



# Economic and Environmental Impact of implementing Solar Energy in a Hemodialysis Unit in Joinville, Brazil.



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## INTRODUCTION

Hemodialysis units face a constant challenge related to high energy consumption, which not only represents a considerable financial burden, but also raises concerns about the environmental impact associated with traditional energy sources. Amid these issues, solar energy emerges as a promising solution, offering a clean, inexhaustible and economically viable source of energy. Its implementation not only aims to reduce long-term operating costs, but also contributes to the economic and environmental sustainability of healthcare institutions.



## OBJECTIVE

This study aimed to evaluate the economic and environmental impact of implementing a solar energy system to generate electricity in a hemodialysis clinic in Joinville, Brazil.

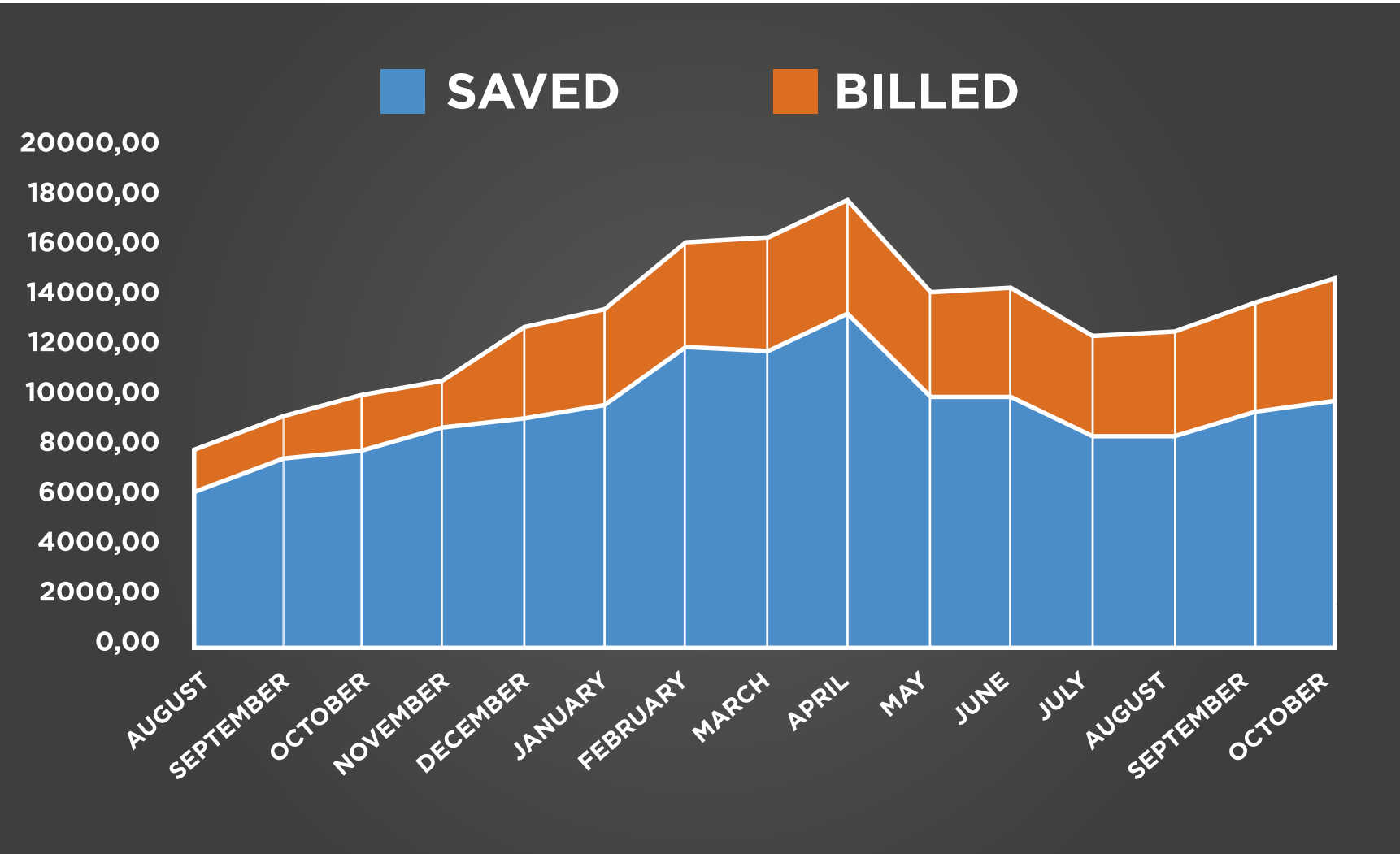
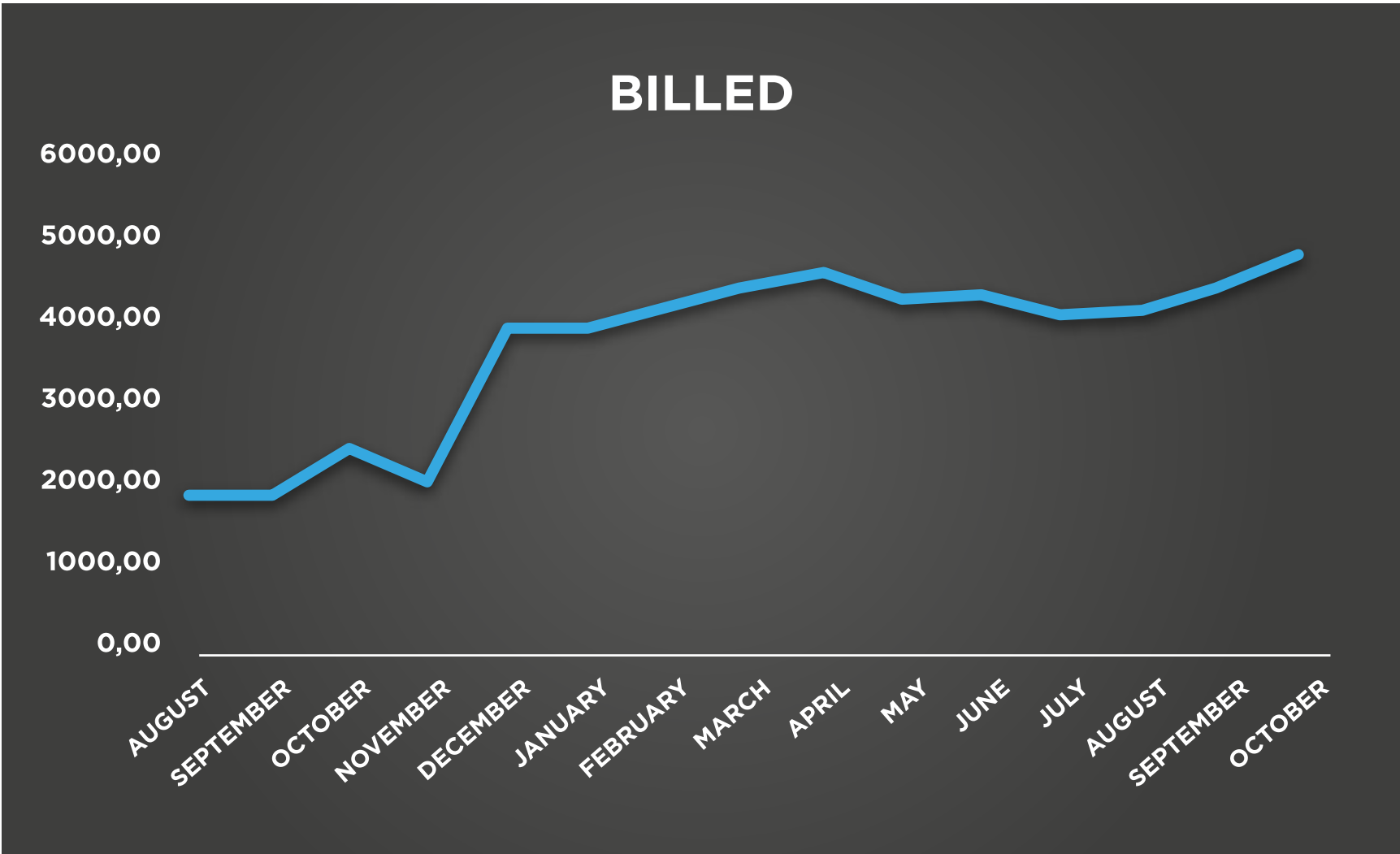
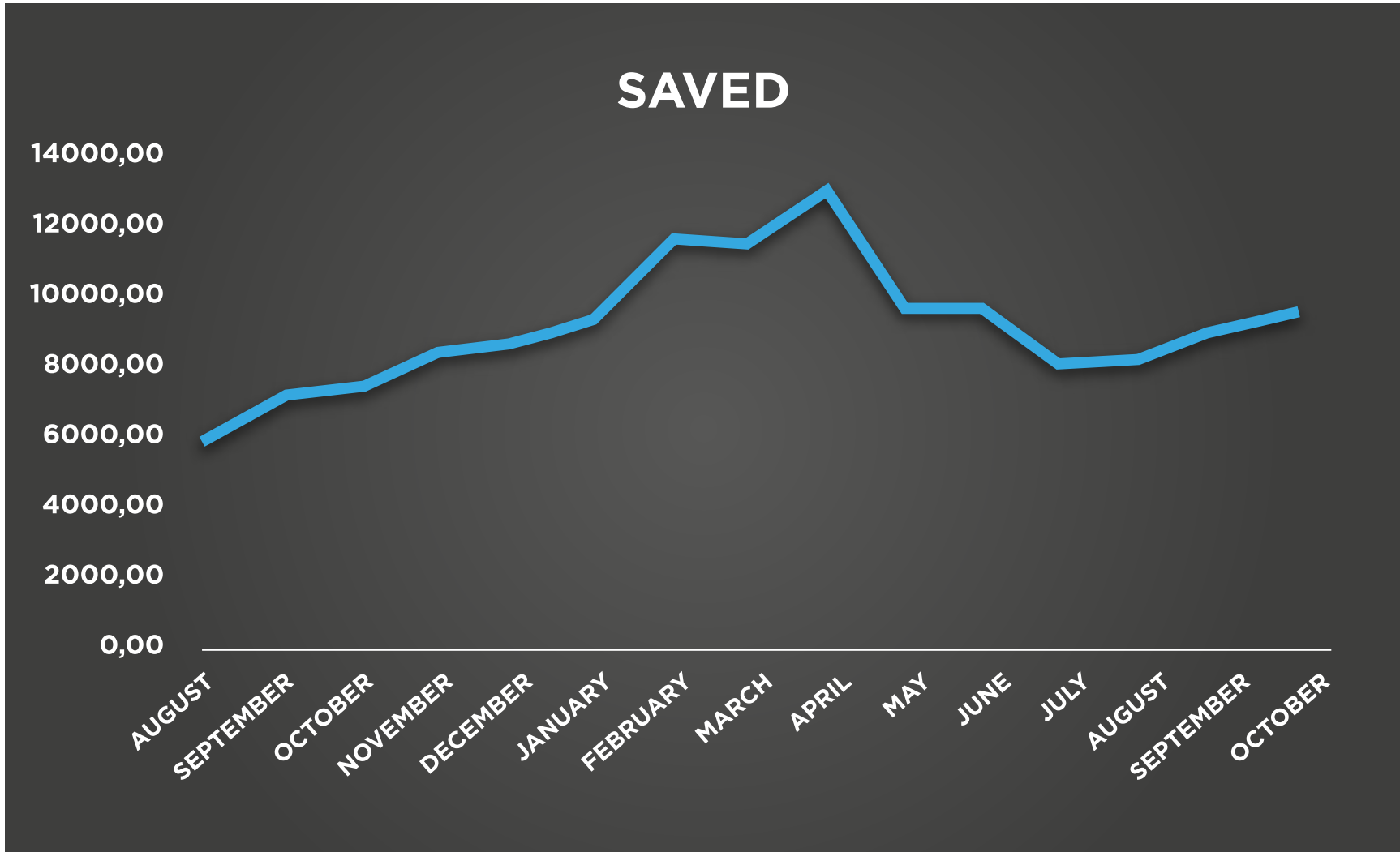
## METHODS

Retrospective and quantitative study, which analyzed the monthly reports generated by the outsourced company responsible for the installation and maintenance of solar panels during August 2022 to October 2023. Data relating to energy generation and performance of solar panels were tabulated. Total energy consumption, savings and billing, subsequently calculating the total values and savings and energy generation rates based on the total energy spent on peak, off-peak and instantaneous consumption.

| PERIOD   | GENERATED | PERFORMANCE | P+FP<br>POWER+<br>POWER FACTOR | SAVED     | BILLED   |
|----------|-----------|-------------|--------------------------------|-----------|----------|
| Aug/2022 | 14675 kWh | 114%        | 12239 kWh                      | R\$ 5816  | R\$ 1861 |
| Sep/2022 | 19731 kWh | 84%         | 14393 kWh                      | R\$ 7109  | R\$ 1854 |
| Oct/2022 | 20130 kWh | 86%         | 14428 kWh                      | R\$ 7364  | R\$ 2436 |
| Nov/2022 | 22375 kWh | 95%         | 16686 kWh                      | R\$ 8387  | R\$ 2010 |
| Dec/2022 | 28076 kWh | 119%        | 17217 kWh                      | R\$ 8699  | R\$ 3914 |
| Jan/2023 | 25807 kWh | 110%        | 20081 kWh                      | R\$ 9281  | R\$ 3935 |
| Feb/2023 | 31075 kWh | 132%        | 23766 kWh                      | R\$ 11690 | R\$ 4196 |
| Mar/2023 | 23876 kWh | 102%        | 22271 kWh                      | R\$ 11572 | R\$ 4432 |
| Apr/2023 | 28333 kWh | 120%        | 24807 kWh                      | R\$ 13031 | R\$ 4585 |
| May/2023 | 22569 kWh | 96%         | 18940 kWh                      | R\$ 9685  | R\$ 4249 |
| Jun/2023 | 22034 kWh | 94%         | 18986 kWh                      | R\$ 9696  | R\$ 4282 |
| Jul/2023 | 21116 kWh | 90%         | 16051 kWh                      | R\$ 8109  | R\$ 4074 |
| Aug/2023 | 17491 kWh | 74%         | 16377 kWh                      | R\$ 8175  | R\$ 4101 |
| Sep/2023 | 20668 kWh | 88%         | 17408 kWh                      | R\$ 9067  | R\$ 4419 |
| Oct/2023 | 21160 kWh | 90%         | 18300 kWh                      | R\$ 9455  | R\$ 4788 |

## RESULTS

From the 15 months in use, with its arithmetic average performance of 100%, a total saving of approximately US\$ 27,427.00 was obtained, corresponding to a 71.3% discount on monthly energy bills compared to the energy supplied by the local electric company. Total generation in the period was 339116 kWh by solar energy. It was also estimated that around 41.93 T (ton) of CO2 (carbon dioxide) was not produced.



## CONCLUSION

The implementation of solar energy in hemodialysis units not only proves to be a financially intelligent decision, but also a measure with great environmental impact. In addition to providing a significant reduction in operating costs, the transition to clean and renewable energy sources such as solar plays a crucial role in preserving the environment. By reducing carbon emissions and mitigating air pollution, we not only contribute to the health of the local community, but also assume an ethical and sustainable responsibility towards future generations.

*Keywords: electrical panels, photovoltaic cells, electrical energy.*

