IOSR Journal of Applied Physics (IOSR-JAP)
e-ISSN: 2278-4861.Volume 11, Issue 3 Ser. II (May. – June. 2019), PP 11-13
www.iosrjournals.org

Economic Effectiveness of Intelligent Electrical Networks

Hashimov A.M., Novruzova E.E.
H.Javid, ave.131. Institute of Physics of National Academy Science of Azerbaijan, Baku, Azerbaijan
Corresponding Author: Hashimov A.M.

Abstract: *The main problem is the development of a theoretical basis of economic efficiency in the economic system of the republic. This theory finds a new direction in the social and natural sciences, such as in chemistry, physics, economics, psychology, and ecology. To achieve optimal results in the power industry, it is necessary to use the performance management method. This method allows you to define strategic goals with optimal use of resources. Smart Grid is a new strategic direction for the development of power grids and the development of new technologies, devices and materials applicable in the field of energy production, automation and computerization of most processes. The listed combination of factors of this work gives a high level of significance in the economic growth and energy-efficient technology of the country.*

Keywords: *energy, electrical networks, smartmeter, smart home, solar generator, distribution*.

Date of Submission: 06-05-2019 Date of acceptance: 20-05-2019

I. Introduction

In the modern world, the growth of the level of efficiency of each state determines the competition of all economic entities. It is clear that efficiency is the obtaining of the greatest profits at the lowest cost of natural resources. In science, efficiency is an important and basic concept. Efficiency is reflected in all industries. For the characterization of economic efficiency it is necessary to trace its formation. In the work of L. Walras "Elements of pure political economy" (1874) some principles of the complex mechanisms of market economy were formulated. In this paper, with the help of complex interrelated equations, the role of the market mechanism in achieving general equilibrium is analyzed. The work specifies the specifics of the economic system and ways of increasing efficiency. These studies indicate that due to changes in numerous external and internal parameters, the effectiveness of any production will lead to a significant change in the market value. The economic system mainly depends on the following three basic elements: 1) consumer, 2) state-owned enterprises, 3) manageringcommites. Governmental authorities are mainly concerned with 1) the volume of production and its structure, 2) the level of demand for the consumer of goods. This economic model of management orients the maximum profit and, of course, regulates prices. Economic equilibrium should be determined taking into account economic dynamics. The concept of general equilibrium suggests that maximizing efficiency occurs when consumers and producers act together. If this factor is violated in the economy, a non-equilibrium distribution of goods occurs and the steady state in the market is disturbed. The theory of economic efficiency is a rational theory of production, distribution and consumption of goods and services. Efficiency in the economy is a diverse process of interaction of each subject of the economic process with the external environment, related industries, and national economies. Of course, efficiency is closely related to the social effect. Efficiency while minimizing costs follows the maximization of results. In any market economy, the concept of efficiency appears to be a multi-factor indicator related to the analysis of markets, the distribution of resources and finished products. In a market economic system, the efficiency of the economic structure requires not only production efficiency, of course, and the functioning of the system itself as a whole. For the effectiveness of any enterprise must clearly define a strategic approach. The economic relations of any state are interconnected by world enterprises and world markets. Managing the performance of any enterprise is highly dependent on management processes, planning, organization, implementation and control should be planned.

II. Some Basics of Economic Efficiency In Energy Enterprises.

In the energy sector, the development of production and efficiency is linked by relations between the sectors of the electric power industry (generation, transmission, distribution, and sales). The energy sector is characterized mainly by the following features:

1) The continuity of the production and consumption of energy

2) Uninterrupted supply of electricity, the need for energy reserves
3) Electric power quality (frequency and voltage)
4) Variable load mode
5) Products of the industry must be of high quality.
6) The long service life of energy enterprises should not affect the economic sector.

In the energy sector, the assessment of economic efficiency is based on the characteristics of the industry, and on the specifics of the project. Design and implementation of energy systems involves the implementation of several tasks:
1) Development of a unified energy system for several years
2) Periodic and technical monitoring
3) Development of regional energy companies for several years
4) Development of energy supply plans for cities and rural areas
The options being developed for the development of the energy sector should satisfy the following conditions:
1) The same production effect by year
2) Regulatory requirements for the reliability of power supply
3) Compliance with environmental requirements
4) Strictly follow these guidelines.
The systemic effect in the power industry is very complex and requires an effective planning project.

III. Applied Technology In Intelligent Electrical Networks

In 2005, at the European meeting, experts discussed the problems of the development of electrical networks and systems integration of wind and solar generation. In the final resolution of 2006, the concept of "Smart Grids" (intelligent networks, smart networks) appeared. Since then, this concept has been transferred to the appropriate components and technologies. The concept of "Smart distribution", "Smart meter", "Smart home" is used throughout the world. Smart Grids are an intelligent network that intelligently coordinates the actions of all connected users, electricity producers, consumers, and guarantees the efficiency of uninterrupted, ecological, economic, and reliable power supply. Intellectual networks are characterized by the following basic properties: with the help of modern information and communication technologies, users and market participants join; provides to the networks of all types of generation of electric energy and improves the development of the market. Power supply through network integration becomes reliable. Electricity production becomes environmentally friendly. The load is adjusted and communication with the market is improved and the environment is minimized.

The transmission networks have a satisfactory communication infrastructure. The main task is to strengthen networks in order to transport new power from power plants to load centers without risks. When designing an electrical network, the load center should be closer. For example, in Northern Germany, the generation of electricity from a wind structure is 25-30 GW per year. This systematically leads to overloads in transmission networks. This problem is solved through the expansion of networks. In Europe, new power transmission technologies are applied, 1000 kW alternating current airlines, 800 kW direct current transmission systems, and underground gas-insulated conductors.

Reactive power is regulated using a flexible AC transmission system (FACTS-Flexible AC Transmission Systems). In transmission networks, overloading of lines should be avoided. Parcel monitoring and protection is performed on Phasor Measurement Units (PMU) devices. These devices are measured, the complex values of current and voltage and transmits to the settlement center. In distribution networks, the following technological tasks are mainly important.

Coordination of small generating capacities so that at every moment the generation does not overhang to the balance sheet plan of the previous day. This coordination should be carried out in wind and solar power plants. Electricity consumers (customers) are provided with "smart meters" that perform the following functions, remotely read the indicators, their parameters change remotely, price rates are variable, their controls, i.e. disconnection, activation occurs remotely. The use of these counters improves the work of communication and information networks. In several countries of the world since 2010 they are used by "smart meters". For technical and economic reasons, local options can be chosen. In intelligent networks, next to the flow of energy, there is an information flow between the network participants.

Each member communicates with any other member of the network. For this purpose, international communication protocols in the technology "plug and play" are used. Electric networks use different communication protocols in various fields. It is assumed that the electric communication networks at all levels will use the new communication protocol according to the JEC 61850 standard. Work on the application of the JEC standards for all communication tasks in the electric current network is being developed. The JEC 61850 standard for meters does not apply. Currently, work is underway to approve standard simple and effective communication structures for home counters of various kinds. In Europe, SML and M-Bus are used for

enumerators. These counters are processed and passed on. Not only electric power industry, and other branches, heat, gas power engineering, need communication meters. In the UK, the service includes not only the operation of meters and the reading of their readings, but also the reporting of information.Unified standardized data models ensure easy data exchange between enterprises and this intelligent network is becoming increasingly necessary. The world is gradually agreeing that smart measurements are necessary to reduce carbon emissions. Electricity providers will increase energy trading efficiency by introducing distributed generation. It is clear that without a smart device there will be no intelligent network. Of course, intelligent networks provide high-quality, ecological, reliable and stable power supply.

IV. Conclusion

Thus, the analysis of power supply shows that stably and reliably operating technological devices guarantee the generation of the supply of electricity. Smart meters and communication networks work together. In all branches of the power industry, new devices are needed with the help of which one can reduce human labor. New technologies can significantly reduce energy loss in all industries.

References

[1]. Conference "Global Energy Transformation" November 25-26, 2010, Moscow, Skolkovo Moscow School of Management.
[2]. Saraev A.L., Saraev L.A. To the theory of structural modernization of industrial enterprises. // Bulletin of the Samara State University. No. 10 (101).P.161-169.
[3]. In particular, the IEA experts in the World Energy Outlook 2010 report refer to the systemic impact of the world economic crisis of 2008 on energy.
[4]. Garaedagi J. System thinking. How to manage chaos and complex processes. - Minsk: GrevtsovBuks, 2011. 480p.

IOSR Journal of Applied Physics (IOSR-JAP) is UGC approved Journal with Sl. No. 5010, Journal no. 49054.

Hashimov A.M " Economic Effectiveness of Intelligent Electrical Networks.” IOSR Journal of Applied Physics (IOSR-JAP) , vol. 11, no. 3, 2019, pp. 11-13.