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THE USING OF SUSTAINABLE HIGH VOLTAGE EQUIPMENT INSULATION MATERIALS IN BRAZILIAN SCENARIO

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All economic activities that impact the environment must be submitted to environmental licensing, being mandatory throughout the Brazilian territory. The National Solid Waste Policy (PNRS), established by Law No. 12,305 / 2010 and regulated by Decree No. 7,404 / 2010, establishes the need for compliance with socio-environmental principles through prevention and precaution, eco-efficiency, among others. An aggravating factor is contaminated and hazardous waste, which, together with the by-products of solid, liquid and gaseous electrical insulation systems, generate negative assets for electric utilities and must have handling, treatment, storage and disposal processes before they are dumped in nature or reused. In case of faults or leaks in transformers, for example, hydrocarbon compounds (mineral oils), due to their relatively high solubility in water, can migrate with rainwater infiltration from the surface to the first layer of the water table. In this scenario, oil leakage from a transformer to a reservoir, makes million liters of water unfit for consumption. Considering that most of the electrical equipment – e.g. power transformers, capacitor banks, circuit breakers, reactors, switches - present in the plant of the electricity distribution companies use mineral insulating oil and given the Brazilian territorial extension, with an electrical system of interconnected power of great complexity, it is evident the concern with the methods of protection to the environment. The appropriate treatment and disposal of waste generated, therefore, brings benefits such as the improvement of socio-environmental indicators of the company and provides control and monitoring of its assets. As verified in the last National Seminar on the Production and Transmission of Electric Energy - SNPTEE (2015), there was a high concern regarding the use of insulating oil with respect to proposals for alternative to mineral oil, such as vegetable oil and nanofluids. Works developed by electric utilities have made it apparent, among other studies, the concern with regeneration and contamination of the insulating oil and new approaches of technologies on

the evolution and experiences with mineral insulating oil. This research demonstrates the environmental and energetic impacts of the use of alternative resources to conventional electrical insulation systems through biodegradable materials and through management techniques used in large Brazilian electric power concessionaires, research centers and educational institutions

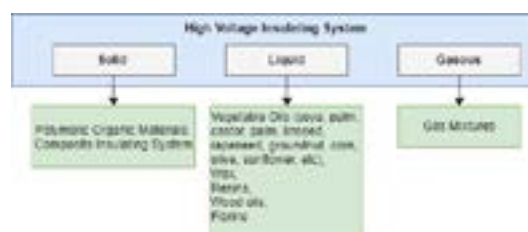


Figure 1: Sustainable materials by insulating system type.

Biography

Douglas Aguiar do Nascimento is an electrical engineer with experience in high voltage testing, pattern recognition, electronic instrumentation and signal and image processing, with development of signal acquisition (DAQ) projects, microcontroller embedded systems and wireless signal transmission (RF). At Furnas Centrais Elétricas SA, Testing and Maintenance Support Division - DEAM.O, he performed collaborative activities in the testing and analysis of partial discharges, assisting in the maintenance of electrical and electronic equipment, and cooperating in performance tests of the generating unit. He is currently a Project Analyst II at the Support Training in IT Foundation (FACTI), Renato Archer Information Technology Center and MSc candidate researcher on the Internet of Things for Smart Cities and Relevant Aspects of Communication Networks, associated to the Visual Communications Laboratory (LCV) at FEEC-UNICAMP (<http://lcv.fee.unicamp.br/laboratory/team>)

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