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Photovoltaic solar energy: The Brazilian reality

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The search for diversification of energy resources in Brazil has become extremely necessary due to two main factors. The first is the current water situation that the country is going through; with the scarcity of rain the generation situation through hydroelectric power plants was compromised. Since the significant reduction in rainfall, power generation by hydroelectric plants has not been sufficient to supply the demand. Therefore, the need to use thermoelectric power plants has caused the price of energy to increase. Secondly, the exploitation of renewable energy resources that brings more comfort, security, flexibility and sustainability. In this scenario, photovoltaic solar energy presents itself as a technology in constant advance in Brazil and around the world. Through a bibliographical review, this article aims to present the principle of the use of this energy, considering the equipment and materials applied to the system, as well as the efficiency they can achieve. In addition, there is a broader view of the use of sunlight to produce electricity through photovoltaic panels and the applications of this technology in specific situations, such as installation on streetlights. The use of photovoltaic energy is a reality that states increasingly in several countries. In Brazil the manufacturing of photovoltaic systems need to reach an industrial scale to reduce costs, technical conditions and the uncertainty of the extent that this market will reach in the coming years also bring difficulties to final consolidation of solar photovoltaic generation in Brazil. There are several uses for a system that generates electricity through solar modules, as in the battery bank and off and on grid systems.

Tipo	Quantidade	Potência		%
		Outorgada (kW)	Fiscalizada (kW)	
COH	668	621.735	623.971	0,39
COG	1	50	50	0
EOL	510	12.532.539	12.509.743	7,91
PCH	429	5.070.129	5.042.723	3,19
UFV	87	1.084.662	1.050.302	0,68
UNE	218	101.883.450	95.619.465	60,44
UTE	3.091	42.722.019	41.348.180	26,13
UTH	2	1.990.000	1.990.000	1,26
Total	4.916	165.904.584	158.214.417	100

Figure 1: Energy generation ventures in operation in Brazil (2018)

Recent Publications

1. Fraidenraich, n. Comparison of the performance of PV water pumping systems driven by fixed, tracking and V-through generators. *Solar Energy*, London, v. 76, n. 6 p. 703-711, 2004.
2. Cresesb. *Energia solar: princípios e aplicações*. Rio de Janeiro: CEPEL, 2008. 28 p. Disponível em: <http://www.cresesb.cepel.br/tutorial/tutorial_solar.pdf>. Acesso em: 12 setembro 2008.
3. Fraidenraich, n.; vilela, O.C. Performance of solar systems with non-linear behavior calculated by the utilizability method: application to PV solar pumps. *Solar Energy*, London, v. 69, n. 2, p. 131-137, 2000.
4. Grupo de trabalho de energia solar fotovoltaica. *Manual de engenharia para sistemas fotovoltaicos*. Rio de Janeiro: CRESESB, 204 p, 1999.
5. Hinrichs, r.; kleinbach, m. *Energia e meio ambiente*. São Paulo: Pioneira Thompson Learning, 543 p, 2003.

Biography

Renato N C Sakamoto has completed his Bachelor's degree in Electrical Engineering, graduate studies in Safety Engineering and a Master degree in Renewable Energy. He has four years of experience in the field of Photovoltaic Generation and Power Distribution Networks.

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