



# SOLAR PHOTOVOLTAIC MINI POWER PLANTS





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The Government of Piauí's proposal to develop PPPs in order to install photovoltaic systems that convert solar energy into electric energy aims to foment the state's energetic self-sufficiency. This project forecasts the implementation of 8 microgeneration systems, each with a capacity of 5Mw, for subsequent injection of the production into the electric power concessionaire. It also foresees the management of both the compensation of the energy produced by the mini power plants, and of the energy consumed by the state public administration.

According to Brazil's Ministry of Mines and Energy, in 2016, renewable sources were responsible for 43,5% of the Brazilian energy matrix. Considering only electric power generation,



renewable sources represented 81,7% of the entire production. Solar photovoltaic energy is currently one of the world's fastest growing energy sources. The sector had a record growth of 34% concerning power generation in 2017 and is predicted to receive a 17-fold increase in its installed capacity until 2040, according to the International Energy Agency – IEA.

From 2016 to 2018, there was an increase of 115% in the installed solar energy capacity in Brazil. Having merely 81 MW of photovoltaic energy installed in 2016, the country now has 2,46 GW (2018). Moreover, it has been predicted that photovoltaic energy will represent 32% of Brazil's energy matrix until 2040, in sharp contrast to today's percentage of 0,8%.





# PIAUI'S POTENTIALS

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Brazil has an expressive potential when it comes to the generation of solar electric energy, with far higher levels of irradiation than in Germany, France and Spain. Within this context, Piauí has been frequently recognized for its long periods of sun, holding a prominent position with regards to solar energy systems. The state is located at the solar belt (where the solar incidence is high): with 12 hours of sun, in average, and circa 5KWh/m<sup>2</sup>/day.

The Parque Solar Nova Olinda, located in Ribeira do Piauí, is considered to be the largest solar power plan in South America and the second largest in Latin America. Situated at 377Km from Teresina, it possesses 292MWPI of installed capacity and is able to generate up to 600 GW per year, which is sufficient to meet the consumption needs of 300 thousand Brazilians/year.

In São Gonçalo da Gurgueia, located at 790 km from Teresina, the largest solar power plant project in America is being implemented, with an investment of 1.4 billion reais. The operation, apropos, is foreseen to initiate in 2020. When in full operation, the power plants will be capable of producing more than 1,200 GWh per year, being able to attend about 400 thousand homes. More than 1.5 million solar boards will be installed in an area of 930 hectares.







# DEMAND

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The consumption of electric energy by the state bodies revolves around 58,320,934 Kw/year, with an annual cost of R\$ 46,073,537.90. The project will contemplate, at least, the amount of power plants that be capable of attending the annual consumption of a parcel of the bodies of the public administration that were selected for this first phase of the project. Furthermore, it intends to produce a surplus to be utilized by the state government in priority projects, aimed at developing the state of Piauí.

# TECHNICAL AND OPERATIONAL MODELLING

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It has been foreseen the implementation of 8 mini power plants with a generational capacity of 5MW. Each one will require an area of 5 hectares and the implanted structure should be situated near a distribution line that have enough capacity to support the energy load generated.

In virtue of the established criteria, the following municipalities have been indicated to receive the power plants: **José de Freitas Miguel Alves, Cabeceiras, Caraúbas do Piauí Piracuruca e Canto do Buriti.**





For this project, 6 municipalities are apt to receive a mini power plant and 2 will be chosen at the discretion of the bidder.





# PARAMETERS OF INVESTED CAPITAL COMPOSITION

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The financial proposal made by individuals will depend on their cost conditions, technique and financing, so that the winning bidder will be the one who presents the greatest efficiency. In other words, the one who, with the lowest costs, is still able to attend all the clauses of the public notice, its annexes and contract. Relevant items to be observed with regards to the investors' composition of costs are: the degree of the relationship entertained with the financial, and the amount of available capital. Apropos, when it comes to capital per se, the project has chosen the alternative of equity. For this methodology seems to have a zeal for transparency and predictability.



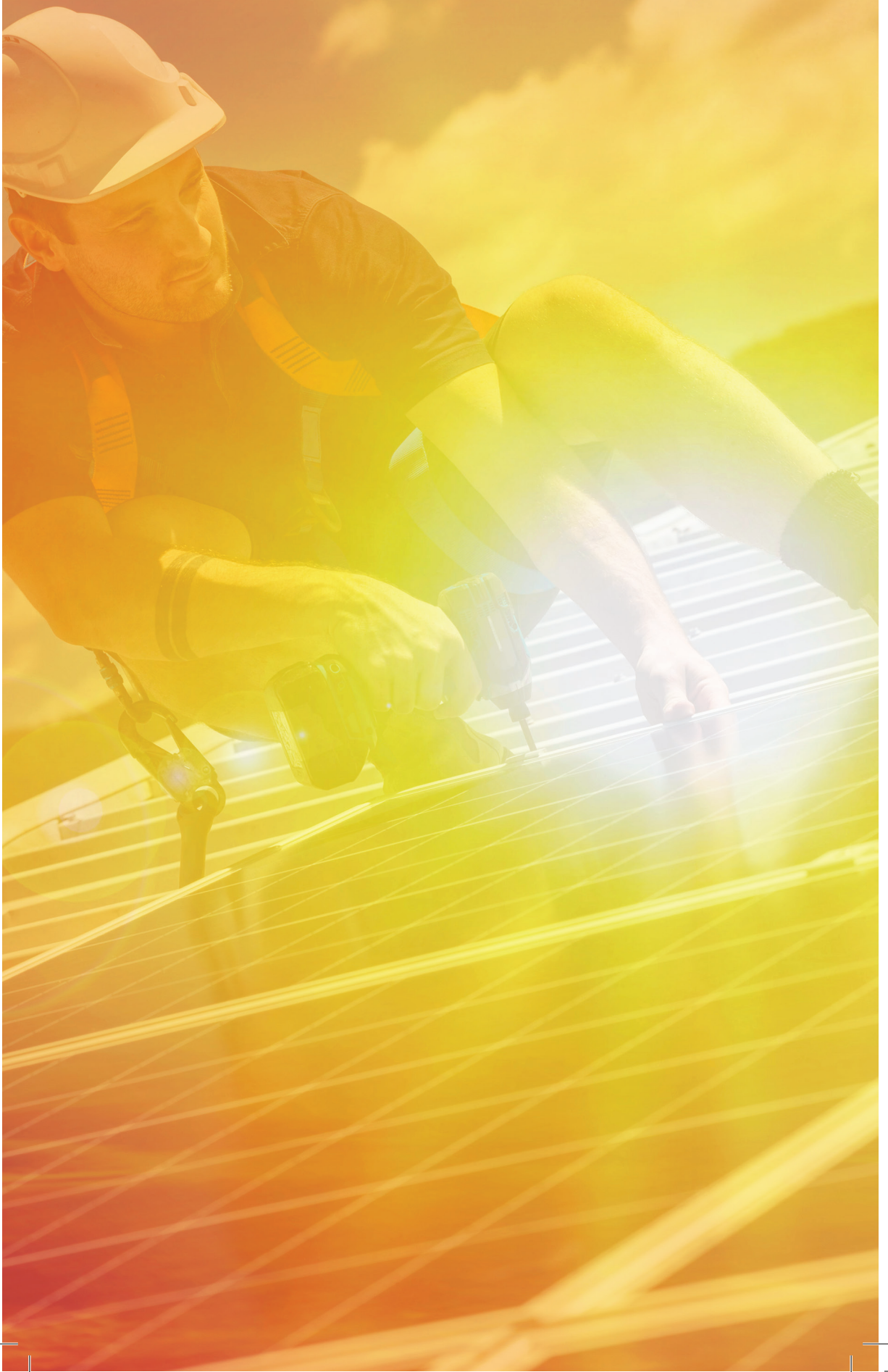


# CONCESSIONAIRE'S REMUNERATION

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In order to implant, operate and maintain the power plant, as well as to execute the services of compensation of the energy credits, the concessionaire will be remunerated with a monthly consideration in the amount of R\$407,364.32, to be paid by the state government. The total value to be paid by the state administration, taking all monthly considerations into account, will be R\$ 3,258,91458. Under the current contract, signed between the bodies of the state public administration and Eletrobás, the government pays the amount of 3,839,461.49 per month. The consideration will be paid in monthly installments, and will be due from the beginning of the operation of the photovoltaic mini power plants in the state of Piauí in 2020.







# SHARING OF ANCILLARY REVENUES

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The project claims that the amounts obtained by the Concessionaire, by way of ancillary revenues, will be shared with the grantor power, in the ration of 30% (thirty per cent) of the net profit determined. Such sharing, according to the clauses of the contract, can be accomplished through the abatement of the monthly consideration, reducing even more the amount to be paid by the state government in the project. In the event that there is no amount to be paid by way of consideration, the sharing can be accomplished via deposit in the checking account of the Grantor Power or via its utilization in projects of public interest.

## VALUE FOR MONEY

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The private sector will have the responsibility to invest capital, be it equity or third-party capital, in the construction of the mini power plants, being also responsible for operating and maintaining the system in full operation throughout the 25-year period. The project foresees, as of the system's operation, an expressive reduction of the amounts owed by state public bodies concerning electric power consumption, and the reversal of the asset by the end of the concession agreement. It should also be noted that, amongst the myriad of positive externalities generated by the project, some are not computed by the VfM, such as: new opportunities regarding indirect and direct employment, income generation, professional qualification, environmental sustainability, the revenues that will be destined to benefited municipalities, inter alia.







# INSTITUTIONAL GOVERNANCE MATRIX

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The institutional governance and management of the PPP contract under scrutiny are so structured so that it can rely on the performances of the following actors:

- **MONITORING COMMITTEE**
- **INDEPENDENT VERIFIER**
- **AGRESPI**

# RISKS MATRIX

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23 situations or circumstances of potential risk to the contractual stability have been identified, and possible solutions have been anticipated to each of them. The result is indicated in the Annex V of the Contract – RISKS MATRIX, in accordance with what is set forth in Law 5,494/05 and Law 11,079/2004.



# ENVIRONMENTAL LICENSING GUIDELINES

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Enterprises or activities that utilize environmental resources which are considered effectively or potentially polluters, or that may cause environmental degradation, will necessitate a previous Environmental Licensing or an Environmental Clearance (AAF).

The Study of Technical, Economic, and Environmental Viability presents the guidelines for the environmental licensing and meets the guidelines that are set forth in State Law 5,494/05 and in Federal Law 11,079/2004.

## NOTICE

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The licensing will be structured in batches. 4 batches will be in dispute, each one containing 2 mini power plants. Nonetheless, it is worth noting, no group can receive more than one batch.

In order to compete in the bidding, participants can present themselves individually or in the form of a consortium, and must prove: to have had at least 01(one) year of direct operation of photovoltaic solar energy; and the compensation of energy credits in enterprises with a generation capacity higher than 2.5 Mw.









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