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THE LOAD CURVES PROFILING AND THEIR PARAMETERS OF DIFFERENT CONSUMER CATEGORIES SUPPLIED FROM ELECTRIC ENERGY REPARTITION AND DISTRIBUTION SYSTEMS

BY

BOGDAN NEAGU[*] and GH. GEORGESCU

"Gheorghe Asachi" Technical University of Iaşi
Faculty of Electrical Engineering, Energetics and Applied Informatics

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Abstract. The electric energy consumption shifting from high voltage (HV) to medium voltage (MV) and low voltage (LV) and also the electricenergy market development have raise to the attention of specialists the problem of rational electric energy repartition and distribution system (ERDS) development and restructuring. Through these systems are supplied a large numbers of households and tertiary consumers, and for the rational design and operation of these facilities should be known, as accurately as possible, the current levels of consumption for all consumer categories, the forecasts or predictions regarding the power or energy demand for a shorter or longer period, how that energy is consumed, depending on hour, day and season during a year. For these reasons the paper presents in detail some results of a recent measuring/recordings campaign of the load curves in ERDS characteristic nodes. In this way, was followed the update of the database which contain the shape or the profile of these load curves for characteristic (standard) days over a year, which must be considered in design and operation processes. Also, these hourly profiled load curves can be used in the current operation by territorial units of electricenergy distribution for billing and closing the hourly balance, allowing, in this way, the participation of the tertiary consumers at energy market.

Key words: profiling process; load forecast; standard day; typical load curves.

[*] Corresponding author: *e-mail*: bogdan.neagu@ee.tuiasi.ro

1. Introduction

The profound changes in power sector and the energy market evolution recorded in last years in our country accompanied by massive shifting of electric energy consumption from HV to MV and LV, brought to the present, the specific problems of the ERDS optimal planning and restructuring from technical and economical point of view.

For these reasons, given the increasing technical and economical demands and restrictions which are subjected these systems to ensure the service quality, require from the specialists a detailed analysis of ERDS structure and characteristics (Gh. Georgescu *et al.*, 2010).

Through ERDS are supplied different consumer categories such as: household and tertiary consumers (commercial, social-cultural, public utility, small enterprises, etc.) from urban and rural area. The household and tertiary consumption are two facets of electric energy consumption directly by people, their level and structure provide extensive information on the degree of social development at one moment.

The consumers supplied from ERDS are, usually, captive ones, each of these intervening with a more or less weight in total value of electric energy consumption from a given area.

The design of public ERDS or electric energy distribution facilities must respond, also, to the following key issues: the types of equipment that will be used to achieve these facilities; a thorough analysis of different overall variants in component terms. Also, it's necessary to note that the distribution facilities design is a complex and difficult problem due to the following features of these public systems: continuity development, high number of available operational configurations and required decisions, fault diversity, working deadlines, etc. (Gh. Georgescu *et al.*, 2001; Gh. Georgescu, 2007; B. Luştrea, 2001).

2. Mean Characteristics of the Daily Load Curves, Typical Load Profile Determination and Consumption Prediction for Different Consumer Categories

One of the decisive factors for choosing the right variant from technical and economical point of view, of power supply solution for a certain area, can be pointed: the knowledge of the actual consumption level, its evolution or dynamics in time, and of the main characteristic parameters of this consumption, global or by different consumer categories; how that energy is consumed in a hour, day and season, over a year, etc.

It should be noted that in the electric energy consumption analysis from a certain area it is necessary to determine not only the level achieved in various stages, but also the consumption patterns of the consumers, and also their participation to the global load curve (M. Eremia *et al.*, 2006; Gh. Georgescu *et al.*, 1997, 1999;ANRE, 2002).

Classical statistical-probabilistic methods were often used before and they are also currently used to determine load profiles for different consumer categories, building load type profiles databases, to compute load curves characteristic parameters, etc. All this information is essential for both the design and operation stages of ERDS. Also, the changes in power industry and electric energy market evolution raised the problem of developing topical modules which would enable all consumer categories to enter the market. Should be noted that these modules are essential, especially for household and tertiary consumers which represent the majority customers of the electric energy territorial units and for which, currently, the standard procedure give information regarding only the maximum load and energy consumption, without any indication how that energy is consumed over a year (Gh. Georgescu *et al.*, 2007; ANRE, 2000).

Over time, for this purpose the statistical-probabilistic methods were often used, and currently used for establishing the typical load profiles of different consumer categories, in various stages of development; for creation of the databases which contain typical load profiles; for daily load curves characteristics and dimensionless parameters determination, etc. Also, studies have been conducted of the load forecasts for various consumer categories, on a proximate or long horizon, using static mathematic models, where are extrapolated to future data and relations from the past, the widest application is the extrapolation time series of values (M. Eremia *et al.*, 2006; Gh. Georgescu *et al.*, 2010, 1999; ANRE, 2002).

In last years, such studies and analysis were carried out by a number of specialists (B. Luştrea, 2001; Poeată *et al.*, 1985; ANRE, 2007), including the authors of this paper (Gh. Georgescu *et al.*, 2001, 2010, 1999; ANRE, 2002), regarding the forecast of load (power) demand or electric energy consumed by household or tertiary various consumer categories from urban/rural area, supplied from ERDS. In these analyses has been used the general methodologies which require the following basic steps: collection, storage, selection and processing of initial data regarding past load evolution, for a minimum period of six or seven years retrospective; establishing different types of mathematical models that allow the loads temporal evolution modeling; analysis of variants obtained for forecast, their hierarchy and determining the final decision. As a rule, the criterion for choosing the function or optimal mathematical model was to minimize the sum of square deviations of each theoretical function curve to the real curve, being known as the method of least squares.

Alternatives to the aforementioned classic methods are the usage of Artificial Intelligence (AI), with its hybrid techniques – Artificial Neural Networks (ANN), Fuzzy Logic (FL), Genetic Algorithms (GA), Evolutionary Strategies (ES) – or using load profiling models based on clustering techniques, which lead to very good results in load forecast, in consumers typical load profiles determination, segmentation and sampling of consumer categories, contingency analysis in electrical networks, etc. (Gh. Georgescu *et al.*, 2010, Hyde *et al.*, 1997).

In the literature were published remarkable results regarding the load forecast process and demand or consumed energy by household or tertiary consumers, respectively, on a short or medium term, by using, primarily, an artificial neural network – Multilayer Perceptron (MLP) (Gh. Georgescu *et al.*, 2007, 2010; Hyde *et al.*, 1997; ANRE, 2002, Scutariu *et al.*, 2001). These neural networks represent efficient means of forecasting approach more powerful and flexible, having the advantage that it allows complex time series modelling, which can be described quite difficult with traditional methods. Also, better results in the daily load curves forecast of various consumer categories were obtained by a particular class of recurrent neural networks (RNN), composed by neural networks with multilayer architectures that contain static and dynamic neurons with feedback connections. In fact, this type of neural network is based on well-known behaviour of discrimination in class through multilayer structures and at the same time, providing temporal features as inputs.

To evaluate the load level and main characteristic and dimensionless parameters of the load curves, in urban and rural public distribution networks, in various stages of development, and consumption forecast regarding demand load or consumed energies, respectively, several measurement (recordings) campaigns were carried out at different characteristic points of ERDS.

In recently measurement campaigns carried out during 1999…2003 and 2010…2009 years, the load curves were recorded for each month of the year, for standard days (ANRE, 2000, 2002, 2007). For load curves raising and recording, the SCADA system (Supervisory Control and Data Acquisition) or ALPHA three phase electronic meters with a sampling rate of 5 or 15 min were used, and the energy consumption was computed by integrating the load curves (Gh. Georgescu *et al.*, 2010).

It is important to underline that any statement of power or the maximum, minimum, average, average square load, etc., and other characteristics or dimensionless parameters of the load curves must be coupled with load level duration interval. In this context, by load duration two categories can be distinguished: continuous load (15, 30 or 60 min.) and short-time load or peak load (1 to 10 s). Each of these loads aforementioned are used for rational choosing and sizing of the components using technical limitation such as voltage drops or power and energy losses, etc., and at the computing of voltage fluctuations, for choosing proper protection and automation devices, for checking voltage drops in special circumstances, etc., respectively.

Using a software application, daily load curves recorded at various key points in the ERDS, for different period of the year, were automatically processed as 24 hourly values series, each hourly value representing the average hourly load of the curve. By statistical processing of these daily load curves were determined, for continuous load, the typical load profiles, at different consumer categories. Also were determined the characteristics and dimensionless parameters for typical load profiles of different consumer categories, in standard day, during a year.

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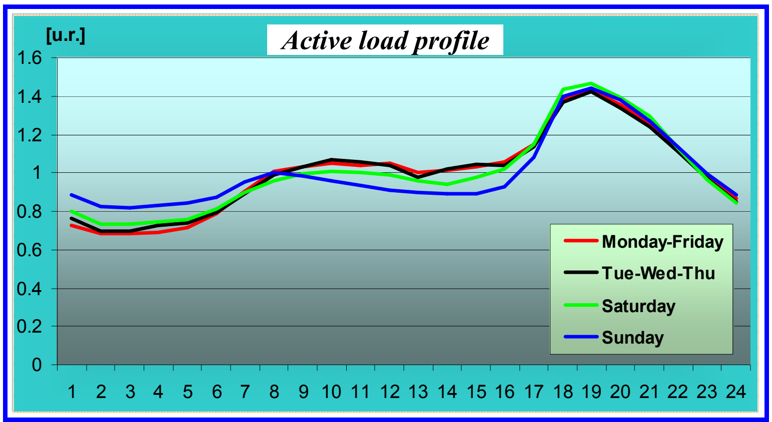

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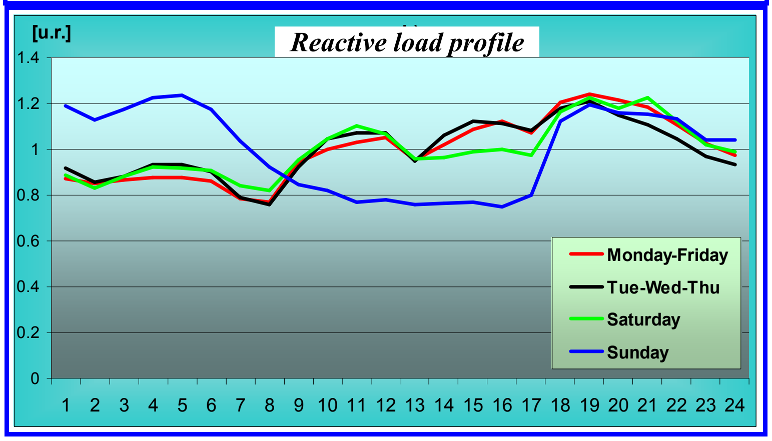

Fig. 1 – Active/reactive typical load profiles (p.u.) for MV bars of step-down station, in standard days from November 2010.

The expressions for the above mentioned parameters, which have been developed in software application, were presented by Neagu *et al.* (2011). In a similar way, the software application allows the computing of characteristics and dimensionless parameters that describe the load curves for short-term load or peak load, depending on the user choice and needed data for operating with this.

3. Case Study and Results

Considering that in the recent years the household consumers are increasingly endowment with modern electrical equipments, and because of the fact that the tertiary consumers load pattern has changed, other determining factors for consumer load curves are daily temperature variations and natural daylights hours. Considering these issues, the studies and analysis realized in this paper, based on methodologies presented in previous sections, made using a software application, with the main purpose to update the necessary data for optimal design and operation process of ERDS.

Table 1
Characteristics and Dimensionless Parameters, Expresed in p.u. of the Typical Load Profile at HV/MV Station for the Four Standard Day in November 2010

Standard day	HV/MV station			
Parameters [p.u.]	Mon-Fri	Tue-Wed-Thu	Saturday	Sunday
$P_{\min}/P_{\max}$	0.675/1.442	0.691/1.433	0.728/1.467	0.808/1.442
P_{med}	1.001	1.000	1.000	1.000
$Q_{\min}/Q_{\max}$	0.762/1.267	0.749/1.226	0.814/1.239	0.740/1.238
Q_{med}	1.001	1.000	1.000	1.000
$P_{m.p}$	1.049	1.043	1.046	1.036
$Q_{m.p}$	1.023	1.017	1.015	1.034
$T_{\max P} / T^*_{\max P}$	16.670/0.695	16.766/0.699	16.363/0.682	16.645/0.694
$T_{\max Q} / T^*_{\max Q}$	19.005/0.792	19.384/0.816	19.384/0.808	19.396/0.808
$T_{\max S} / T^*_{\max S}$	17.819/0.742	18.096/0.754	17.779/0.741	18.240/0.760
$\tau_{\max P} / \tau^*_{\max P}$	12.133/0.506	12.227/0.509	11.668/0.486	11.958/0.498
$\tau_{\max Q} / \tau^*_{\max Q}$	15.375/0.641	16.281/0.678	15.914/0.663	16.216/0.676
$\tau_{\max S} / \tau^*_{\max S}$	13.619/0.567	13.989/0.583	13.521/0.563	14.167/0.590
$\cos\varphi_{\text{pond}}$	0.709	0.709	0.709	0.712
σ_P/σ_P^2	0.217/0.047	0.207/0.043	0.213/0.046	0.189/0.036
σ_Q/σ_Q^2	0.142/0.020	0.129/0.017	0.124/0.015	0.183/0.034
σ_S/σ_S^2	0.240/0.058	0.222/0.050	0.230/0.053	0.210/0.044
k_{v_P}	0.169	0.156	0.162	0.147
k_{v_Q}	0.217	0.207	0.213	0.189
k_{v_S}	0.142	0.129	0.124	0.183
r_{PQ}	0.801	0.741	0.830	0.255
α_P	0.468	0.483	0.497	0.560
α_Q	0.603	0.611	0.658	0.598
α_S	0.569	0.584	0.580	0.626
k_{u_P}	0.695	0.699	0.682	0.694
k_{u_Q}	0.792	0.816	0.808	0.808
k_{u_S}	0.742	0.754	0.741	0.760
k_{F_P}	1.048	1.043	1.046	1.036
k_{F_Q}	1.022	1.017	1.015	1.034
k_{F_S}	1.460	1.453	1.454	1.454
k_{m_P} / k_{M_P}	0.040/0.058	0.040/0.057	0.040/0.059	0.040/0.058
k_{m_Q} / k_{M_Q}	0.040/0.051	0.040/0.049	0.040/0.050	0.040/0.050

In recently measurements/recordings campaign made in 2009 and 2010, were recorded daily load curves on MV bars from several 110 kV/MV stations located in several cities of Moldavian area with a smaller or larger population. Also, active and reactive daily load curves records were taking at MV and LV bars of MV/LV substation from distribution networks.

Table 2

Characteristics and Dimensionless Parameters of Active and Reactive Typical Load Profile at LV Station Bars from Urban Distribution which Supply Household Consumers, for the Four Standard Day in October 2010

Standard day	LV substation bars			
Parameters [p.u.]	Mon-Fri	Tue-Wed-Thu	Saturday	Sunday
P_{min}/P_{max}	0.695; 1.586	0.647; 1.689	0.674; 1.567	0.671; 1.570
P_{med}	1.000	1.000	1.000	1.000
Q_{min}/Q_{max}	0.855; 1.358	0.875; 1.211	0.820; 1.246	0.839; 1.203
Q_{med}	1.000	1.000	1.000	1.000
$P_{m.p}$	1.080	1.089	1.066	1.070
$Q_{m.p}$	1.020	1.011	1.018	1.015
$T_{\max P} / T^*_{\max P}$	15.133; 0.631	14.213; 0.592	15.315; 0.638	15.288; 0.637
$T_{\max Q} / T^*_{\max Q}$	17.677; 0.737	19.268; 0.826	19.268; 0.803	19.943; 0.831
$T_{\max S} / T^*_{\max S}$	16.797; 0.700	16.538; 0.689	17.177; 0.716	17.4000.725
$\tau_{\max P} / \tau^*_{\max P}$	10.306; 0.429	9.170; 0.382	10.422; 0.434	10.423; 0.434
$\tau_{\max Q} / \tau^*_{\max Q}$	13.285; 0.554	16.540;0.689	15.750; 0.656	16.814; 0.701
$\tau_{\max S} / \tau^*_{\max S}$	12.260; 0.511	11.847; 0.494	12.744; 0.531	13.073; 0.545
$\cos \varphi_{pond}$	0.709	0.711	0.709	0.709
σ_P/σ_P^2	0.283;0.080	0.299; 0.089	0.258; 0.066	0.265; 0.070
σ_Q/σ_Q^2	0.142; 0.020	0.105; 0.011	0.135; 0.018	0.121; 0.015
σ_S/σ_S^2	0.294; 0.086	0.283; 0.080	0.271; 0.074	0.270; 0.073
k_{v_P}	0.207	0.199	0.191	0.191
k_{v_Q}	0.142	0.105	0.135	0.121
k_{v_S}	0.283	0.299	0.258	0.265
r_{PQ}	0.855	0.864	0.876	0.907
α_P	0.438	0.383	0.430	0.427
α_Q	0.630	0.723	0.659	0.698
α_S	0.561	0.550	0.550	0.549
k_{u_P}	0.631	0.592	0.638	0.637
k_{u_Q}	0.737	0.826	0.803	0.831
k_{u_S}	0.700	0.689	0.716	0.725
k_{F_P}	1.080	1.089	1.066	1.070
k_{F_Q}	1.020	1.011	1.018	1.015
k_{F_S}	1.480	1.478	1.470	1.470
k_{m_P} / k_{M_P}	0.040;0.063	0.040; 0.068	0.040; 0.063	0.040; 0.063
k_{m_Q} / k_{M_Q}	0.040; 0.054	0.040; 0.048	0.040; 0.050	0.040; 0.048

As regards the analysed HV/MV stations they are of mixed type, supplying urban or rural household and tertiary consumers, more than 90%, and industrial consumers with a low weight of about 9...10%. The MV/LV analysed station (100 approximately) are located in various urban and rural localities from Moldavia area, and are network type and subscribed type. About the MV/LV station – network type, these serving or supplying with electric power the household and tertiary consumers from urban/rural habitat, in different proportions or percentages.

By processing the daily load curves recorded on MV bars of the step-down HV/MV station, they were expressed, primarily, in per units (p.u.), by reporting the 24 hourly load levels at the average load of the daily load curves. In the following, by statistical process of these daily load curves in p.u., were determined for continuous load, the typical load profiles, at different consumer

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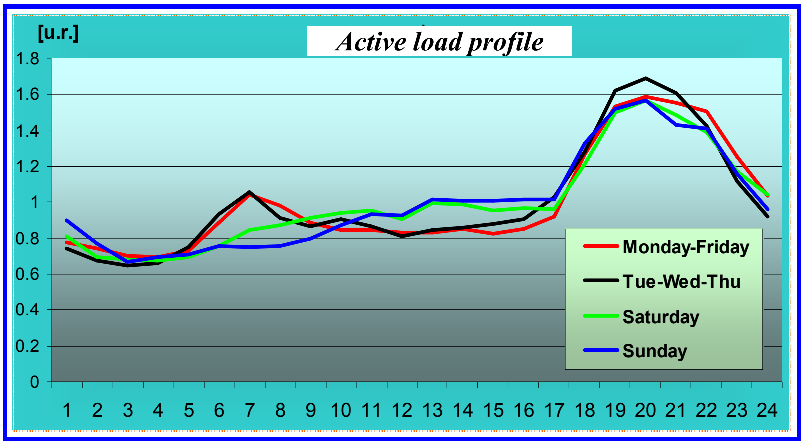

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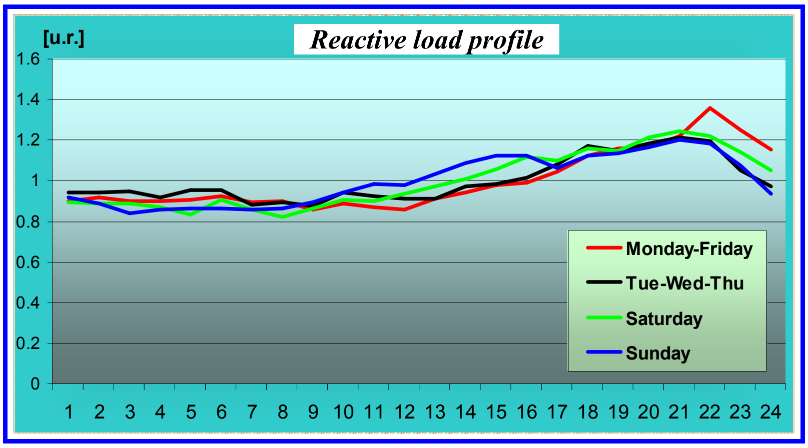

Fig. 2 – Active/reactive typical load profiles (p.u.) for LV bars of substation which supply household consumers, in standard days from October 2010.

categories. For exemple, in Fig. 1 are presented the active and reactive typical load profiles for MV bars of the step-down station of ERDS (lack of space), in standard days for November 2010. Also, in Table 1 are showed the main characteristics and dimensionless parameters for these typical load profiles, expressed in p.u., in standard day from November.

On the MV/LV which supply household and tertiary consumers, for their analysis approximately 1,900 daily load curves was recorded throughout the study period (2009 and 2010 years), in every months. Processed in same way the recorded load curves on LV bars of the substation, expressed in p.u., by using the software application, were determined the typical load profiles, the main characteristics and dimensionless parameters for these typical load profiles, and the values and correlation coefficients of active and reactive daily load curves, in standard day, in all months over a year. For example, in Fig. 2 and Tables 2…4, some obtained results from these analyses are shown.

Table 3

Values of Correlation Coefficients Between Hourly Loads of the Active Load Curves on Tuesday-Wednesday-Thursday (Working Day)

Working day	Tuesday	Wednesday	Thursday
Tuesday	1.000000	0.991301	0.985883
Wednesday	0.991301	1.000000	0.988167
Thursday	0.985883	0.988167	1.000000

Table 4

Values of Correlation Coefficients Between Hourly Loads of the Reactive Load Curves on Tuesday-Wednesday-Thursday (Working Day)

Working day	Tuesday	Wednesday	Thursday
Tuesday	1.000000	0.948499	0.844066
Wednesday	0.948499	1.000000	0.889507
Thursday	0.844066	0.889507	1.000000

To determine the coefficients mathematical model for forecasting by extrapolation (direct methods forecast) used for time evolution consumption is considered, for example, power function, having the following form

By using both the time series extrapolation method of electric energy consumption values and artificial neural networks (Multilayer Perceptron), was followed the forecasting function establishing which can reflect correctly the trend of the time evolution of urban household consumption, as power absorbed per apartment from substations. In order to build real time series as regards the electric energy consumed in the substation, has been used real data recorded in operation for 40 substations which supply households, during the year's 2000…2010. The period of analysis for forecasting electric energy consumption was between 2010 and 2035. The analysis period for electric energy consumption forecast was between 2010 and 2035. For the two analysed consumption variants – minimum and maximum – the same mathematical model has been selected for the forecast process, namely power function with the following general expression:

$$P(t) = At^B = P(1)t^B , \tag{1}$$

where: $P(t)^B$ is the forecast power, absorbed by the consumer in year *t*, from forecast period; t – years of the forecast period 2010 … 2035 (t = 1, for 2010); $A = P(1)$ - absorbed power in first year of the period, considering 2010 as the base, and consumption of that year respectively; B – coefficient determined by regression, based on measurements or recordings from the past, having different values depending on the consumer category supplied, how meet the utilities, etc.

Should be noted that the same forecast function is recommended by the standard from our country (PE *132*/2003), when the analysis period is considered to be between 2010…2025, for electric energy consumption forecast of rural households and tertiary consumers.

4. Conclusions

The changes of the electric energy consumption and the shifting from HV to MV and LV, and electric energy market development, from our country, have raised to the attention of specialists the complex problem of ERDS development, restructuring, execution and rational operation. The importance of economic and social aspects regarding the normal and efficient supply with electric energy of household and tertiary consumers, and the higher demands which must respond these systems, requires a detailed attention to their structure and characteristics.

Actually, the increased performance of computations systems or electronic systems and digital data acquisition (records relating to electric loads or the daily load curves, etc.), inevitably leads to the development of concepts and methods of supervision (monitoring) and management of public ERDS with very positive consequences in improving their technical/economical parameters.

Today, it’s necessary to use the profiling techniques of the loads for all household and tertiary consumer categories, the forecasts on the power or energy demand for a shorter or longer period and the parameters that characterize the typical load profiles; the knowledge of general characteristics and dimensionless parameters of the typical load profiles represents a very useful information in rational ERDS design and operation. The load curves of different tertiary consumer categories hourly profiled can be used in current operation by electric energy distribution territorial units for billing and closing hourly balance, allowing the participation of these consumers at energy market.

Considering the major changes occurring in recent years at household and tertiary consumers with new equipment which satisfy the population necessity, it’s necessary that the typical load profiles with their main parameters, and adopted mathematical models for power and electric energy forecast, to be in accordance with the energy situation of each development stage. For these reasons it is necessary a periodically updating of all information.

Following a recent campaign of measurements/recordings, during the 2009…2010 years, the paper presents, to update, some obtained results of consumer load profiles from these MV substations and feeders, for determining characteristics and dimensionless parameters which described these profiles.

REFERENCES

Eremia M. *et al*., *Electric Power Systems. Electric Networks*. Edit. Acad., Bucureşti, 2006.

Georgescu Gh., Neagu B. *et al*., *Proiectarea şi exploatarea asistată de calculator a sistemelor publice de repartiţie şi distribuţie a energiei electrice*. Edit. Fund. Acad. AXIS, Vol. **1**, Iaşi, 2010.

Georgescu Gh., Gavrilaş M., Cârţină Gh., *Aspects Concerning Power Distribution Networks Planning Using Artificial Intelligence*. 14th Internat. Conf. on Electr. Distr., CIRED '97, Birmingham, 1997.

Georgescu Gh., Poeată Al., Brumă N., Sufleţel N., Dumitroaia C., *Analiza statistic-probabilistică a sarcinilor din nodurile reţelelor de distribuţie. Bază de date, programe software specializate*. Rev. Prod. Transp. şi Distr. Energ. El. şi Term., *8-9*, Bucureşti (2001).

Georgescu Gh., Gavrilaş M., Rădăşanu D., *Previziunea pe termen scurt şi mediu a puterii folosind reţele neuronale artificiale*. Energetica, *8-9* (1999).

Georgescu Gh., *Sisteme de distribuţie a energiei electrice*. Vol. **1**, partea **I**-a şi a **II**-a, Edit. Politehnium, Iaşi, 2007.

Hyde O., Hodnett P.F., *An Adaptable Automated Procedure for Short-Term Load Forecasting*. IEEE Trans. Power Syst., **12**, *1*, 84-93 (1997).

Luştrea B., *Prognoza consumului de energie*. Edit. AGIR, Bucureşti, 2001.

Neagu B., Georgescu Gh., Guşă M., *The Profiling of Load Curves and Main Parameters for Different Tertiary Consumer Categories Supplied through Electricity Repartition and Distribution Systems*. 8TH Internat. Conf. on Ind. Power Engng., Bacău, CIEI, 2011.

Poeată Al., Georgescu Gh., *Posibilităţi de utilizare a graficelor tip de sarcină ale consumatorilor în studiile de dezvoltare şi pentru exploatarea raţională a reţelelor electrice urbane*. Energetica, *2* (1985).

Scutariu M., Chicco G., Napoli R. Postolache P., *Sistem de sondare a curbelor de sarcină ale consumatorilor în vederea stabilirii profilurilor tip*. Energetica, *7* (2001).

* * * *Metodologie de încadrare pe categorii a consumatorilor captivi de energie electrică*. ANRE, Bucureşti, Ianuarie, 2000.

* * * *Codul de măsurare a energiei electrice*. ANRE, Bucureşti, 2002.

* * * *Procedură pentru definirea şi utilizarea profilului rezidual de consum*. ANRE, Bucureşti, Noiembrie, 2007.

PROFILAREA CURBELOR DE SARCINĂ ŞI PRINCIPALII INDICATORI CARACTERISTICI AI ACESTORA PENTRU DIFERITE CATEGORII DE CONSUMATORI ALIMENTAŢI DIN SISTEMELE PUBLICE DE REPARTIŢIE ŞI DISTRIBUŢIE A ENERGIEI ELECTRICE

(Rezumat)

Deplasarea consumului de energie electrică de la înaltă spre medie şi joasă tensiune, precum şi evoluţia pieţei de energie din ţara noastră au adus în atenţia specialiştilor o serie de probleme legate de dezvoltarea şi restructurarea raţională a

sistemelor de repartiție şi distribuție. Prin intermediul acestor sisteme sunt alimentați un număr mare de consumatori casnici şi terțiari, iar în vederea proiectării şi exploatării optime a respectivelor instalații trebuie cunoscut, cât mai exact posibil, nivelul actual de consum pentru toate categoriile de consumatori alimentați cu energie electrică, prognozele sau previziunile privitoare la cererea de putere ori a energiei pe un orizont mai apropiat sau mai îndepărtat, precum şi modul în care se consumă energia respectivă, în funcție de oră, zi şi sezonier, de-a lungul unui an calendaristic. Din aceste considerente, în lucrare sunt prezentate o parte din rezultatele obținute în urma unei campanii recente de măsurători/înregistrări privind curbele de sarcină din nodurile caracteristice ale sistemelor respective. În felul acesta s-a urmărit reactualizarea formei sau profilului acestor curbe de sarcină, pentru zilele caracteristice (standard) ce urmează a fi luate în considerație de-a lungul unui an, în procesele de proiectare şi exploatare. Totodată, aceste curbe de sarcină profilate orar pot fi utilizate şi în exploatarea curentă de către unitățile de distribuție teritoriale a energiei electrice, în vederea închiderii balanțelor orare şi a facturării, permițând, în acest mod, participarea consumatorilor respectivi la piața de energie.