch offices, or individuals who own consumer units with distributed microgeneration or minigeneration, with all consumer units being served by the same distributor.

In the shared generation compensation modality, the surplus verified in a consumer unit with distributed micro or mini generation may be destined to consumer units of other holders, whether they are individuals or legal entities, provided that all the holders of the participating consumer units integrate the same civil entity for shared generation and that the units are in the concession area of the same distributor.

The New Law introduced a major innovation in this type of compensation by allowing consumers to join for shared generation purposes using voluntary civil or building condominiums or any other form of civil association instituted for this purpose, in addition to the possibilities of consortium or cooperative, already contemplated by REN 482. This flexibility means, in practice, that the Law expands the number of potential consumers capable of "purchasing" energy from distributed micro and mini-generation projects by joining an association for a shared generation. The amendment also allows for the diversification of business models in the distributed generation sector, contributing to an increase in market competitiveness. In this regard, see the provisions of article 1, item X of Federal Law No. 14,300/2022, and article 2, item VII of REN 482, as amended.

Finally, the compensation modality enterprise with multiple consumer units or EMUC may be formed by the set of consumer units located in the same property or contiguous properties, without separation by public roads or by other properties that do not integrate, in which the facilities to serve the common use areas constitute a distinct consumer unit, to which the generating plant with mini or micro distributed generation is connected. The physical proximity between the consumer units of the EMUC, often coinciding with the condominium building, is one of the main differences in this compensation modality for a shared generation.

In this case, the surplus verified in the consumer unit of the common use areas may be distributed among the other consumer units integrating the enterprise (this is the provision of Article 1, item VII, of Federal Law No. 14,300/2022).

In all compensation modalities with the plurality of participating consumer units (that is, except for the local self-consumption modality), the consumer-generator holder of the consumer unit with distributed generation may establish the criterion for distribution of the surplus among the beneficiary units. The distribution may occur by percentage (e.g. 60% for one unit, 40% for another), as already provided by REN 482, or by priority (e.g. destination of the surplus to consumer unit X until full compensation of its consumption, with the destination of the remaining surplus to consumer unit Y, to the extent available), a new possibility introduced by the Law. This is the provision of Article 1, item VII, of Federal Law No. 14,300/2022. Also, this is provided by Article 14, caput, of Federal Law No. 14,300/2022.

3. LEGAL REGIME OF ELECTRICITY CREDITS

As seen above, after all the possibilities of compensation of the surplus in the same billing cycle have been exhausted - either by the consumer unit with distributed micro or mini generation or any other beneficiary unit that has received it in the modalities of remote self-consumption, shared generation or EMUC - the surplus not compensated will accumulate in the beneficiary consumer unit and will be transformed into electric energy credits.

The electric energy credits, in turn, will be allocated to the beneficiary consumer unit (which in the case of local self-consumption, will be the unit with micro or minigeneration) and may (i) be used in subsequent billing cycles to compensate for the electric energy consumed; or (ii) be sold to the distributor.

In this line, the electric energy credits shall be registered in the beneficiary consumer unit in terms of active electric energy (kWh), and their accumulated amount cannot be changed due to the variation in the electric energy tariff values. For compensation for the energy consumed by the consumer unit, the oldest credits shall always be used to the detriment of the most recent ones. The credits are valid for 60 (sixty) months from the billing date in which they were generated, and their corresponding value will be destined to the tariff in case of expiration of this term without the use of the credits by the consumer.

With the distribution of credits among the consumer units benefiting from the SCEE, in addition to the criteria for sharing the surplus allowed to the consumer and already explained above, the New Law innovated by conferring the right to reallocate credits accumulated by a consumer unit to another

consumer unit of the same ownership, upon simple notification to the distributor. Under REN 482, reallocation could occur only in the event of closure of a consumer unit, meaning that, in practice, many consumer units accumulated excess credits that they could hardly use or allocate to another unit. This change consists of one of the main flexibilities conferred by the New Law to the electric energy credit distribution regime.

4. CHANGES IN THE ENERGY COMPENSATION METHODOLOGY IN THE SECS

In addition to the novelties presented in the previous topics, the New Law introduced three substantial changes in the methodology for the compensation of electric energy in the SECS, which directly impact the viability and financial return of distributed micro and mini generation projects. They are: (i) the transition regimes for the incidence of tariff components in the compensated energy in the SECS; (ii) the correction of the "duplicity" in the collection of the availability cost for consumers in tariff group B; and (iii) the application of the TUSD Generation to consumers-generators in tariff group A with distributed generation.

4.1. Transition Regimes for the Incidence of Tariff Components on Compensated Energy

The main change in the methodology for calculating the compensation of electric energy in the SECS consists of the provision for the incidence of tariff components related to the operation and maintenance of the distribution electric system on all the energy compensated in new distributed micro and minigeneration projects, as will be seen below.

According to the Tariff Regulation Procedures approved by ANEEL in the form of Normative Resolution No. 1,003, of February 1, 2022 - PRORET, the monthly billing of users of the electricity distribution system is made by charging the Energy Tariff - TE and the Distribution System Use Tariff - TUSD. Both are applied on the amount of energy consumed and, on the demand, contracted by the user, when applicable, to calculate the final amount to be paid in a billing cycle to the distributor.

Along these lines, under the REN 482 compensation rules, the energy compensation that occurs under the SCEE is considered as parity, since 1 MWh (one megawatt-hour) injected into the distribution grid completely offsets all the costs of 1 MWh (one megawatt-hour) consumed from the distribution grid. In this way, the consumer only needs to pay the bill for energy consumed that is not compensated, without the incidence of any TE or TUSD tariff component on the compensated energy.

Also, according to PRORET, TUSD is composed of three tariff components: (i) TUSD Transport, which in turn comprises TUSD Fio A - corresponding to the regulatory costs for the use of transmission systems - and TUSD Fio B - corresponding to the regulatory costs for the use of assets owned by the distributor itself, including distribution system administration, operation, and maintenance costs; (ii) TUSD Charges; and (iii) TUSD Losses.

Thus, it can be observed that the equal compensation allowed to small, distributed generators under REN 482 exempts them from paying the TUSD and especially the TUSD Fio B - its main tariff component, which remunerates the distribution services - on all the compensated energy. This exemption allows

small, distributed generators to currently bear comparatively less of the costs of maintaining and operating the distribution system than other consumers in the regulated market. This difference is seen by some as a necessary cross-subsidy to stimulate a renewable energy source in the national electricity matrix, while by others, it is an injustice to the regulated consumer who is outside the SECS.

The second view seems to have prevailed over the legislator for the enactment of the New Law. Thus, transitional regimes were instituted so that the compensation of electricity under the SCEE ceases to be parity and becomes partial, with the gradual incidence of TUSD components - mainly the TUSD Fio B - on all electricity compensated by consumer units participating in the SCEE, no longer being limited to the incidence of these tariffs on the amount of energy not compensated.

In practice, this means that after the incidence of the tariff components, the electric energy injected will have a slightly lower value than the electric energy consumed, increasing the operating costs of distributed generation with those practiced under the REN 482.

However, due to the sensitivity of the topic, the New Law instituted transition regimes to safeguard the legal security of already existing projects and to mitigate the effect of the incidence of these tariff components on the viability of future distributed generation projects.

The first transition regime instituted by the New Law consists simply of the continuity of the surplus valuation rules of REN 482 until December 31, 2045 (that is, for almost 24 years after the enactment of the New Law). This transition regime applies to all the developments already existing on the

date of publication of the New Law and to those that file the access request within 12 (twelve) months from its publication, constituting a "window of opportunity" for the maintenance of the parity compensation until the deadline provided by the Law.

Regarding this final deadline for framing in the first transition regime, it is important to highlight that the law expressly states that the access request must be filed with the distributor within 12 (twelve) months. The protocol of the access request is the first step in the connection procedure of a distributed micro or mini generation plant with the local distributor, not to be confused with the later phases of issuing the access opinion, signing the access opinion, or signing the contracts for access to the distribution network. These later phases, therefore, may occur after the period of 12 (twelve) months from the publication of the Law.

In any case, a second deadline must be observed for this later phase to start the injection of energy by the power plant in the distribution grid, to ensure the maintenance of the framework in this first transition regime. This second deadline is counted from the issuance of the access opinion by the distributor and varies between 120 (one hundred and twenty) days for microgeneration, 12 (twelve) months for minigeneration of solar source, and 30 (thirty) months for minigeneration of other sources.

The New Law also provided for other three transition regimes, all applicable to consumers who file an access request after 12 (twelve) months from the publication of the New Law, with the three having as a common characteristic the levy of the TUSD Fio B on all the energy compensated in the respective consumer units as of 2023.

In the second transition regime, applicable to the consumer units that file an access request between the 13th (thirteenth) and the 18th (eighteenth) month counted from the publication of the New Law, the incidence will occur gradually, starting with the incidence of 15% (fifteen percent) of the TUSD Fio B as of 2023 until reaching 90% (ninety percent) as of 2028, maintaining this percentage (and the transition regime itself) until the end of 2030. The third transition regime, in turn, applies to consumer units that file an access request as of the 19th (nineteenth) month of the publication of the New Law, and has the same characteristics as the previous one, with the sole exception that in this regime the transition rules will only be in force until the end of 2028.

Finally, the fourth and last transition regime, applicable to units with distributed mini generation with installed capacity greater than 500 kW (five hundred kilowatts) that meet some specific energy and corporate requirements, consists in the incidence until the end of the year 2028 of 100% (one hundred percent) of the TUSD Fio B, 40% (forty percent) of the TUSD Fio A and 100% (one hundred percent) of the Research and Development (P&D), Energy Efficiency (EE) and the Supervision Tax of Electric Energy Services - TFSEE.

After the end of each transition regime provided by the New Law, the respective distributed generation projects covered by it must adhere to the single post-transition regime for the valuation of credits. However, the New Law gave great indeterminacy to the compensation rules of this future regime.

On the one hand, it established that all consumer units will be invoiced by the incidence of the TUSD components on all the electric energy consumed from the grid and on the

use or demand. On the other, it established that all benefits to the electrical system provided by micro and mini-distributed generation plants should be deducted from the amount billed. Along these lines, the Law granted the National Energy Policy Council (CNPE) the duty to establish the guidelines for valuation of the costs and benefits of small distributed generation within 6 (six) months of publication of the Law, and ANEEL the duty to establish the calculations for valuation of such benefits, following the guidelines approved by the CNPE, within 18 (eighteen) months after publication of the Law.

4.2. The Cost of Availability

In contrast to the transition regimes of surplus valuation, which increased costs for small, distributed generation, the New Law also brought changes in the compensation methodology that benefit the consumer-generator, such as the end of "double" charging for the cost of availability for consumers in Tariff Group B.

The availability cost is the minimum billable amount of energy that must be paid in every billing cycle by the consumer of Group B, to remunerate the distributor for the constant availability of energy to the consumer.

Under REN 482, many consumer-generators in Group B have the impression that they are paying the cost of availability "twice" since the standard provides for the minimum collection of the cost of availability in every billing cycle also for consumer units participating in the SECS but does not stipulate any rule that excludes from the compensation calculations the portion of active energy consumed that must be paid anyway by the consumer as availability cost. Thus, the consumer perceives a

double financial impact, because he pays the cost of availability with credits and with money every billing cycle.

The text enacted in the form of the New Law responded to consumers' demands for the elimination of this duplicity in two distinct ways. For consumers under the first transition regime described above, the New Law prevented the value of the availability cost from being counted as part of the energy compensated with credits, and it must only be paid in currency, separately, without debiting the value corresponding to the availability cost in the number of credits used in the consumer unit.

With a similar economic effect, for the other transition regimes, the New Law excluded the need for separate payment of the availability cost. For these, the availability charge must only be applied when the measured consumption is lower, and the verified difference must be paid by the consumer.

4.3. The TUSD Generation in Small Distributed Generation

The New Law introduced yet another novelty to the compensation methodology in the SCEE. This time, the beneficiaries are Group A consumers, a group that, as a rule, needs to contract demand with the distributor to guarantee the availability of the energy needed in the grid at the time of use.[1]

The novelty consists in the possibility of consumer units with mini generation paying for the contracted demand for the injection of the energy generated in the distribution network at a tariff significantly lower than the one charged on

1 Group A consumers, except for those who can and choose to be billed as Group B consumers ("B opting"), have the blue or green hourly tariff mode and are required to contract demand with the distributor.

the contracted demand for consumption. This special tariff is called TUSD Generation or simply "TUSD g".

Along these lines, TUSD Generation is a special tariff for power plants regulated by Submodule 7.4 of the PRORET. Although its specific value varies according to the concession area where the plant is located, it is usually, on average, considerably lower than the TUSD Demand or TUSD Load, corresponding to the common energy consumption demand of a consumer unit.

The Generation TUSD will be immediately applied to distributed generation projects governed by the new transition regimes (for which an access application is submitted to the distributor after twelve months from publication of the Law), but may only be applied to projects under the first transition regime - which covers existing generating plants and those that apply for access within twelve months of publication of the Law - as from the first tariff review by the local distributor after the publication of the Law

CONCLUSIONS

As seen above, Federal Law No. 14,300/2022 introduced important changes to the legal regime of small, distributed generations in Brazil. Firstly, by instituting the SECS by law, it conferred greater legal security for consumers participating in this market. The New Law also introduced novelties that made the system's compensation modalities more flexible, making it possible, in the case of shared generation, for consumers to join through any form of civil association permitted by law, contributing to the expansion and diversification of the distributed generation market. The distribution of the surplus and credits was also made more flexible with the introduction

of a new criterion of eligible distribution by the consumer-generator, namely the distribution among the beneficiary units in order of priority, and with the new possibility of reallocating credits already accumulated by a consumer unit to another unit of the same ownership, by simple request to the distributor.

As for the SCEE's compensation methodology, the New Law introduced transition regimes to allow the incidence of TUSD tariff components - especially the part relating to the operation and maintenance of the distribution network itself - to new distributed generation projects, as a way to address the growing concern of part of the electricity sector regarding the increase in maintenance costs for other consumers in the regulated market but creating mechanisms to preserve the legitimate expectations of consumers who made their investments under the previous rules of REN 482. On the other hand, new projects may gain in efficiency with the end of the "double" charging of the cost of availability, for Group B consumers, and with the introduction of the Generation TUSD, for Group A consumers.

Finally, it is worth noting that all changes that did not require a change in regulations or procedures of the distributor became effective immediately upon publication of the Law. In all other cases, distributors and ANEEL were able to adjust their regulations and procedures within six (6) months after the publication of the Law.

REN 482, in turn, was not formally revoked by the New Law, but all its provisions that diverge from the New Law ceased to be in force as of its publication, due to the principle of hierarchy of norms. Thus, ANEEL must update REN 482 to adapt it to the new contours of the SECS stipulated by law.

REFERENCES

Câmara dos Deputados do Brasil. (1995). Law No. 9,074, of 1995.

Ioan Dulu, L. and Dorin Bic, M. A. (2014). Distributed Generation Technologies and Optimization. *Procedia Technology*, 12, pp. 687-692.

National Electric Energy Agency ANEEL. (2015). Normative Resolution No. 687 of November 24, 2015.

National Electric Energy Agency ANEEL. (2017). Normative Resolution No. 786 of October 17, 2017.

Presidência da República da Brasil. (2004). Federal Decree nº 5.163 of July 30th, 2004.

Presidência da República da Brasil. (2004). Federal Law no. 10,848, of March 15, 2004.

Presidência da República da Brasil. (2022). Federal Law No. 14,300, of January 6, 2022.

Presidência da República da Brasil. (2022). Federal Law No. 14,300/2022.

Presidência da República da Brasil. (2022). Federal Law No. 14,300/2022.

Sosnina, E. N., Shalukho, A. V., Lipuzhin, I. A. and Voroshilov, A. A. (2019). The Increase of Small Distributed Generation Efficiency, *2 019 IEEE Conference of Russian Young Researchers in Electrical and Electronic Engineering (EIConRus)*, pp. 1103-1107.

Received: 10/08/2021

Approved: 09/26/2022

Vitor Rhein Schirato: PhD Professor of Administrative Law at the University of São Paulo (USP) Law School. PhD in State Law from the Law School of USP. Master of Laws (LL.M.) in Economic Administrative Law from the University of Osnabrück, Germany. Member of Associazione Italiana dei Professori di Diritto Amministrativo (AIPDA). Academic Secretary of the Center for Studies of Administrative, Environmental and Urban Law - CEDAU. (USP)

City: Sao Paulo

Country: Brazil

Email: vrschirato@usp.br

ORCID: https://orcid.org/0000-0001-5563-2265

Felipe de Almeida Ribeiro Campos: Independent legal researcher specialized in infrastructure and administrative law.

City: Sao Paulo

Country: Brazil

Email: rfj@puce.edu.ec

ORCID: https://orcid.org/0000-0003-4490-6755