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History of electrification in Tashkent during 1914–1918 years

Abstract. After the colonization of the Turkestan region by the Russian empires in the second half of the 19th century, the tsarist authorities chose the city of Tashkent as



the political, administrative and military center of the entire region. This was primarily due to Tashkent's trade and economic superiority over other cities, and secondly, the city's location in the central part of the country and its strategic importance. Although the industrial sectors were poorly developed, work began on the construction of power plants to illuminate the city streets and operate small manufacturing enterprises. The main focus was on Russian and foreign capital, and the initial projects were not implemented due to the bureaucratic system. Although the number of power plants operating in Tashkent increased somewhat in 1914–1917, they were used only for lighting buildings and streets of social importance, not for industrial purposes. By 1914, the Russian Empire ranked 8th in the world in terms of electricity production, with 14 kWh of electricity per capita in the central parts of the empire, while in Tashkent this figure was only 1 kWh per capita, indicating that the metropolis's attention and fundamental interests were directed to other things, rather than the development of the city's socio-economic sectors. Although the participation of the Russian Empire in the First World War gave impetus to the increase in production in the food, textile, and military industries, there were no noticeable changes in the energy sector. In particular, although attention was somewhat increased in Tashkent in 1914–1918 to the construction of power plants, financial difficulties for investors and the complex political changes of the time negatively affected the number of people at the helm of this work, which led to the postponement of planned work. Economically, Tashkent and its surroundings, as an industrial-agrarian region, have the potential to introduce various infrastructure systems, have vast natural raw material reserves, and have all the conditions for the construction of hydroelectric power stations, but these natural opportunities have not been fully utilized.

Keywords: *Tashkent; electrification; electrical power station; contract; lamp; tram*

Introduction.

In the 21st century, the constant increase in demand for mineral resources for the purpose of energy production is the reason for the strengthening of geopolitical rivalries. It is explained by the study of the slowness of electricity production in industry and other sectors in the end of the XIX century – the first quarter of the XX century and its negative impact on the development of the socio-economic and cultural life of the people of the country. At a time when world economic relations chose new directions of development and began fundamental changes on this basis, the conflict situation in colonial Turkestan did not allow for timely assimilation of technical innovations and implementation of large-scale measures of their introduction into industry. This can be observed in the colonial administration's old-fashioned way of turning the country into its own raw material reserves, with a primary focus on the agrarian issue and neglecting the development of industrial sectors. The process of electrification of the Turkestan region also experienced the same complex historical reality, and as a remote country, initially during the colonial period, and later under the

Soviet rule, it lagged far behind the indicators of electricity consumption in the central regions. Such disparity and other important issues of the field require a new approach to the problem, understanding of their roots and historical scientific evaluation.

In a number of works that examined the issue of electrification in the regions and large cities of the Russian Empire, it was noted that the electrification of Tashkent at that time was at a low level than other parts of the empire (Simonov, 2016; Simonov, 2017). In works devoted to the history of the region and its industry during the colonial period, it is noted that the electrification of Tashkent, which was the political and administrative center of the Turkestan Governorate, was carried out last of all other cities in the empire (Musaev, 2008; Abdullayev, Rakhimov, & Rajabov, 2019). A number of other scientific studies devoted to the socio-economic history of Turkestan in the late 19th and first quarter of the 20th centuries have analyzed in detail the low level of the Tashkent city's industry and technical condition, and the main attention of the colonial administration was paid to raw materials from agriculture (Shadmanova, 2011). Some researches revealed that the number and technical equipment of industrial enterprises in the Russian Empire lagged behind European countries and the USA, which also had the bad an impact on the economic situation of Tashkent that period (Khaydarov, 2018; Makhmudova, 2018).

Colonial nature of the economic policy of the Russian Empire in Turkestan's cities during the First World War, noting that the colonial administration, by placing various artificial obstacles to the development of manufacturing industry in Tashkent, tried with all its might to develop cotton growing in the country (Tukhtabekov, 2015).

It was only during the implementation of the GOELRO plan that the electrification process in the socio-economic and cultural life of Tashkent accelerated, and the Turkestan Commission created for this purpose had a separate financial fund (Timurov, 2015; Yeryasheva, 2018). Some works considered the establishment of the first higher educational institution in Tashkent –Turkestan People's University and its Technical faculty and the training of technical personnel there, as well as the sending of local youth to study abroad and improve their skills there (Kholboev, 2003; Turdiev, 2006; Irzaev, 2018).

On the eve of the World War I, the Dumas of the cities located in the Russian Empire were unable to function as a democratic organization representing the interests of the people (Soloviova, Hurinchuk, Berdnychenko, & Strelko, 2020). This situation is also characteristic of the Tashkent city Duma, the Duma members, whose management system consists of tsarist officials, retired generals and officers, worked for their own interests and did not think about the affairs of the city. Even "Izvestia", the printed edition by the Duma, reproached the persons sitting in the Duma apparatus, saying that "they often did not work with zeal, but served" (Izvestiya Tashkentskoy gorodskoy Dumi, 1916, p. 476). Such persons without initiative and responsibility in the Duma sat for the specified term of office, signed the included papers, received the visitors, and after leaving the power, they forgot about the concerns of the city.

At the moment, revitalization of beautification works in the city, development of lighting systems was an urgent issue. Due to this, in April 1914, projects of a hydroelectric power station and a water pipeline were considered under the Tashkent city administration. At the meeting, professors A. I. Astrov and V. D. Sokolov (Technical college), V. V. Dmitriev (Petersburg Electrotechnical Institute), A. K. Yensh (Riga Polytechnic Institute), technical managers of the Moscow water supply organization and local engineers and doctors from Tashkent participated. It was unanimously decided that Bozsuv canal of Salor brook was chosen for the construction of the hydroelectric station and water supply facilities (Turkestanskiy kuryer, 1914).

The planned power plant should to be used mainly by lighting and water supply consumers, and the “Belgian society” did not envisage electricity supply for trams. This would not ensure the full use of the hydro-station, and since the owners of Salor canal’s arable land have priced the land at a high price, their purchase would have automatically increased the cost of the hydro-station and the water pipeline.

All these combined forced the city administration to temporarily stop the implementation of this project before the beginning of the World War I. But the activities of the Belgian “Tashkent tram” company in providing electricity to the whole city were so huge that the only way for the city administration to fight against it was to build its own power station, only in this way it could have a monopoly on the city’s electric lighting.

If Pavlov’s station was purchased by the Belgian company “Tashkent Tram” by the city administration, it would expand in the future and complicate the implementation of the project of construction of the power station intended by the city. Therefore, the head of the city N. G. Mallitsky while in Petersburg in March 1914, persuaded the Russian Minister of Defense not to allow the “Tashkent tram” society to start electric lighting works. Although this will cause great damage to the city, the community has won this right (Turkestanskiye vedomosti, 1917). However, in the “law” announced on April 22, 1914 with the signature of the Minister of Trade and Industry, amendments were made to the charter of the Belgian “Tashkent Tram” company, and it was allowed to start electric lighting works. As a result, the city authorities of Tashkent lost the right to own the city enterprises with the “Tashkent tram” company.

Speaking at the City Duma on October 19, 1917, N. G. Mallitsky stated the following: “In Russia, a number of Belgian joint-stock companies with millions of capital are operating in the field of starting electric (tram, electric lighting) enterprises. They are using Belgian diplomatic representatives to protect their interests. Also, special representatives are kept in St. Petersburg to carry out their projects from the central offices. ...Foreign companies prefer to complete their work through central agencies, denying Russian society the rights of self-governing agencies” (Turkestanskiye vedomosti, 1917).

Research methodology.

In the process of studying this problem, special attention was paid to the comparative historical method, which allows identifying and comparing the levels in the development of the process being studied, the changes that have occurred, and determining development trends. With the help of the comparative historical method, which identifies the general and the specific in historical phenomena by comparison, knowledge of the various historical stages of development of the same phenomenon or two different coexisting phenomena is achieved.

And also used the statistical method, which allowed tracing the quantitative parameters of the historical process of researching of that period.

Results and Discussion.

It should be noted that before and during the World War I and even after, the majority of the local population mainly lit their homes with candles, and there were shops selling candles in the bazaars. In below by Figure 1 we can see such little local shop in Tashkent, which were distributed in many small towns and large cities of all Turkestan (NACFPh Uz (National Archive of Cinema, Foto-phono of Uzbekistan. No. 0-93844).

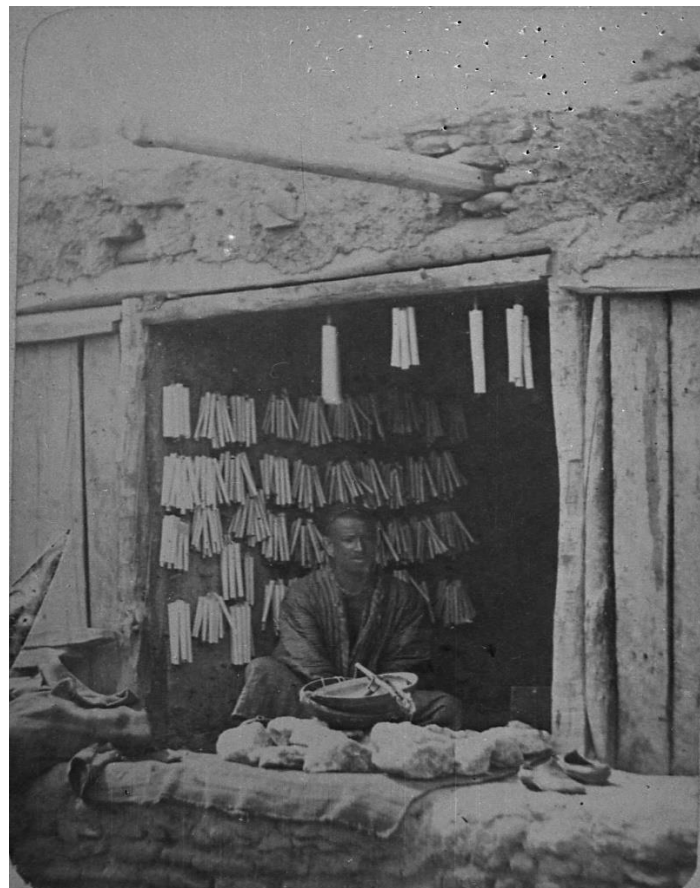


Figure 1. Candles shop in Tashkent local bazaar (NACFPh Uz (National Archive of Cinema, Foto-phono of Uzbekistan. No. 0-93844).

From June 1914, preparations for the construction of the thermal power station were started in central city of Turkestan – in Tashkent. It was intended as a backup for the future hydroelectric station. On July 20, 1914, two 350 horsepower (hp) diesels were ordered for the Kolomensk plant, for which a deposit of 10,000 rubles was transferred (Turkestanskiye vedomosti, 1914).

Ilnsk Square (around Oloy Bazar) was chosen for the thermal power plant. The beginning of World War I, financial difficulties slowed down the pace of construction of the temporary station.

The official request of the city administration to the Minister of Finance Uvarov to open an account with a pledge of 1,650,000 rubles in the state bank was not satisfied. The Russian Imperial Ministry of Finance considers it “not very necessary” to build a power plant in the city (NAUz (National Archive of Uzbekistan). F. I-1. D. 1. C. 1890. S. 13).

In this way, the city’s attempts to build a temporary power station, then a hydroelectric power station, and finally a thermal power station, deprived it of the capital provided by the imperial treasury. Later, the head of the city said that after 5 years, the hydroelectric power station can be built and put into operation, and until then, the temporary power station will bring a profit of 22,000 rubles (NAUz (National Archive of Uzbekistan). F. I-1. D. 3. C. 1670. S. 19).

Due to the need for electricity, the city administration was forced to negotiate with the community to strengthen the former station of Pavlov. On December 18, 1914, an additional agreement was signed between the city and the society, according to which the society was allowed to transfer excess electricity to Pavlov's station under the following conditions:

1. The city grants the society the right to transfer the necessary amount of electricity to Pavlov’s station according to the specified plan to drive the 60 hp electric motor dynamo machines at the central tram station.

2. The society undertakes to pay the city 3 kopecks for each kWh of energy transmitted to the city for the right to use the electric energy transmitted from the tram station, as well as the city streets, narrow streets and squares based on this contract (NAUz (National Archive of Uzbekistan). F. I-44. D. 1. S. 283).

The newspaper “Turkestanskiye vedomosti” dated December 19, 1914 published the news that the city administration had signed an additional contract with the “Tashkent Tram” company, and informed that the needs of all consumers who have not yet been supplied with electricity will be met in the near future³.

In the fall of 1915, the number of electricity consumers increased dramatically, and the work of V. P. Pavlov’s station exceeded the established norm. The city administration received dozens of applications from state organizations and individuals asking for permission to supply electricity.

According to the situation, City Duma (between the city) with V. P. Pavlov to amend the charter concluded in 1911 and decided to provide the right to strengthen V. P. Pavlov’s former station with one more motor with a capacity of 150 hp. Until the

installation of this engine, the society temporarily received electricity from the central tram station to V. P. Pavlov's station received a sufficient amount of transmission with the help of a 75 hp (NAUz (National Archive of Uzbekistan). F. I-44. D. 1. C. 122. S. 1).

After install of the motor-generator in V. P. Pavlov's power plant, the 140 hp engine broke down soon and could not be repaired due to lack of spare parts. In this way, many consumers were left without lamps, The society was allowed to add one unit to the tram station to run the lighting system of the V. P. Pavlov power station (NAUz (National Archive of Uzbekistan). F. I-44. D. 1. C. 251. S. 71). Despite the fact that there was a clear direction to build a diesel power station with a hydroelectric power station, this project was also not implemented.

The Belgians gradually began to acquire new projects for the electrification of the city in return for various promises. During this period, the city's plan to build its own hydroelectric power station faced a number of insurmountable obstacles. The design power of the hydroelectric station was designed for 3,000 hp. Thus, the technical side of the problem was quickly solved. But it was somewhat difficult to solve organizational issues from the point of view of the current legislation. Because water had to be used primarily for agricultural purposes, then for shipbuilding, and thirdly for the purposes of "water movement" (Saidboboeva, 2021, p. 88).

In addition, the problems of cotton ginning factories, which worked only four months in the winter season at that time, as energy consumers, were also added. This did not take into account the usual consumers (hydraulic mills, mills, rice mills, etc.), whose devices and equipment were simple and simple, and it was difficult to predict that they would switch to electric motors.

During this period, electricity was mainly used for lighting purposes, and its role in the use of power tools was very small. For example, in 1914, the share of electricity in breweries with a total capacity of 214 hp was 80 hp or 38%, and cotton gins only 16%.

Despite the weak industrial development, there were 50 different industries in the region. The most important of them is the processing of agricultural products, the total volume of industrial production was 13,388,6778 rubles (1913), the number of workers employed in it was 20,925, the total number of enterprises was 702, and the number of engines in it was 507 (Aleksandrova-Zaorskaya, 1964, p. 210).

In 1914, while there were 223 cotton ginning factories in Turkestan, the number of power stations was only 36. Correspondingly, 96,177,163 rubles of cotton ginning factories, and only 242,435 rubles of power stations, in terms of production in the country's industries.

The technical backwardness of the country has led to the low level of electrification. Only in 1914, the total capacity of all power stations in Tashkent was 3,000 kW, producing 3.5 million kWh of electricity per year. In the years 1910–1917, several central power stations in the country operated only in the city of Tashkent.

Their total power was 5 thousand hp or 3.7 thousand kW, which was only 1.85% of the total power in Petrograd.

Tashkent’s 1916 electricity performance can be seen in below (Table 1; Table 2) comparing it with the capital of the empire – Petrograd (Kaminsky, 1931, p. 56):

Table 1. Electrical power stations in Petrograd (1916).

Name of the electrical power stations	Power, (thousand kW)	Type of direct current (Voltage)	In volts
1886 year’s society	40,2	3 phases	2000 and 6000
Gelios	12,8	1 phases	3000
“Belgian society”	12,1	1 phases	2000
Tram	No data	Direct current (DC)	600

In addition to the above stations in Petrograd, there were also many stations for general use, called block stations, which served individual consumers.

Table 2. Electrical power stations in Tashkent (1916).

Name of the electrical power stations	Power, (thousand kW)	Type of direct current (Voltage)	In volts
Pavlov	0,125	direct current (DC)	2×220
Davidov	0,231	direct current (DC)	2×220
Tram	1,450	direct current (DC)	600
Shamsutdinov	0,045	direct current (DC)	2×220

About 70 electricians, 55 shift diesel workers, and 94 black workers performing various jobs worked in Turkestan power stations. During this period, 168 of the 702 main enterprises were equipped with electric lighting using their own independent generators. Despite the insufficient production of electricity and such a low level of electrification, there have been significant changes in the country’s industry.

The Russian Empire, which was mute to foreign capital, had to import electric lamps from foreign countries in addition to machinery and technical equipment.

The situation in the metal manufacturing industry was similar. For every 15 mechanical engines in the industry: 13 internal combustion engines with 170 hp, one locomotive with 24 hp and 1 water engine (water blade) with 12 hp. Only one of the metalworking enterprises had a 5 hp electric motor. During the colonial period, electricity was mainly used for lighting purposes, and only 15–20% of it was used as a driving force (Saidboboev, Musaev, & Saidboboeva, 2020, p. 453).

The state of electrification of communal economy was also very low. Even in big cities such as Tashkent, Samarqand, Kokand, Fergana, Andijan, only 2–3 streets are lit

with electricity, the rest of the streets are partially lit with gas, and the rest are completely unlit. In three or four cities, the houses of some big officials were also lit by electricity. Although small power plants began to operate in the industrial enterprises of Turkestan at the end of the XIX century, by the first decades of the XX century, with the growth of the industry and the emergence of power plants for general use, energy was formed as an independent industry in the industry.

The number of workers working in the existing power plants in Turkestan was also not that large. According to the statistics published in 1915, a total of 151 workers were employed in the industry during this period. For comparison, if we take into account that 7626 workers worked in the country's cotton ginning industry in the same period the above figure seems to be quite low (NAUz (National Archive of Uzbekistan). F. I-1. D. 2. C. 432. S. 78).

The growth of the industrial and transportation sectors during World War I stimulated the increase in the number of workers in the country. In 1914, there were about 50,000 workers in the main industrial regions of the country, and during the war, the working class in Turkestan increased by 15-20,000 people and reached approximately 70,000 people (NAUz (National Archive of Uzbekistan). F. I-278. D. 2. C. 716. S. 35).

The increase in the number of workers initiated qualitative changes in the national economy of Turkestan, and created the basis for the emergence of new industrial sectors, including energy, along with the general growth of enterprises.

In 1916, the imperial authorities developed plans to exploit the water reserves for economic purposes, but despite the large hydropower wealth in Turkestan, most of the stations were oil-fired. Oil for these stations is mainly brought from Baku, which was expensive for the country. However, especially during this period, the Volga River was the main factor in the transport system and trade exchange, economically connecting the districts of the empire with its tributaries. It transported fish from the Caspian Sea, cotton from Turkestan and a large amount of factory products from other regions. Every year, 30 million tons of such cargoes are transported along the river and its tributaries (Simonov, 2016, p. 143).

The steady increase in demand for electricity in the country forced the administration to look for new sources of energy. According to the decision of the General Artillery Department of the Military Council on November 5, 1916, in the telegram sent to the military governor of Fergana region on November 10, it is said that Count de Monge and Davidov, an engineer-hydraulic engineer of the Department of Land Affairs and State Property of the Turkestan region, were assigned the task of studying the waterfall in Isfayramsoi in the Maidan and Uchkurgan districts of the Skobelev district of the region (NAUz (National Archive of Uzbekistan). F. I-276. D. 1. C. 936. S. 164).

In order to ensure the implementation of the decision, the local administration will provide the researchers with: 1) previous projects for the construction of a hydroelectric station in Isfayramsoy (1914) and all information about the river in general;

2) providing the necessary means of transportation from the city of Skobelev to Maidan at current prices; 3) assigned the task of providing all-round assistance for hiring and other needs of workers.

On the basis of the above letter, on November 21, 1916, the military governor of Fergana region sent an open order to the officials of the Russian and local administrations in the region to unconditionally fulfill these tasks (NAUz (National Archive of Uzbekistan). F. I-276. D. 1. C. 936. S. 165).

In 1917, one of the two city central power stations in Tashkent was the Shamsutdinov power station, and the other was N.K. Romanov's renovated power station (NAUz (National Archive of Uzbekistan). F. I-1. D. 1. C. 291. S. 1).

All the power plants in the country of Turkestan are mainly concentrated in industrial and cultural centers, 32 of them, i.e. about 16% of the country's power plants, were located in the city of Tashkent. They were considered the largest power plants of their time and distinguished by the large number of workers. Among the 22 power stations under the industrial enterprises of the city, Tram power station employs 18 people (NAUz (National Archive of Uzbekistan). F. I-44. D. 1. C. 237. S. 17) and 10 people work at the power stations under the Central Asian Railway Workshops.

There is no information about the workers at the Yusuf Davidov's electr station.

The remaining 19 small electrical devices were serviced by 1-2 people mainly for lighting purposes. Thus, 60-65 workers were employed at the power stations of the industrial enterprises. In terms of numbers, the second place was occupied by workers working at 10 power stations serving the city's communal economy. The biggest of them is V.P. Pavlov's power station is considered, and out of 9 people working in them, 5 were employees and 4 were workers working at the central station. Monthly wages for employees: 300 rubles for an engineer, 100 rubles for an accountant, 100 rubles for 2 office workers, 25 rubles for a document carrier; for workers: 120 rubles for a machinist, 100 rubles for a machinist's assistant, 35 rubles for an electrician, 45 rubles for a plumber (NAUz (National Archive of Uzbekistan). F. I-44. D. 1. C. 244. S. 11).

The same amount of salary is typical for small power stations, according to the reports of Max Visokinsky, who leased the Khiva cinema and the Knyaz Romanov power station, where 3 workers (electromechanic Ozolin with a monthly salary of 120 rubles, and two assistants with a salary of 40 rubles) (NAUz (National Archive of Uzbekistan). F. I-40. D. 1. C. 172. S. 20).

The average annual wages of power plant workers were 3,7 times that of cotton gin workers and 2 times that of machine shop workers in 1913, compared to the average annual wages of workers in other industries.

Due to the shortage of electricity, working conditions in the country's industrial enterprises were very difficult. The working day lasted 14 hours, and in most enterprises the workers worked 18 hours, and they were paid very little. In 1913–1914, the average annual salary of one worker was around 180 rubles (Ziyodullayev, 1964, p. 13).

Moreover, in 1917, the number of enterprises operating in Turkestan decreased by 75% compared to before the war. Industrial production was reduced by 80% (Desyatchikov, 1949, p. 18). Although the workers of the power plants had better conditions in many respects (salary, working conditions) than the workers of other enterprises, they had a feeling of dissatisfaction with the government and politics.

In particular, the initiators of many strikes that took place in Turkestan at the end of 1916–February 1917 were Russian and local railway workers and workers at the Tashkent tram depot, among whom there were many women. The Turkestan district security department worriedly said, “The mood of the workers is not calm. Failure to meet the urgent needs of railway workshop workers may cause continuous strikes and may be a signal for strikes in other enterprises as well” (Kastelskaya, 1980, p. 94).

Later, in the armed uprising of workers and peasants on October 28, 1917, the workers of power stations also participated.

There are a small number of small manufacturing enterprises in the country, and they did not fully carry out their activities for several reasons, first of all, because the state did not support them, because Turkestan was considered as an additional raw material part of the empire. Also, if we take into account that the number and technical equipment of industrial enterprises in the Russian Empire lags behind European countries and the United States, this also did not affect the situation in its colony (Saidboboyev, 2015, p. 30).

Most of the equipment of industrial enterprises was old equipment imported from metropolitan enterprises.

Foreign economists saw industrialization not as a method of ending the inequality of nations, but as a method of strengthening their backwardness and weakness. They argue that this concept was preserved and even developed in Turkestan in the period before World War I, which was inherited from the colonial tsarist system. According to them, the industrialization policy strengthened Uzbekistan’s status as a source of raw materials for Russian industry (Saidboboyev, 2010, p. 99).

The fact that the country’s weak factory industry, including the industry that only pre-processes agricultural products, primarily cotton, does not contribute to the creation of the necessary conditions for the development of the electrification sector, and the administrative and management system of the region, which serves the interests of the metropolis, has not thought of ways out of this stagnation and did not develop quickly.

On the eve of the First War I, the “Belgian society” ordered 80 cars from the “Rateno” factory (Belgium) to start the electric tram line. Each carriage has 40 seats and 2 freight carriages are also included. The tram park is located on Mariinsky (now Nukus) street. Trams were supplied with electricity by a newly built diesel station.

The power plant was equipped with five 430-liter diesel engines, each with a permanent one-shaft electric generator, with a total power of 290 kW and a pressure of 600 volts. The total capacity of the power station was 1450 kW per day. Although the contract stated that the 600-volt power plant was not intended to supply electricity to

the city, its switchgear circuit was designed so that it could operate at 220 volts under any circumstances and meet lighting needs.

Low production of electric energy has had a negative impact on the increase of tram routes, population transportation, and income generation. For example, at the eve of World War I, when the population of Tashkent was 250,000 people, the total length of the electric tramway was only 18,3 km. However, in many other cities of the empire with a small population (not including Petrograd, Moscow), the length of electric tram routes was several times longer than in Tashkent, as can be seen in the following Figure 2 (NAUz (National Archive of Uzbekistan). F. I-37. D. 1. C. 413. S. 45) and in below Table 3 which are based on the data of National Archive of Uzbekistan (NAUz (National Archive of Uzbekistan). F. I-37. D. 1. C. 476. S. 11):

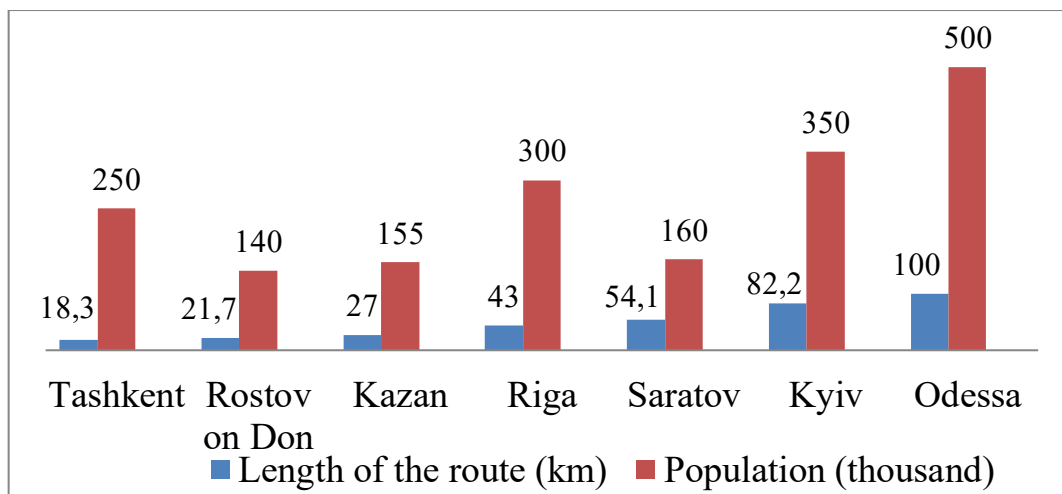


Figure 2. Length of tram routes and population in Tashkent and other cities of the Russian Empire (Eve of World War I) ((NAUz. F. I-37. D. 1. C. 413. S. 45).

Table 3. Electric tram revenue calculation in Tashkent and other cities.

City	Length (km)	Population (thousand)	Gross profit (thousand rubles)	Profit from 1 person	Transportation one person (in year)
Tashkent	18.3	250	550	2.2	44
Riga	43	300	1830	6.1	122
Kyiv	82.2	350	3330	9.5	190
Saratov	54.1	160	925	5.8	116
Odessa	100	500	2700	5.4	108
Kazan	27	155	556	3.6	72
Rostov on Don	21.7	140	1070	7.6	152

In the article published in the issue of “Turkistan viloyatining gazetii” on May 29, 1914, the advantage of the tram was mentioned, “13–14 years ago, if we wanted to go

to the train station or the Sunday market, we would have to walk for two hours with our country's fast-moving cart, and our feet (feet) we were torn to pieces, our hearts were turned upside down, and our souls were coming to our throats. Praise be to you, we got rid of such consequences and began to enjoy the wonderful science of the 20th century". Author expressed satisfaction and at the same time, the article urges the residents to use the tram in an orderly manner: "... if you are blind with a blind eye, squint your eyes. This proverb was left over from earlier. When our neighbors told us to take a step to the right side, become righteous, and follow the path of education, we turned the letter upside down, we don't know where our feet are, and we don't remember our past situation, we keep walking in the cave of ignorance, and all this is a loss to us. Because of our chaos, the government has appointed mirshab and guards to protect the city" (Mirmuhsin, 1914).

Another article talks about the success of electrical engineering, and there is great hope that the telegraph will become popular in European countries and enter Turkestan as well: "In Europe, science is progressing and developing day by day, and many crafts are emerging that are useful to various people. One of the inventions of European science and culture is the wireless telegraph. Although this day has just been released, these days mankind has developed and progressed to a surprising extent. On a new occasion, with this wireless telegraph, standing at two stations with a distance of 12,500 miles, two people talked that this distance, that is, the distance between the two stations, is one-third of the circumference of the earth" (Turkiston viloyatining gazeti, 1916).

In 1914, other tram routes were also electrified. In particular, the Pushkin route was opened from the Church of St. Sergius to the Salor bridge, the Moscow route was opened from the Knyazhesky fortress to the Beshyogoch gate, and at the beginning of 1915 to Chorsu, and on December 13, 1915, the fifth electrified tram route was opened from Kokaldosh to the Takhtapul gate through Eski Jova.

By 1916, the "Tashkent Tram" society, which saw the gratitude of the population, started using 50 motorized, 25 cargo and 2 service wagons in Tashkent. In the same year, the company took the leading place in the field in terms of the amount of energy supplied to consumers by power plants of Tashkent city (1450 thousand kW).

At the same time, it is worth noting that with the active participation of the public and city authorities, the Belgian "Tashkent Tram" company's desire to deprive the city of its ownership of the lighting systems caused a number of difficulties for the community. The society's efforts to provide direct current (DC) energy to the tram lines were condemned, and the city administration was on the verge of becoming a monopoly customer in this field.

From September 10, 1918, the tram service stopped due to the lack of fuel at the city diesel station and the failure of many cars. This was due to the change of the political situation in the country and the departure of experts from Belgium to their homeland as a result of the establishment of Soviet power. Soon after, on December 10, 1918, the "Tashkent Tram" was nationalized by the Central Executive Committee of Turkestan, and only by 1920, irregular tram traffic was restored in the city.



Figure 3. Workers of Tashkent nationalization tram (NACFPh Uz (National Archive of Cinema, Foto-phono of Uzbekistan. No. 0-93973).

In this way, although the process of electrification of the transport system in the country has been opened, the lack of a clear plan and measures for its rapid development, financial difficulties and laxity in the issue of personnel shortage have hindered the slowdown of work in the field and its competitiveness.

However the coming of the electric power industry in Turkestan required the training of highly qualified electrical engineers, electrical fitters and management personnel for the system. The geographical location of the region far from the central parts of the country, the fact that the Soviet regime did not yet have strong governing bodies in the country, the civil war, and economic difficulties all delayed the most necessary work in this direction.

In 1918, the work of establishing a leading educational institution for the training of highly educated personnel in engineering and technical specialty was started in Turkestan. For example, on March 16, 1918, the Council of People's Commissars adopted a decision to open a People's University in Turkestan, which stipulated that all expenses for the establishment of the People's University will be made at the expense of the trade turnover of nationalized cotton, oil and coal.

On April 11, 1918, the first meeting of the technical faculty of the Turkestan People's University was held, and "in this way, classes began on May 9 at the natural mathematics and technical faculties of the Turkestan People's University, which accepted Russians or Russian-speakers" (Kholboev, 2003, p. 70). It is interesting that no documents are required for admission, only the desire was enough.

In this way, the number of students admitted to the higher courses (faculties) of the People's University reached 1200 and 186 of them started studying at the technical faculty.

According to the archive data, there were 632 people who expressed their desire to study at the faculty. In fact, the number of regular participants in the lectures was very small and decreased sharply at the end of the semester. This is due to the lack of technical equipment, scientific and auxiliary rooms (scientific office, library, laboratories), and the fact that the existing buildings are not suitable for conducting university classes (NAUz (National Archive of Uzbekistan). F. R-34. D. 1. C. 107. S. 555).

Studying at the technical faculty will be four years instead of the usual five years, and it is planned to open sub-departments such as textiles and chemistry later. On May 9, 1918, according to the information about students at the technical faculty of the People's University, the number of electricians was 14 (NAUz (National Archive of Uzbekistan). F. R-368. D. 8. C. 1. S. 6).

Dean of the technical faculty A. Bykovn on June 17, 1918, wrote to the administration of Turkestan People's University, asking for an advance of 5,740 rubles to reward faculty employees and lecturers, and at the letter by June 18, 1918, informed in connection with the closing of the "General Electric Company" store, equipment costs for the purchase of equipment for the electrical laboratory at low prices were included in the faculty budget and according to the preliminary estimate, it was stated that the Council of the Faculty of Engineering approved the purchase of equipment in the amount of 11,000 rubles presented by the Board of Electromotive Courses, and a total of 22 types of equipment were requested (NAUz (National Archive of Uzbekistan). F. R-368. D. 8. C. 1. S. 33-34).

On June 18, 1918, the cost of the electrician course was 4,800 rubles. The project was reviewed and approved by the Technical Faculty Council. The courses were successfully conducted, and 50–70 regular listeners participated in them every day 2. Those who completed this course were tested by a separate commission, and only those who successfully passed received a certificate of completion of electrical installation courses (NAUz (National Archive of Uzbekistan). F. R-368. D. 8. C. 1. S. 3).

After listening to the information of the rector of the university A. V. Popov about the transformation of the technical faculty under the People's University into a form of higher education, the technical faculty of the collegium will remain within the People's University and in a short period of time, various courses will be combined into one whole – the People's Technical College, and it will be transferred from the university to the administrative training of the technical faculty and made a decision to transfer to the hands of persons of the organization who are not employed in the institution (NAUz (National Archive of Uzbekistan). F. R-34. D. 1. C. 38. S. 74).

According to the information of the commission for quality control of the students of technical faculty of the university, the origin of the students was also from different social classes (NAUz (National Archive of Uzbekistan). F. R-368. D. 8. C. 81. S. 10).

Table 4. Social classes of students of technical faculty of Turkestan People’s University in Tashkent.

Level	Specialties’ and governances’ children	Servants’, doctors’ and layers’ children	Intelligents’ children	Unemployments’ children	Craftsmans’ children
1- course	8	18	1	1	1
2- course	4	7	-	-	-
3- course	2	5	-	2	-
4-course	-	-	-	-	1
Total	14	30	1	3	2

Conclusions.

The practical use of electric energy in the beginning of the 20th century, while the developing capitalist production demanded the creation of new energy bases, industrial production in Turkestan was in its infancy, and the colonial policy of the empire prevented the development of productive forces, the necessary conditions for the wider operation of the industry. was not available.

A lot of the proposals and projects for the construction of power stations in Tashkent were not implemented as a result of the neglect of the colonial administration in the country and the bureaucratic system. In many cases, disagreements over energy prices, difficulties in bringing technical equipment, lack of qualified personnel and the low level of the country’s industrial sectors caused investors to abandon their plans. Although the number of power stations operating in the country increased somewhat on the eve of World War I and in during the war they were mostly used for the purpose of lighting buildings and streets of social importance, not industry.

The transport system in the country, first of all, the electrification of tram networks, was far behind the central districts of the empire, and the lack of financial resources for its development, changes in the political management system, and the world and civil war had a negative impact on the development of the sector. Nevertheless, Tashkent had the country’s first electrified transport network, a status it maintained for decades to come.

The possibilities of the first higher education institution established in Tashkent during the studied period were limited, more Russians than local youths were educated in the field of electrical engineering. Due to the low monthly salaries of electrical engineers and workers, the lack of jobs, and unsatisfactory working conditions, many of them, who did not believe in the prospects of the network, made a living by hiring other jobs.

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Історія електрифікації Ташкента у 1914–1918 роках

Анотація. Після колонізації регіону Туркестан Російською імперією в другій половині 19 століття, царські власті обрали місто Ташкент політичним, адміністративним та військовим центром усього регіону. Це було обумовлено передусім торгово-економічною перевагою Ташкента над іншими містами, а також його розташуванням у центральній частині країни та стратегічним значенням. Хоча промислові сектори були слабо розвинуті, розпочалися роботи зі створення електростанцій для освітлення міських вулиць та обслуговування малих виробничих підприємств. Основну увагу було приділено російському та іноземному капіталу, але початкові проекти не були реалізовані через бюрократичну систему. Хоча кількість електростанцій у Ташкенті зростає децю в період 1914–1917 років, вони використовувалися лише для освітлення будівель та вулиць соціального значення, а не для промислових цілей. До 1914 року Російська імперія займала 8-е місце у світі за обсягом виробництва електричної енергії, з 14 кВт·год електрики на душу населення в центральних районах імперії, в той час як у Ташкенті цей показник складав лише 1 кВт·год на душу населення, що свідчить про те, що увага і основні інтереси метрополії були спрямовані на інші речі, а не на розвиток соціально-економічних секторів міста. Хоча участь Російської імперії в Першій світовій війні сприяла збільшенню виробництва в харчовій, текстильній та військовій промисловості, помітних змін в енергетичному секторі не відбулося. Зокрема, хоча в Ташкенті у 1914–1918 роках децю збільшилася увага до будівництва електростанцій, фінансові труднощі для інвесторів та складні політичні зміни того часу негативно вплинули на кількість осіб, що були на чолі цих робіт, що призвело до відтермінування запланованих робіт. Економічно Ташкент та його околиці, як промислово-аграрний регіон, мали потенціал для впровадження різних інфраструктурних систем, мали великі природні ресурси сировини та всі умови для будівництва гідроелектростанцій, але ці природні можливості не були використані в повному обсязі.

Ключові слова: Ташкент; електрифікація; електростанція; контракт; лампа; трамвай

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