ROSTLANUVCHI QUVVATLI KONDENSATOR VA SINXRON DVIGATELLAR YORDAMIDA KUCHLANISH HAMDA QUVVAT KOEFFITSIENTINI ROSTLASH

Karimova Maftuna Tuxtash qizi
Termiz muhandislik-texnologiyalari istituti
E-mail: maftuna2047@gmail.com

Annotatsiya: Qishloq elektr tarmoqlarida tariflarni barqarorlashtirish uchun shart-sharoitlar yaratish, tarmoq korxonalari energiya samaradorligini oshirish hamda elektr ta'minoti ishonchliligini ta'minlash bugungi kunning asosiy vazifalariga kiradi. Ushbu maqola qishloq elektr tarmoqlarining hozirgi holatini tahlil qilish orqali yuqorida sanab o'tilgan vazifalarni bajarish yo'llari sanab o'tilgan.

Kalit so'zlar: Qishloq elektr tarmoqlari,ishonchlilik,energiya isroflari,elektr energiyaning sifat ko'rsatkichlari.

Qishloq xo'jaligi ishlab chiqarish korxonalarini sifatli elektr energiya bilan ta'minlashda soxa mutaxassislari oldiga yechilishi zarur bo'lgan bir qancha dolzarb masalalarni qo'yadi. Biz sifat bo'yicha talabga javob bermaydigan elektr energiyaning qishloq xo'jaligi ishlab chiqarishiga bo'lgan ta'sirini o'rganib, uni bartaraf etish bo'yicha bir necha tavsiyalarni berib o'tmoqchimiz. Elektr energiya sifat ko'rsatkichi parametrlaridan biri – kuchlanishning nominal qiymatidan og'ishini aytib o'tishimiz mumkin.

Elektr tarmoqlarida kuchlanish og'ishi tahlil qilinganda, uning quyidagi belgilangan oraliqlardagi foiz ko'rsatkichlariga qarab talab darajasida ekanligini bilishimiz mumkin: -5 % dan +10 % gacha elektr yuritkich va apparatlarning qisqichlarida yurgizish va boshqarish paytida, -2,5 % dan +5% gacha ish yuritish qurilmalari qisqichlarida, ±5 % qolgan elektr iste'molchilar qisqichlarida. Alohida

hollarda, avariyadan keyin kuchlanish kamayishi qo‘shimcha 5 % ga ruxsat etiladi. Kuchlanishning haqiqiy qiymati va nominal qiymati orasidagi farqdan kuchlanishning og‘ishini necha foizga teng ekanligini bilishimiz mumkin.

$$\Delta U = U - U_{\text{н}} \; yoki \; \Delta U\% = \frac{U - U_{\text{н}}}{U_{\text{н}}} \cdot 100\ \%$$

Qishloq xo‘jaligi ishlab chiqarish korxonalaridagi elektr iste’molchining kuchlanishi nominal holatda bo‘lishi, normal ish rejimida sifatli mahsulot chiqarish imkonini beradi. Ko‘rsatilgan me’yordan o‘zgarganda iste’molchilarning ish holati buzilishi mumkin (elektrotermik qurilmalarda harorat o‘zgarishi, yoritkichlarning yoritilganlik darajasi o‘zgarishi, elektr dvigatel valida FIKning o‘zgarishi va boshqalar).

Qishloq xo‘jaligi ishlab chiqarish korxonalaridan biri chorvachilik fermalarini oladigan bo‘lsak, ularda asosiy istemolchi – yoritish tarmog‘idir (umumiy elektr energiyaning 30 – 45 % miqdori yoritish uchun sarf bo‘ladi) [2]. Kuchlanishning me’yoridan pasayishi yoritilganlikning kamayaishiga, oshishi esa, chiroqning xizmat muddatini kamaytirishga olib keladi. Bundan ko‘rinib turibdiki, kuchlanishning oshishi ham kamayishi ham iqtisodiy tomondan sarf-harajatning oshishiga hamda ishlab chiqarish jarayonida noqulayliklar tug‘ilishiga olib keladi. Shu tariqa mahalliy ishlab chiqaruvchilar tomonidan yetkazilib berilayotgan oziq-ovqat mahsulotlarining tannarxi bevosita oshishini kuzatishimiz mumkin. Bundan tashqari chorvachilik fermalarida elektr energiya sifatining pasayishi mo‘tadil iqlimni yaratishda noqulayliklar tug‘dirishi mumkin.

Ishlab chiqarish korxonasi tomonidan kuchlanish qiymatini me’yorida ushlab turish masalasini muvaffiqiyatli hal qilish uchun, ta’minlovchi tarmoq sxemasi va parametrlari to‘g‘risidagi to‘liq ma’lumotlar, sutkalik ma’lumotlar va ehtiyoj sezilsa korxona yuklamasining mavsumiy o‘lchashlar to‘g‘risidagi ma’lumotlar, transformator shinalaridagi ta’minot manbai hamda iste’molchi tomondagi kuchlanishning amaldagi qiymati haqidagi, asosiysi kutilayotgan kuchlanish qiymati to‘g‘risidagi ma’lumotlarni aniqlab olishimiz lozim.

Ushbu ma'lumotlarni tahlil qilish ko'pchilik holatlarda muammo yechimini to'g'ri aniqlash yo'lini ko'rsatadi. Ma'lumki, yuklamaning har bir o'zgarishi kuchlanish qiymatida aks etadi, masalan, yuklama oshib ketishi kuchlanish pasayishiga yoki kechki yuklamaning kamayishi kuchlanishning nojoiz qiymatda oshib ketishiga olib kelishi mumkin.

Agar ta'minlash tarmog'ida bir necha yirik iste'molchilar bo'lsa, tarmoq parametrlarini rostlash yanada murakkablashadi. Oldimizga kuchlanishni rostlash yoki yuqori va pastgi tomonga pog'onali o'zgartirish maqsadini qo'yganda, transformator orqali bog'langan tarmoqlardan past kuchlanish tarmog'i parametrlarini yuqori kuchlanish tomonidagi rostlash chora-tadbirlari orqali amalga oshirish maqsadga muvofiqdir.

Kuchlanishni rostlash deganda, elektr apparatlar elementlariga kuchlanishni berilgan oraliqda ushlab turish maqsadida ta'sir qilishga aytiladi. Kuchlanishni rostlash – qo'lda, yarim avtomatik yoki avtomatik usulda amalga oshiriladi.

Kuchlanishni rostlash quyidagi texnik vositalar yordamida amalga oshiriladi, kuchlanishni yuklama ostida rostlash qurilmasi (РПН), kuchlanish qo'shuvchi transformatorlar, maxsus liniyaviy rostlovchi transformatorlar, kondensator batareyalari.

Sinxron mashinalarga, elektr stansiya generatorlari hamda qishloq xo'jaligi ishlab chiqarish korxonalaridagi sinxron dvigatel va salt yurish rejimida ishlovchi sinxron kompensatorlar misol bo'la oladi. Sinxron mashinaning kuchlanishni oshishiga ta'siri, uning uyg'otish chulg'amini silliq o'zgartirishda reaktiv quvvatining o'zgarishi va tarmoqdagi reaktiv quvvat oqimlarining qayta taqsimlanishiga asoslangan. Bizga ma'lumki, ishlab chiqarish korxonalari tarmoqlarida oqayotgan tokning katta ulushi reaktiv tok hissasiga to'g'ri keladi. Ushbu ulush qancha katta bo'lsa, quvvat koeffitsienti shuncha past hamda ta'minlovchi tarmoqning o'tkazish qobiliyati kam, tarmoq kuchlanishida esa yo'qotish katta bo'ladi. Bunday tarmoqlar yaqinida sinxron dvigatellar yoki kompensatorlarni reaktiv quvvatni generatsiyalash rejimida ishlatish, tarmoqni reaktiv quvvatning katta toklaridan ozod qiladi va iste'molchining kuchlanish

bo‘yicha rejimi yaxshilanib, elektr ta’minoti tizimi tejamkor bo‘ladi. Xuddi shunday ta’sirni statik (kosinusli) kondensator batareyalarida ham ko‘rishimiz mumkin.

Statik kondensatorlardan va sinxron dvigatellardan reaktiv quvvatni kompensatsiyalash hamda kuchlanishni rostlash vositasi sifaitda foydalanishda ko‘p o‘xshashliklar mavjud. Tarmoqqa ko‘ndalang ulanuvchi kondensator batareyasi, “yulduz” yoki uchburchak shaklda ulanganda reaktiv quvvat generatori vazifasini bajarib, tashqi tarmoqni reaktiv quvvat katta toklaridan to‘liq yoki qisman ozod qiladi. Reaktiv quvvatning ta’minlovchi tarmoqdan kam is’temol qilinishi, uchastkalarda quvvat koeffitsientini yaxshilaydi, aktiv quvvat yo‘qotilishini kamaytiradi va tarmoqning barcha bo‘g‘inlarida kuchlanish oshishiga olib keladi.

Kondensator batareyalariga xizmat ko‘rsatish soddaligi, ularda isrof bo‘ladigan elektr energiyaning kichik qiymati, ularning konstruksiyasi hamda yuqori ishonchlikka egaligi tufayli sanoati rivojlangan mamlakatlarda kuchlanishni rostlash maqsadida kondensator batareyalaridan keng foydalaniladi. Bu esa o‘z-o‘zidan sinxron kompensatorlarni qo‘llashning kamayishiga olib keldi.

AMPLIFICATION AND POWER COEFFICIENT DETERMINATION USING ADJUSTABLE CAPACITOR AND SYNCHRONOUS MOTORS

Abstract: Creating conditions for stabilization of tariffs in rural electricity networks, increasing the energy efficiency of network enterprises and ensuring the reliability of electricity supply are among the main tasks of today. in this article, the ways of fulfilling the above tasks are listed by analyzing the current state of rural electricity networks.

Key words: Rural electricity networks; reliability; energy waste; quality indicators of electricity.

The supply of agricultural production enterprises with high-quality electric energy poses a number of urgent issues that need to be solved before the specialists of the field.

We want to study the impact of substandard electricity on agricultural production and make some recommendations for its elimination. We can mention one of the parameters of the quality indicator of electric energy- voltage deviation from the nominal value.

When analyzing the voltage deviation in electrical networks, we can know that it is at the required level depending on the percentage indicators in the following specified intervals: from -5% to + 10% during operation and control of the clamps of electric motors and devices, from -2.5% to +5 to % in the clamps of stationery devices, ±5% remaining in the clamps of electrical consumers .In exceptional cases, an additional 5 % voltage drop after an accident is allowed. From the difference between the actual value of the voltage and the nominal value, we can find out the percentage of the voltage deviation.

The voltage of the electricity consumer in the agricultural production enterprises is in the nominal state, it allows to produce quality products in the normal working mode. When it changes from the specified norm, the working condition of consumers may be disturbed (temperature changes in electrothermal devices, changes in the level of illumination of lamps, changes in the FIK of the electric motor shaft, etc.).

If we take livestock farms as one of the agricultural production enterprises, their main consumer is the lighting network (30-45% of the total electricity is used for lighting). A decrease in voltage from the norm leads to a decrease in illumination, and an increase in it lead to a decrease in the service life of the lamp. It can be seen that both the increase and decrease of the voltage lead to an increase in consumption from the economic side and inconveniences in the production process. Thus, we can observe a direct increase in the cost of food products delivered by local producers. In addition, a decrease in the quality of electricity in livestock farms can cause inconvenience in creating a temperate climate. In order to successfully solve the issue of maintaining the voltage value by the production company, complete information about the scheme and parameters of the supply network, daily data and, if necessary, seasonal measurements

of the company's load we need to determine the information about the current value of the supply source and consumer side voltage value.

Analysis of this information will in most cases lead to the correct determination of the solution to the problem. It is known that any change in load can lead to a decrease in voltage or a decrease in late load can cause an increase in voltage to an unacceptable value.

If there are several large consumers in the supply network becomes more complicated. When setting the goal of voltage adjustment or step change to the upper and lower side, it is appropriate to implement the parameters of the low voltage network from the networks connected through the transformer by means of adjustment measures om the high voltage side.

Adjusting the voltage means affecting the elements of electrical equipment in order to maintain the voltage in a given range. Voltage adjustment – manual, semi-automatic or automatic.

Voltage adjustment is carried out using the following -technical means, on-load voltage adjustment device (RPN), step-up transformers, special linear adjustment transformers, capacitor batteries.

Examples of synchronous machines are generators of power stations and synchronous motors in agricultural production enterprises, and synchronous compensators working in the idle mode. We know that a large share of the current flowing in the networks of production enterprises corresponds to the contribution of reactive current. The large this share, the lower the power factor and the lower the transmission capacity of the supply network, and the greater the loss in the network voltage. The use of synchronous motors or compensators near such networks in reactive power generation mode frees the network from large reactive power currents, improves the consumer's voltage regime, and makes the power supply system economical. We can see the same effect in static (cosine) capacitor batteries. There are many similarities in the use of static capacitors and synchronous motors for reactive power compensation and voltage rectification. A capacitor battery connecting to the

grid, acting as a reactive power generator when connected in 'star' or delta from, completely or partially frees the external network from large currents of reactive power. Less consumption of reactive power from the supply network improves the power factor in sections, reduces active power loss and leads to an increase in voltage at all links of the network. Capacitor batteries are widely used for voltage adjustment in industrialized countries due to the ease of maintenance of capacitor batteries, the low cost of wasted electricity, their construction and high reliability. Which led to a decrease in the use of self-synchronous compensators.

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