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48. The active consumer at the centre of the energy system

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Introducing. In terms of the transformation of electric power industry all over the world, the consumer of the energy market is forced to become an “active consumer” (AC) who has the technical capabilities to optimize his energy consumption by either “producing” or “purchasing” electricity in the market.

Materials and methods. To start with the concept of the AC in the energy system is based on the energy consumption management mechanisms, which are divided into long-term and short-term actions (Scenario Forecast for the Development of the Electric Power Sector for the Period up to 2030).

The Demand-side management (DSM), as an example of a static response mechanism, is currently a developed area. The program of action is aimed at stimulating energy-efficient consumption. The dynamic response mechanism is characterized by the consumers’ reaction and includes planned or contracted actions, which contribute to the stability of the energy system and its balancing or are required in case of network failures. The main problem is consumer retention, as well as ensuring their motivation and ability to participate in the program.

Results. As a result of the electrical energy market develops on the basis of protecting all participants’ interests, which is feasible provided that energy companies interact with AC by offering them load rate tariffs for electricity, capacity utilization and grid connection.

Therefore, tariffs help control the participants’ behaviour in the energy market, which allows to create economic incentives for the formation of their behaviour. For example, in order to stimulate necessary actions, tariffs are reduced, to prohibit unwanted behaviour, they are increased. Energy companies need analyse the AC behaviour in the market in order to manage their demand. DSM is an integrated approach to interaction with the consumer, based on its active participation in the formation and regulation of the load including incentives for the AC.

Consequently, this model allows us to identify the main economic factors that influence the behaviour of the active user, helps to assess the order of magnitude of these factors in financial terms, and can be used to describe the consumer behaviour in the development of consumer motivation to participate in management and control demand mechanisms [2].

Concluding. To sum up, the AC’s functions in the energy market are to purchase electrical energy from the shared energy grid, to choose the quantities of electrical energy purchased from other participants in the energy market and to sell it.

The change in the behaviour of energy companies when AC appear on the market is to make it possible for the consumer to change the amount of the purchased electrical energy on their own, and to choose the functional properties (reliability level, quality) based on the balance of their needs and the capabilities of the energy grid.

References:

1. Firsova, I.A., Vasbieva, D.G., Losyakov A.V., Arhipova V.S., Pavlushin A.A. (2018). Development of “active consumer” concept on energy market. *International Journal of Energy Economics and Policy*, p. 8 – 13.
2. Volkova, Irina & Goubko, Mikhail & Salnikova, E. (2014). Active consumer: Optimization problems of power consumption and self-generation. *Automation and Remote Control*, p. 75.