

# Aspects on Choosing and Exploiting in Economic Conditions the Medium Voltage Electrical Power Transformers

Mircea-Emilian Ardeleanu, Dan Gabriel Stănescu, Cristian Minculescu, Ștefan Popa  
Faculty of Electrical Engineering  
University of Craiova  
Craiova, Romania

mircea\_emilian@yahoo.com, dstanescu@elth.ucv.ro, cristi\_minculescu@yahoo.com ,  
[popa\\_stefan2000@yahoo.com](mailto:popa_stefan2000@yahoo.com)

**Abstract**— The reduction of electricity consumption in many situations, by the disappearance of the large industrial enterprises considered as “energy-intensive” and the emergence of small and medium-sized industrial enterprises, led to the appearance of inefficient energy issues in the distribution power grids through the existence of underloaded electrical power transformers. The use of underloaded electrical power transformers is an important factor in the operation of electrical installations at a power factor ( $\cos\phi$ ) below the one permitted by national and international norms (neutral power factor), presenting multiple disadvantages both economic and financial, and technical. In this respect, replacing these transformers with some lower power (optimal for the new requirements of the consumer) is the accepted solution in practice. Thus, choosing and sizing the transformer with optimum load and reduced losses is very important for users. This paper presents a method for analyzing the optimal load of transformers based on the calculation of electrical energy transited and energy losses. As a solution for optimal use of electrical power transformers, there are some advantages of the “rewired transformers”.

**Keywords**—electric power transformer, energy losses, rewired transformers, energy loss curves, utilization degree of the transformer capacity.

## REFERENCES

- [1] \* \* \* IEEE Guide for Loading Mineral-Oil-Immersed Transformers and STP-Voltage Regulators- C57.91-2011, 2012.
- [2] L. W. Pierce, “Predicting liquid filled transformer loading capability,” IEEE Trans.on Ind. Appl., vol.30, no.1, pp.170-178, 1994.
- [3] M.Gavrilă, “Economical charging of the transformers (in Romanian Încărcarea economică a transformatoarelor- suport de curs),” FORMENERG S.A., 2006.
- [4] \* \* \* Instrucțiunea I 194-93.
- [5] M.Gavrilă, “Reducing losses in transformers (in romanian Reducerea pierderilor în transformatoare),” available at <https://stoianconstantin.files.wordpress.com>.
- [6] \* \* \* [www.elecmond.ro/transformatoare-retimbrate/html](http://www.elecmond.ro/transformatoare-retimbrate/html).
- [7] I. Cioc and C. Nica, “The design of the electrical machines (in Romanian Proiectarea mașinilor electrice),” Ed. Didactică și Pedagogică, București, 1994.
- [8] I. Cioc, I. Vlad, and G. Calotă, “The electrical transformer (in Romanian Transformatorul electric),” Ed. Scrisul Românesc, Craiova, 1989.
- [9] M.E. Ardeleanu (coord.) and C. Minculescu, “Aspects of optimal charging of the transformers (in romanian Aspecte privind încărcarea optimă a transformatoarelor electrice, lucrare de licență),” Faculty of Electrical Engineering, Craiova, July, 2017.
- [10] M.E. Ardeleanu (coord.), S. Popa, and C. Minculescu, “Aspects of Optimal Charging of Distribution Transformers (in romanian Aspecte privind încărcarea optimă a transformatoarelor de distribuție),” Sesiunea Națională a Cercurilor Stiințifice Studentești ELSESE, Craiova, 18-19 Mai , 2017.