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## ПРОБЛЕМИ ВДОСКОНАЛЕННЯ ПРОЦЕСУ ТЕХНОЛОГІЧНОГО ПРИЄДНАННЯ СУБ'ЄКТІВ РИНКУ ІННОВАЦІЙНИХ ТЕХНОЛОГІЙ УКРАЇНИ ДО ІНЖЕНЕРНИХ МЕРЕЖ

**Актуальність.** Одним з важливих факторів, що заважає розвитку в Україні ринку інноваційних технологій та створює інвестиційні бар'єри для його суб'єктів, є існуючі проблеми при підключенні до мереж інженерної інфраструктури. Це викликає необхідність вдосконалення процесу технологічного приєднання суб'єктів ринку інноваційних технологій до мереж інженерно-технічного забезпечення їх діяльності.

**Мета та завдання.** Метою даної статті є визначення проблем, пов'язаних з підключенням до інженерних мереж (в сфері енерго-, водо-, тепло- і газових постачань), у суб'єктів ринку інноваційних технологій та розробка пропозицій щодо усунення цих проблем. При цьому необхідно вирішити два завдання: виявити та дослідити основні проблеми при приєднанні до мереж інженерно-технічного забезпечення та знайти шляхи їх усунення.

**Результати.** Порівняльний аналіз інформації з сайтів постачальників ресурсів - монополістів у чотирьох великих містах з різних регіонів України свідчить, що існує низка проблем при підключенні до інженерних мереж, а саме: складність і непрозорість процедури приєднання до інженерних мереж, особливо при виготовленні Технічних умов, та відсутність чітких термінів для здійснення робіт щодо приєднання до інженерних мереж. Усе це створює живильне середовище для проявів корупції та призводить до зростання грошових і часових витрат підприємців - суб'єктів ринку інноваційних технологій.

**Висновки.** У статті доведено, що одним з важливих факторів, що заважає розвитку в Україні ринку інноваційних технологій та залучення нових інвесторів, є підключення до інженерної інфраструктури. Існуючі проблеми пов'язані з відсутністю єдиної процедури, яка визначає етапи, терміни і вартість підключення до інженерних мереж. Тому необхідно законодавчо закріпити таку єдину процедуру, її етапи, терміни і вартість. Крім того, необхідно закріпити законодавчо такі положення: встановлення відсутності плати за приєднання до інженерних мереж для промислового будівництва; заборона організаціям-постачальникам ресурсів (суб'єктам природних монополій) вимагати від замовника будівництва інженерних мереж придбання будь-яких товарів (послуг) або проведення будь-яких робіт на користь юридичних чи фізичних осіб; введення штрафних санкцій для суб'єктів природних монополій за ненадання або несвоєчасне надання замовнику Технічних умов, за порушення порядку чи термінів, передбачених при спорудженні інженерних мереж. Також доцільно створення єдиної платформи при Департаментах економічного розвитку обласних адміністрацій, на якій можна буде отримати допомогу в підключенні до інженерних мереж «під ключ - одним пакетом», що дозволить скоротити час на оформлення документації для підключення до інженерних мереж і позбавить від зайвих контактів з постачальниками-монополістами.

**Ключові слова:** ринок інноваційних технологій, підключення до інженерних мереж, інженерні мережі, інженерна інфраструктура, інвестиційні бар'єри, платформа.

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## PROBLEMS OF IMPROVEMENT OF THE PROCESS OF TECHNOLOGICAL ACCESSION OF THE SUBJECTS OF THE MARKET OF INNOVATIVE TECHNOLOGIES OF UKRAINE TO ENGINEERING NETWORKS

**Topicality.** One of the important factors hindering the development of the market of innovative technologies in Ukraine and creating investment barriers for its subjects is the existing problems in connecting to the networks of

engineering infrastructure. This necessitates the improvement of the process of technological connection of the subjects of the market of innovative technologies to the networks of engineering and technical support of their activity.

**Aim and tasks.** The purpose of this article is to identify problems associated with the connection to utilities (in the field of energy, water, heat and gas supply), the market participants of innovative technologies and develop proposals to address these problems. It is necessary to solve two tasks: to identify and investigate the main problems when connecting to the networks of engineering and technical support and find ways to eliminate them.

**Research results.** Comparative analysis of information from the sites of resource providers - monopolists in four major cities from different regions of Ukraine shows that there are a number of problems when connecting to utilities, namely: the complexity and opacity of the procedure for connecting to utilities, especially in the preparation of specifications; terms for carrying out works on connection to engineering networks. All this creates a breeding ground for corruption and leads to an increase in money and time spent by entrepreneurs - participants in the market of innovative technologies.

**Conclusion.** The article proves that one of the important factors hindering the development of the market of innovative technologies in Ukraine and attracting new investors is the connection to the engineering infrastructure. Existing problems are related to the lack of a single procedure that determines the stages, timing and cost of connecting to utilities. Therefore, it is necessary to legislate such a single procedure, its stages, deadlines and cost. In addition, it is necessary to enshrine in law the following provisions: establishing the absence of payment for connection to engineering networks for industrial construction; prohibition of organizations-suppliers of resources (subjects of natural monopolies) to demand from the customer of construction of engineering networks acquisition of any goods (services) or carrying out of any works for the benefit of legal or physical persons; introduction of penalties for natural monopolies for failure to provide or late provision of Technical Conditions to the customer, for violation of the procedure or deadlines provided for in the construction of utilities. It is also advisable to create a single platform at the Departments of Economic Development of regional administrations, where you can get help in connecting to utilities "turnkey - one package", which will reduce the time for documentation for connection to utilities and eliminate unnecessary contacts with suppliers- monopolists.

**Keywords:** market of innovative technologies, connection to engineering networks, engineering networks, engineering infrastructure, investment barriers, platform.

**Problem statement and its connection with important scientific and practical tasks.** One of the important factors that creates investment barriers that hinder the development of the market of innovative technologies in Ukraine is the lack of a single effective system of connection to the engineering networks of the market of innovative technologies.

**Analysis of recent publications on the problem.** Problems of defining and increasing the productivity of entrepreneurial activity, especially innovation, in Ukraine dedicated research by Burkinsky B.V., Laika O.I. [1], Schlafman N.L. [2], Galasyuk V.V. [3], Morgachova I.V. [4] and others. **Allocation of previously unsolved parts of the general problem.** However, the problem of connecting the subjects of the market of innovative technologies to the engineering and technical networks requires more in-depth research to further improve the business environment in Ukraine.

**Formulation of research objectives(problem statement)** . The above allows us to formulate the purpose of the article as identifying ways to improve the connection of market participants of innovative technologies to engineering infrastructure, as one of the ways to attract investors to the development of their innovation, both domestic and foreign.

**An outline of the main results and their justification.** Engineering networks are an important part of communications that ensure the work of business structures, especially the market of innovative technologies. Engineering networks include networks that supply electricity, gas, heat, water to the point of consumption of the business entity (Fig. 1).

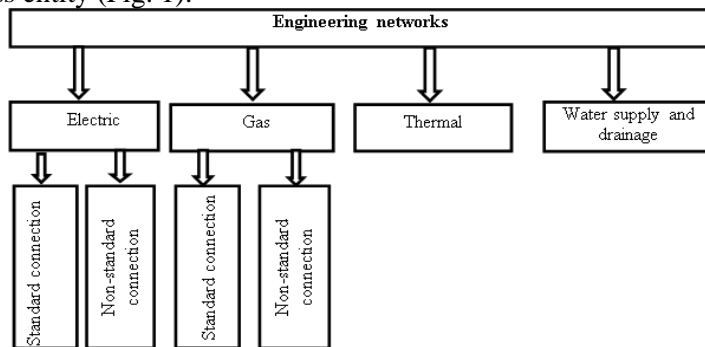


Fig. 1 - The structure of engineering networks

Source: Developed by the author

Depending on the power and distance, there are two types of connection to utilities: standard and non-standard. Due to the fact that large objects of the market of innovative technologies, such as business parks, science and industrial parks, industrial clusters, etc., in the vast majority of cases provide individual heating, we decided to consider a non-standard connection. subjects of the market of innovative technologies to gas, electric, water supply and sewerage networks. To solve this problem it is necessary to consider in detail the connection to the engineering networks, as well as to analyze the conditions and cost of connection to them. To do this, it is advisable to conduct such a study in four major cities in different regions of Ukraine (see tables 1, 2).

Table 1

**Algorithm of actions when ordering the service "Non-standard connection" to the gas distribution system**

<b>Stages of connection</b>	<b>Odessa</b>	<b>Kyryvyi Rih</b>	<b>Lviv</b>	<b>Kharkiv</b>
- contact the Customer Service Center;	+	+	+	+
- write a statement;	+	+	+	+
- fill in a questionnaire on the technical characteristics of the object of the gas consumption system;	+	+	+	+
- provide documents (copies) confirming the ownership or right of use of the customer for land or gas consumption, other documents necessary for the provision of services;	+	+	+	+
- get technical conditions	+ (within 10 working days from the date of registration of the application).	+ (within 10 working days from the date of registration of the application).	+ (within 15 working days from the date of registration of the application).	+ (within 10 working days from the date of registration of the application).
- ensuring the development, approval and transfer to the gas distribution company of design and estimate documentation for external gas supply	+	+	+	+
- contract for connection to gas networks;	+ (within 10 working days after receiving from the customer the relevant documentation and the agreed design and estimate documentation)	+ (within 10 working days after receiving from the customer the relevant documentation and the agreed design and estimate documentation)	+ (within 10 working days after receiving from the customer the relevant documentation and the agreed design and estimate documentation)	+ (within 10 working days after receiving from the customer the relevant documentation and the agreed design and estimate documentation)

Source: developed by the author on the basis of data from the sites of Kharkivmiskgaz <https://khor.dsoua.com/ua/services/pidkljuchiti-gaz>; Lvivgaz <https://lv.dsoua.com/ua/services/pidkljuchiti-gaz>; Kyryvyi Rih gas <https://kr.dsoua.com/ua/services/pidkljuchiti-gaz>; Odessagassupply <https://odgaz.odessa.ua/>

To order the "Non-standard connection" service, the customer must: contact the Customer Service Center, having the necessary documents, where he will write an application for connection to gas distribution systems and fill out a questionnaire on the technical characteristics of the gas system. Then, after receiving the technical conditions, it is necessary to develop and submit for approval to the gas distribution company

design and estimate documentation for external gas supply, and then obtain a contract for connection to gas networks.

The cost of technical supervision over the construction (new construction, overhaul, reconstruction or technical re-equipment) of domestic gas supply networks is also different in each city, for example, in Kryvyi Rih - it's free, in Lviv is determined by the estimated coefficient of 1.5% of the cost of direct costs of the object, and in Kharkov this ratio is equal to 1.875% [5-8].

Table 2

**The cost of connection to the gas distribution system, UAH**

City	Odessa	Kryvyi Rih	Lviv	Kharkiv
The name of the service when connecting to gas networks				
<b>1. Providing technical conditions for accession</b>				
For industrial and non-industrial facilities (connection to gas networks of legal entities). 1 object		1934,70	2631,10	2469,00
For the reconstruction and internal gas supply of industrial and non-industrial facilities (legal entities). 1 object		1845,00	2510,70	2412,00
<b>2. Approval of project documentation for compliance with the provided technical conditions and current regulations</b>				
PDD approval for reconstruction of production and non-production facilities (legal entities) .1 facility		1251,00	1410,20	1374,00
PDD approval for gasification of industrial and non-industrial facilities (connection to gas networks of legal entities). 1 facility		1251,00	1410,20	1374,00
<b>3. Connection to the gas distribution system of the gas networks of the customer's internal gas supply at the connection point</b>				
<b>Connection of new sections of the pipeline to the existing ones (for individuals and legal entities). 1insert</b>				
diameter up to 32 mm		200,58	1205,20	2625
diameter up to 40 mm		223,25	1570,50	3417
diameter up to 80 mm		265,81	1988,50	4329
diameter up to 100 mm		286,79	2355,20	5127
<b>4. Connection of gas networks of external gas supply in the place of power supply</b>				
The cost of the service depends on the type of insert and the diameter of the fitting, 1 insert		676,66 – 8998,54	411,50 – 6409,00	849,00 – 13950,00
<b>5. Gas start</b>				
Start the gas in the riser. 1 riser		183,42	114,10	186,00
Gas start in the inlet pipeline. 1 input		317,46	197,50	324,00
<b>6. Submission of a draft accession agreement</b>				
		0,00	0,00	0,00
<b>7. Commissioning of gas supply facilities (including metering unit as commercial)</b>				
Objects of new gasification for jur. persons		4750.80	3809,20	4119,00
Objects after reconstruction for jur. persons		4750.80	3809,20	4119,00

Source: developed by the author on the basis of data from the sites of Kharkivmiskgaz <https://kghor.dsoua.com/ua/services/pidkljuchiti-gaz/tariff-check/id/vartist-poslug-pat-harkivmiskgaz-19383#sub19386>; Lvivgaz <https://lv.dsoua.com/ua/services/pidkljuchiti-gaz/tariff-check/id/vartist-poslug-pat-lvivgaz-23272#sub23282>; Kryvyi Rih gas <https://kr.dsoua.com/ua/services/pidkljuchiti-gaz/tariff-check?category>; Odessagas supply <https://odgaz.odessa.ua/>

From the table. 1 and 2 show that in the studied cities the algorithm of actions for connection to the gas distribution system (GDS) is the same, but there are differences, although insignificant, namely in terms of implementation. As for the cost of the connection service, it is also different. The cost of stages of

connection to the GDS in these cities is also different, and in the city of Odessa there is no data at all. This indicates that the sites are not properly compiled, they either do not have the necessary information, or it is very difficult to find.

Based on the section "Connection of facilities to the system of centralized drinking water supply and sewerage" of the Order of the Ministry of Housing and Communal Services of Ukraine "On approval of the Rules of use of centralized municipal water supply and sewerage systems in settlements of Ukraine" from 27.06.2008 №190 [9], it is possible to see that these Rules are limited to only a few technical procedures and do not cover the full range of technical and financial issues related to the connection to the water supply and sewerage networks. In this regard, the water supply and sewerage operator in each city sets its own requirements (the number of documents required for submission and the cost of services) to the connection customers [10-13].

The study showed that the main problems with abuses in connection to water supply networks relate to the procedures for obtaining and fulfilling the Technical Conditions.

To prepare the Technical Conditions, the supplier invites the new consumer to fill out a questionnaire, which indicates the design characteristics of the planned facility, its volume and mode of water supply and sewerage. The service for preparation of Technical Conditions is paid, its price is approved by the National Commission for State Regulation of Energy and Utilities (NCREP), based on actual labor costs. In fact, these labor costs are limited to the cost of working time of one engineer of the technical department. Numerous studies show that the problematic issues in this part are [14,15]:

- requirements to receive new Technical conditions in case of change of the owner of the object, even in the absence of technical preconditions, for example, significant change of volumes / modes of consumption. This requirement contains signs of abuse, and it is obvious from the text of the Rules that "connection of the object to the networks" means the physical connection, and not the conclusion of a contract with a new subscriber;

- often the Technical Conditions contain requirements for the construction of additional capacity of pumping stations and / or tanks not directly on site, but in centralized networks and with redundant characteristics;

- requirements to transfer certain property (pipes, pumps, etc.) to Vodokanal. Usually these requirements are indicated in column 9 of the Technical Conditions "Special Conditions". The motivation of water utilities in this case is the intention to legalize the origin of inventory for their registration and future write-off for scheduled repairs;

- in addition to the issuance of the Technical Conditions, the consumer may be imposed another paid service - the preparation of documents, the submission of which is required to obtain the Technical Conditions (for example, a situational plan). Documents prepared by the consumer independently are returned with the wording "drawn up inappropriately" [10-15].

Thus, according to a study by the World Bank "Doing Business", over the past five years, Ukraine has increased its position in this ranking and rose from 83 to 64 place (among 190 countries), but this is the general picture, ie the total value of different ) indicators of the evaluation system. One of them is the connection to the power grid, where Ukraine constantly occupies very low places (Table 3).

Table 3

**Rating of Ukraine in "Doing Business"**

<b>Years</b>	<b>Number of countries studied</b>	<b>Place in the rating "Ease of doing business"</b>	<b>Place on the indicator "Connection to the system power supply "</b>
2020	190	64	128
2019	190	71	135
2018	190	76	128
2017	189	80	130
2016	189	83	137

Source: compiled by the author on the basis of the site <https://www.doingbusiness.org/>

Connection of new facilities to the electricity grid is carried out in accordance with the Resolution of the National Commission for State Regulation of Energy and Utilities, "On Approval of the Distribution System Code" of March 14, 2018 №310 [16].

Determining the cost of the service for non-standard "turnkey" connection of electrical installations of the customer to the electrical networks of distribution system operators is contained in the section "Calculator" on the website of the National Commission for Regulation of Economic Competition [17]. The calculator provides an approximate calculation based on the input source data. The final calculation of the cost of the service of non-standard turnkey connection will be specified in the draft agreement on non-standard connection, which the distribution system operator will provide to the customer in case of receipt of an official application for connection to electricity networks. Also on this site it is possible to get acquainted with the stages and terms of connection to the power supply networks. So, if you analyze the procedure for connecting to the grid, it is possible to conclude that it is the most difficult and incalculable. The problems of enterprises when connecting to infrastructure networks are mainly related to the imperfection of the regulatory framework. Thus, normative legal acts in this area are: the Code of Ukraine on Administrative Offenses, the Land Code of Ukraine, the Laws of Ukraine "On Regulation of Urban Development", "On Local Self-Government", "On the Electricity Market", "On Natural Monopolies", " On drinking water and drinking water supply ", " On heat supply ", " On the natural gas market "and bylaws (Table 4).

Table 4

**Bylaws regulating the procedure for connection to utility networks**

<b>Normative act</b>	<b>Electricity</b>	<b>Gas</b>	<b>Water supply and drainage</b>
Resolution of the National Commission for Regulation of Economic Competition "On Approval of the Methodology (Procedure) for Forming the Fee for Connection to the Transmission System and Distribution System" of December 18, 2018 year №1965	Resolution of the National Commission for Regulation of Economic Competition, "On Approval of the Distribution System Code" of March 14, 2018 year №310	Resolution of the National Commission for Regulation of Economic Competition "On approval of the Code of gas distribution systems" dated 30.09.2015 year №2494	Order of the Ministry of Housing and Communal Services of Ukraine "On approval of the Rules for the use of centralized municipal water supply and sewerage systems in settlements of Ukraine" dated 27.06.2008 year No. 190
-	NKREKP. Calculator for determining the cost of the service of non-standard connection "turnkey" of the customer's electrical installations to the electrical networks of distribution system operators.	-	-

Source: compiled by the author [9, 16-20].

In addition, if the procedure for connection to the grid is regulated by a set of bylaws, the procedure for connection to the gas distribution and water supply networks is almost not regulated by government agencies.

When connecting to each of the engineering networks, the entrepreneur faces the same problem - it is to obtain technical conditions. The technical conditions determine which engineering networks and structures need to be built and / or reconstructed from the point of power supply to the point of connection at the customer's site.

Given that all work (including the development of design documentation) is expected to be performed at the expense of the customer, in the Technical Conditions there are no restrictions, neither in terms of volume nor cost, in determining the necessary work. With this, resource providers can include in the Specifications much more work than is required to connect a specific facility.

Other reasons for abuse and unreasonable requirements for the preparation of Technical Conditions for connection to engineering networks are the lack of publicly available and reliable information on: available capacity, schemes of project planning restrictions, main street networks; information and data on engineering networks contained in the urban cadastre, data on ecological and engineering-geological conditions, etc. [14].

After the issuance of the Technical Conditions, the customer independently develops the design documentation, agrees it with the supplier organization, builds the objects of engineering and transport infrastructure and transfers them to the supplier organization free of charge. This significantly worsens the investment climate in the country and leads to a decrease in investment inflows.

**Conclusions and perspectives of further research.** The study proved that connection to infrastructure networks in Ukraine is significantly more difficult for private enterprises, which creates additional risks for them, and connection to engineering networks is complex and opaque, which creates a breeding ground for corruption, increases costs for entrepreneurs. Existing problems are related to the lack of a single procedure that determines the stages, timing and cost of connecting to utilities. Therefore, it is necessary to legislate such a single procedure, its stages, deadlines and cost. It is advisable to create a single platform at the Departments of Economic Development of regional state administrations, where you can get help in connecting to engineering networks "turnkey - one package", to see all the necessary information in the public domain. It will also be possible to receive information and consulting support, assistance can be provided in reducing the time of consideration of documents, obtaining approvals and permits, as well as monitor the process of obtaining the necessary permits, creating a personal account. Such a scheme will reduce the time for paperwork to connect to utilities and eliminate unnecessary contact with monopoly suppliers. And, importantly, on this platform you can get help in accessing the infrastructure, because when planning and creating a business, the connection to the engineering networks plays an important role, because it is the most unpredictable cost of time and money.

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