The distributed electricity generation diffusion impact on the Brazilian distribution utilities

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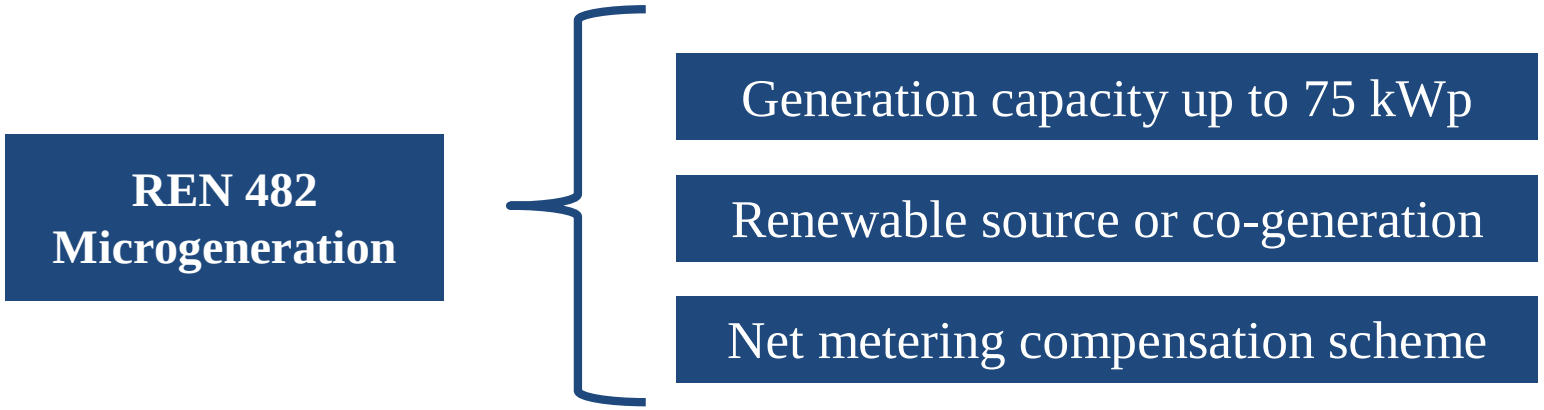
Microgeneration Regulation in Brazil

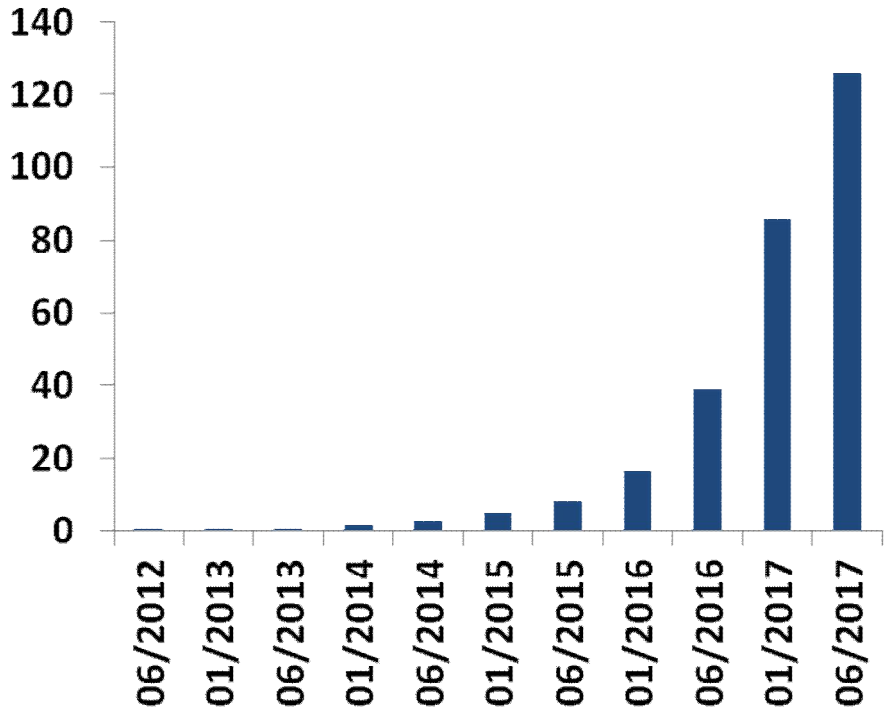
The country's regulatory guidelines concerning distributed microgeneration were first published in 2012, via the publication of ANEEL's (Brazilian regulator) Normative Resolution (REN) 482 (ANEEL, 2012).

It defined what constitutes microgeneration, making it legal and the net metering as the incentive scheme.

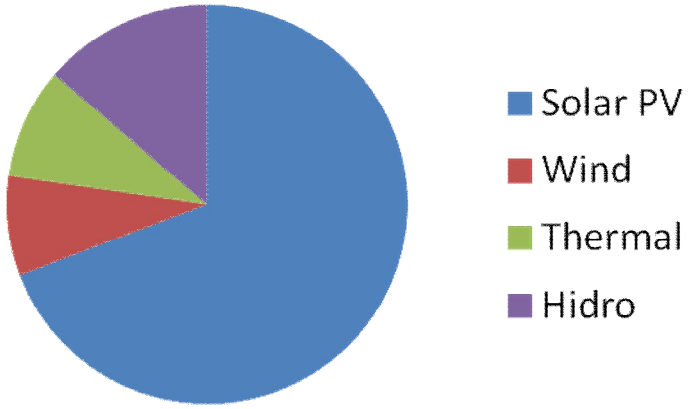


Distributed Generation by Source in Brazil

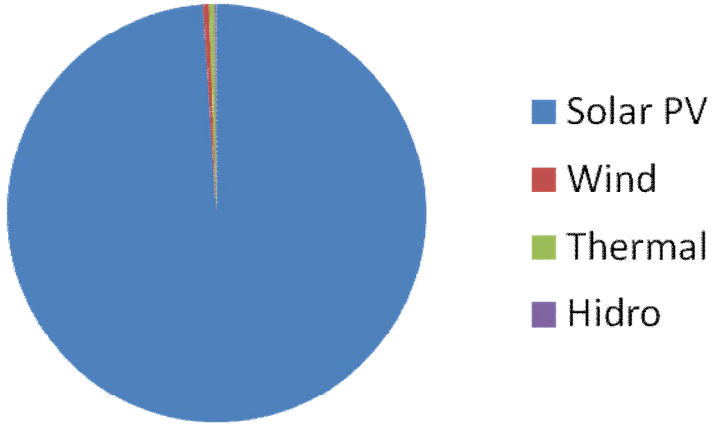
Aggregated Microgeneration Diffusion (GW)



Aggregated Capacity



Number of Installations



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Potential Risk for Accumulated Losses

The revenue for the distribution utilities services is regulated, being composed by a sum of operational costs, and a fair return on capital (by WACC criteria), plus depreciation. It is called Required Revenue and it is determined after every four years. The *Price Cap* is the incentivized regulation methodology.

$$\textbf{Required Revenue} = \textbf{Operational Costs} + \textbf{Capital Cost} + \textbf{Depreciation}$$

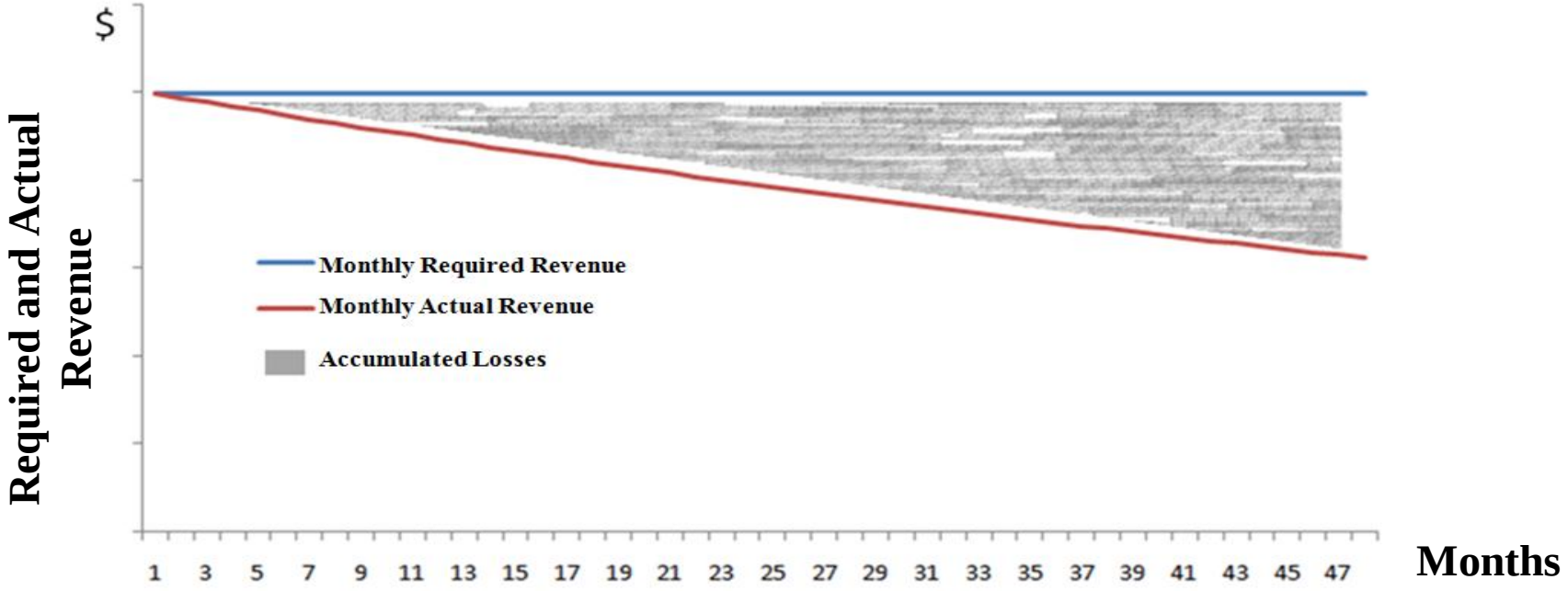
The Required Revenue is achieved through rate payments.

$$\textbf{Required Revenue} = \textbf{Rate X Demand}$$

Demand projections are usually conservative, showing traction to close previous years. However, in a distributed generation scenario, it is difficult to accurately forecast the future demand.

Potential Risk for Accumulated Losses

The existence of regulatory lag and the presence of the incentivized regulatory scheme of *Price Cap*, by the current regulatory practices, implies in no compensations of differences between the Required Revenue and the *Actual Revenue* of a four years period, be it for more or for less. In this scenario, the fall of demand would lead to the accumulation of losses.



The Decoupling Practice

One of the main economic problems that may be caused by decoupling is the creation of a perverse incentive. Common sense shows the improbability of the equality scenario between the real WACC and the regulated WACC. Scenarios with a fixed rate of return higher than the capital costs, which will induce over-investment and inefficient replacement of OPEX.

This dynamic can be directly observed from the stock price of a publicly held company, with the use of Gordon's Discounted Dividends Model.

$$\mathbf{P} = \frac{\mathbf{NBx} + (\boldsymbol{x} - \mathbf{c})\boldsymbol{I}}{\boldsymbol{Nc}}$$

P is the stock price, N is the number of stocks in present shareholders property, B is the book value of the stock, x is the defined rate of return defined by the regulator, c is the actual (true) opportunity cost, and I is the volume of new investments to be financed (CAPEX). If (x – c) is positive, then increases in I increase P.

The Risk of a Death Spiral

Another rising concern related to the diffusion of DG and its implications on the demand of electricity deriving from the distribution utilities is the loss of economic logic and financial sustainability. A direct way of analyzing this threat is understanding the costs components of the electric rates (they are volumetric for most consumers).

$$\text{Rate} = \frac{\text{Fixed Costs} + \text{Variable } \textit{Costs}}{\text{Total } \textit{Demand}} = \frac{\text{Fixed } \textit{Costs}}{\text{Total } \textit{Demand}} + \frac{\text{Variable } \textit{Costs}}{\text{Total } \textit{Demand}}$$

What happens if the demand decreases? If it is considered, for the sake of simplicity, that the variable costs vary in the exact same intensity as the total demand, then the variable component would remain the same and the rate would not suffer any impact from it. However, the fixed component would certainly increase, since the fixed costs remain the same, but its denominator is reducing. The final effect is an increase in the rate level.

The Risk of a Death Spiral