For this analysis the expected value of NPV (E[NPV]) and the risk (σ[NPV]) were equal to R$ 711.347,72 and R$ 623.784,84, respectively. The probability of non-return of the investment is equal to 13.20 %.

Fig. 7 shows the probability distribution of the MIRR. The area represented by the red color indicates the probability of the project being unfeasible (MIRR< MARR). Tohe color in blue indicates the probability of the project being feasible (MIRR≥MARR).
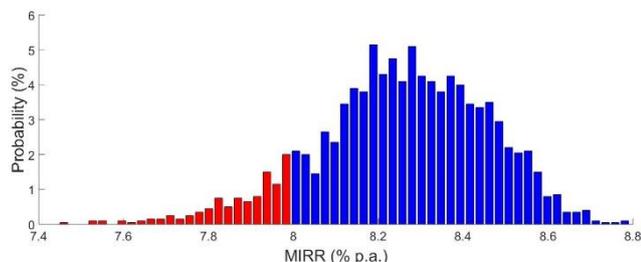

Fig. 7 - Probability distribution of MIRR.

For this analysis the expected value of MIRR (E[MIRR]) and the risk (σ[MIRR]) were equal to 8.26% and 0.21%, respectively. The probability of non-return of the investment is equal to 10.35 %.

Fig. 8 shows the probability distribution of the Discounted Payback. In this figure the area in blue represents the probability of the payback being less than the useful life of the project, which in this case is 300 months. This area indicates the feasibility of the project, as the return on investment will occur before the end of its useful life.

The area represented by the red color represents the probability of the payback being greater than the useful life of the project, indicating its non-viability.
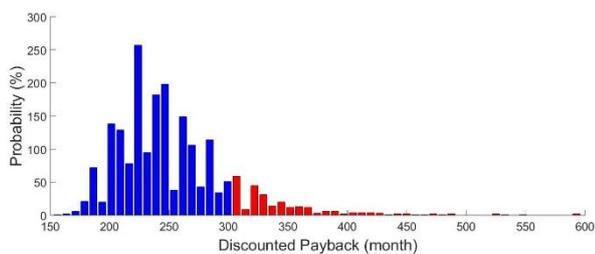

Fig. 8 - Probability distribution of Discounted Payback.

For this analysis the expected value of Discounted Payback (E[Payback]) and the risk (σ[Payback]) were equal to 253 months and 59 months, respectively. Probability of the payback being less than the useful life of the project is 86,79%.

4. Conclusion

This paper presented a methodology for risk analysis of investments in electricity generation from the energetic use of biogas from the biodigestion of vinasse produced in sugarcane agroindustries with commercialization of electricity in the RCE.

From the appropriate stochastic modeling it was possible to predict the behavior of ethanol production, which is directly related to the production of vinasse. Such modeling was validated, presenting characteristics of mean reversion and seasonality.

The risk analysis indicated the economic viability of the project, since most scenarios present NPV greater than zero, MIRR greater than the MARR and Discounted Payback lower than project lifespan.

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