Gino Hadjee, Daniel Sadarnac, Marcelo Saguan

COORDINATION OF TARIFF AND RESIDENTIAL CONSUMPTION ON ELECTRIC POWER DISTRIBUTION BY GENETIC ALGORITHM

SUPELEC, Superior School of Electricity, Energy Department, Plateau de Moulon
3 rue Joliot-Curie, 91192 Gif sur Yvette, France
Phone: +33[0]169851517 Fax: +33[0]169851501234, Email: gino.hadjee@supelec.fr

Electricity network operators are very interested by consumers' behaviour for better managing their system. On their side, the consumers want to preserve their comfort and their cost saving.

The electricity demand on residential sector has increased with the new developments in the world. The electricity distributor operators must to reinforce the power system capacity for meet this demand. However, this solution need not only expensive investments but also increases the cost per for the costumers. Thus, the load management strategy is an innovative way for better managing their system.

Our last work [1] described a new approach to study the residential reaction for optimising the load curve on rural electric power distribution in terms of peak load reduction. A " bi-objectif " optimisation method has used to shift the electric heating consumption from on-peak periods to off-peak periods. With this method, the consumer reaction is to mitigate their comfort and their energy cost. The reaction of the consumers is fonction of hourly tariff variation (during one day). Then, the optimisation of this tariff variation is very important for the electric operators.

This present approach consists in optimizing the electric tariff that takes into account two news following objectifs: consumers saving (energy costs and comfort) and the network distribution profit (benefit). Two levels optimisation are dealt simultaneously: a better consumption of consumers and the optimal tariff suggested by the electricy distributor operators.

To solve this optimisation problem, a Genetic Algorithm (GA) is used. It enables us to separate the local and total optimal solutions.

The results consist to compare consumers and operator profits with and without this optimisation of tariff. Supposing various types of consumers group (flexible, normal, not flexible) are tested on several examples.

References

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