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TARIFF SETTING IN THE DISTRICT HEATING SECTOR: RECOMMENDATIONS BASED ON INTERNATIONAL EXPERIENCE

Pacific Northwest National Laboratory (PNNL)

Energy Security Project (ESP)

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AUTHORS

PACIFIC NORTHWEST NATIONAL LABORATORY (PNNL)

Alison Delgado
Molly Charles
Meredydd Evans
Nazar Kholod

ENERGY SECURITY PROJECT (ESP)

Artem Kuznetsov
Viacheslav Kutsman
Sergii Pinchuk

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I. ACRONYMS AND ABBREVIATIONS

bcm	Billion cubic meters
CHP	Combined Heat and Power
CHS	Central heating substation
CMU	Cabinet of Ministers of Ukraine
DH	District heating
DUR	Danish Utility Regulator (Forsyningstilsynet in Danish)
ERO	Energy Regulatory Office (Czechia)
Gcal	Gigacalorie
GWh	Gigawatt hour
HWS	Hot water supply
IHS	Individual heat substation
Minregion	Ministry of Communities and Territories Development of Ukraine
MERP	Municipal Energy Reform Project
NERC	National Energy Regulatory Council (Lithuania)
NEURC	National Energy and Utilities Regulatory Commission of Ukraine
OSA	Oblast State Administrations
PSO	Public service obligation
RES	Renewable energy source
SPFU	State Property Fund of Ukraine
UAH	Ukrainian Hryvnia
URE	Energy Regulatory Office (Urząd Regulacji Energetyki in Polish)

2. EXECUTIVE SUMMARY

Ukraine's district heating (DH) system is an essential resource for the country and has the potential to provide efficient, local, and renewable energy to a large share of the population. However, inefficient regulation and management have caused the sector to experience a vicious cycle of financial, operational, and technological problems. Overcoming these challenges and building a sustainable DH system requires comprehensive reforms, which could attract significant investment, improve the quality of services, and increase the efficiency of DH. One of the key elements of a comprehensive reform program should be a comprehensive reform of the tariff system.

The purpose of this report is to provide analysis of European models for tariff regulation and recommendations for reforms to Ukraine's DH tariff system. The report presents several case studies from European countries, followed by analysis of the current tariff system in Ukraine and barriers to effective regulation. Based on these findings, the report proposes actions Ukraine could take to improve the tariff regulatory system and promote a sustainable DH sector.

In Europe, countries have different heat tariff methodologies and regulatory systems, but countries that regulate tariffs generally rely on a national energy regulator to either set tariffs or review tariffs set by DH companies to ensure compliance with the methodology. Effective systems provide a clear set of rules for tariff setting, often through national legislation, and clearly define the roles of the regulator, municipalities, and DH companies.

Tariffs in Ukraine are based on the cost-plus methodology and according to legislation should cover economically justified costs. In practice, however, many such costs are rejected or not fully covered by the regulator or municipalities, so tariffs often do not completely cover DH companies' operating expenses. In addition, the current system does not encourage investments in the DH system, as there is no guarantee that the costs can be included in the tariff and distorts incentives to optimize activities. This is a major cause of the unsustainable financial situation of DH companies. In addition, lack of investments for maintenance and modernization has resulted in DH systems that are unreliable and expensive to operate. The gap between expenses and revenue is mainly covered by financing from local budgets and accumulation of debt to fuel suppliers.

In addition, due to the gradual liberalization of the gas market (the dominant fuel for DH), a sound tariff system becomes even more important to ensure that tariffs can incorporate real fuel costs for DH and adjust when fuel prices change. Otherwise, the financial shortfall of DH companies and debt to fuel suppliers may significantly increase.

The tariff setting process can be complicated and time consuming, due to the lack of a consistent and unified system for licensing DH companies and regulating tariffs. Regulatory responsibilities of different government institutions are not clearly defined, which can add confusion to the process.

Based on the current tariff system in Ukraine and international experiences, the following tariff and regulatory reforms are recommended:

1. Develop a clear policy, and a single and consistent set of regulations for approving tariffs, avoiding duplicative regulatory procedures. Ensure that the decision on who sets tariffs is based on who has the greatest capacity.
2. Reform tariffs to cover all economically justified costs and provide incentives for DH system improvements.

3. Build strong capacity for tariff setting, e.g., center of excellence on training and tariff setting questions.
4. Any major changes to the system (regulatory roles, rules) should have some transition period.
5. Create a transparent and public reporting system for the regulator and DH companies.
6. Link regulatory elements so tariffs support investment plans and metrics.
7. Ensure that each CHP facility maintains a consistent approach for cost allocation .
8. Promote clear communication with consumers and DH companies.

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4. INTRODUCTION

In Ukraine, there are over 1,600 district heating (DH) companies providing centralized heat and hot-water supply services and employing over 65,000 workers. Centralized DH supply services are provided to 37% of Ukrainian families, and accounts for a significant share (over 20%, as estimated) of their housing and utility expenses in urban areas. Ukraine remains highly dependent on fossil fuels with gas and coal together accounting for around 90% of the total energy mix in the DH sector. In 2019, DH companies consumed 7.4 bcm of natural gas, accounting for 25% of overall natural gas consumption in Ukraine.

Tariff and regulatory reform are crucial to improving the economic sustainability of the DH sector in Ukraine. In most cities, DH tariffs do not cover all the operating and capital expenses of companies. This leads to inefficiency and makes it difficult for DH companies to invest in improvements to DH systems. The result has been declining quality and efficiency of heating services, higher costs, and customer dissatisfaction and disconnections.

Another factor complicating tariff setting is the fact that Ukraine has two separate sets of regulatory rules for DH, one from the National Energy and Utilities Regulatory Commission (NEURC) and another from the Ministry of Communities and Territories Development of Ukraine (Minregion). The rules vary depending on who regulates heat tariffs; for example, the rules differ in what is considered an economically justified cost. In addition, some entities (for instance, Kyivteploenergo) are regulated by both systems at once, which adds even more complexity to the tariff setting process. The existence of two parallel sets of regulatory requirements can lead to confusion on which regulations to follow and is a barrier to high-quality regulation.

Overcoming the vicious cycle of financial, operational, and technical problems to improve sustainability of the sector requires a comprehensive reform program. Several European countries provide practical examples of how to reform regulatory systems for deep transformation. Reforming the tariff structure to cover costs and incentivize improvements could attract investment, improve the quality of services, and increase the efficiency of DH. Likewise, creating a transparent, rules-based DH regulatory system is important to stabilizing the sector. A priority should be developing one common and consistent set of regulations across the country and building capacity for tariff-setting at both the national and local levels.

Tariff reform is necessary to facilitate climate mitigation policies in the DH sector, such as promotion of renewables and energy efficiency, which save money while reducing emissions. Without reform, tariffs are essentially subsidizing excess energy consumption, making it difficult to implement repairs and improvements to reduce emissions. While regulatory instruments alone do not impose policies such as increased use of CHPs, renewable energy, and waste heat, they can be designed to facilitate implementation of these policy objectives. Reforming the regulatory system and ensuring full coverage of costs in tariffs can provide the framework to implement measures to improve the sustainability of the DH sector and reduce emissions.

The purpose of this report is to provide recommendations on reforms to Ukraine's DH tariff system. The report presents several case studies from European countries, organized by topic to provide an overview of approaches to tariff setting regulation used internationally. This is followed by analysis of the current tariff system in Ukraine and barriers to effective regulation. Finally, the report proposes actions Ukraine could take to improve the tariff regulatory system and promote a sustainable DH sector, based on the specific challenges in Ukraine and lessons learned from international experience.

5. RESEARCH METHODOLOGY

To collect information on tariff setting methodology and regulation in other countries, the authors began with desk research to identify countries with systems and experience that could provide lessons to stakeholders in Ukraine. From this, four countries were chosen for in-depth case studies based on the clarity and effectiveness of their regulatory systems and range of approaches. Those countries include Czechia, Denmark, Lithuania, and Poland. The research team identified experts from each of these countries to interview and asked a standardized interview protocol covering the institutional regulatory setup, methods of setting tariffs, and capacity building. This report does not provide extensive details on all categories of costs included in tariffs because this was the subject of USAID's Municipal Energy Reform Project (MERP) reports. For background, Annex I provides information on heat generation by source in the selected countries.

The research team also analyzed relevant Ukrainian regulations and legislation and interviewed experts in the DH sector. The researchers then developed recommendations that considered the international best practices while also focusing on solutions to Ukraine's unique barriers, such as the existence of two parallel sets of licensing and tariff setting systems.

6. INTERNATIONAL EXPERIENCES

This section presents information on heat tariffs and tariff regulation in the four European case study countries (Czechia, Denmark, Lithuania, and Poland). International case studies can provide examples of effective tariff regulation systems, as well as approaches to reform. The Eastern and Central European countries considered here have experienced similar challenges to Ukraine in their district heating sectors related to the transition to a market economy, and have implemented tariff reforms to address issues such as lack of cost coverage, burdens on municipal budgets, and the need for modernization of DH systems. Establishment of regulatory systems was an important aspect of these reforms to set clear rules for the DH sector and protect heat customers from unreasonably high prices. Countries took different approaches; some envisage a larger role for municipalities in tariff setting, while others have a national regulator playing a key role. Denmark, while not a transition economy, nonetheless provides an example of an advanced and efficient DH system regulated based on non-profit principles. Experiences with reforming tariff and regulatory systems in other countries provide examples that Ukraine can learn from. The information is organized by topic to provide an overview of approaches to tariff setting regulation used internationally. The topics cover who, what, and how of tariff setting: the legal basis and institutions involved, the tariff setting methodologies, and processes for setting and approving tariffs.

WHO: LEGAL BASIS AND INSTITUTIONAL SET-UP

This section describes the institutional framework regarding tariff regulation for the European case studies. This includes which entity sets the rules and does the tariff setting, the role of the regulator, and the system of appeals in place for both regulated companies and customers. In each country covered here, there is a role for the national regulator, although the specific role of the national regulator varies between countries. In some countries, such as Poland and Lithuania, the national regulator only regulates DH companies over a certain size threshold¹, and municipalities regulate the smaller companies. However, the role of the national regulator in Poland, for instance, is more extensive than the role of NEURC in Ukraine, as the size threshold is an order of magnitude higher than the size threshold that NEURC uses to determine if it regulates a DH company. In others, such as Czechia, all DH companies are nationally regulated. Poland has regional branches of the regulatory authority to increase capabilities, as there are more DH companies to regulate compared to smaller countries like Lithuania. In Denmark, the regulator periodically takes a representative sample of DH companies that set the tariffs to see in more detail how they are working. As indicated in the MERP reports², national regulators also play a significant role in Estonia, Hungary, Latvia, and Slovakia. A common practice for the national regulator is to set the tariff methodology, so that there is a single

¹ The threshold is 170,000 Gcal in Ukraine, 5 MW in Poland, and 10 GWh in Lithuania. In consistent units, these thresholds would be 198 GWh in Ukraine, 21.6 GWh in Poland, and 10 GWh in Lithuania. We assume that all values reflect the quantity of heat supplied to the customers (as it is final consumption, it does not account for heat production efficiency and network losses). In Poland, the threshold specifically takes into account the amount of heat ordered by customers.

² USAID, 2017. Analytical report on international experience over incentive based regulatory pricing methods of thermal energy generation; USAID, 2017. Analytical report on rate of return practice for incentive-based regulation in district heating and district water supply and wastewater treatment sectors; USAID, 2017. Analytical report on international experience regarding regulatory analysis, assessment and approval of long-term investment programs under incentive-based regulation; USAID, 2018. Report on regulatory asset base establishment during the period of transition in central and eastern European countries, in the district heating sector.

and consistent set of regulations that apply whether tariffs are regulated by municipalities or the national regulator.

CZECHIA

The Czech district heating system covers about 40% of households, or about 1.6 million households. As of 2016, total heat sold in Czechia was about 105,000 TJ. The district heating infrastructure includes over 2,000 licensed heat plants and distribution networks with a length of 7.5 thousand kilometers. There are 673 companies licensed for heat production and 658 companies licensed for heat distribution. There is a mix of ownership models, with private, municipal, and mixed companies, some owned by Czech entities and some with foreign participation. The generation mix is made up of about 55% coal, 32% natural gas, 6% biomass, and the remainder heating oil and other fuels. The share of coal in heat production has been declining in recent years, while the share of renewables is increasing.³

Legal basis

Czechia has a national regulator, the Energy Regulatory Office (ERO), which regulates electricity, gas, and district heating and is the single regulatory body for heat tariffs. The ERO was established in January 2001 under Act No. 458/2000, *On the Conditions of Business and State Administration in Energy Industries and Changes to Certain Laws*, or the Energy Act. The ERO is an independent administrative authority governed only by laws and other government regulations, and may not act on direction from the president, parliament, or other governmental body. The ERO supervises compliance with the Energy Act and the Act on Prices as required by the Act on the Competence of the Bodies of the Czech Republic in the Area of Prices.

Key institutions

The ERO is responsible for licensing; under the Energy Act, any entity conducting business in the energy sector, including DH companies, must be licensed by the ERO in order to operate. The ERO is also responsible for tariff regulation, including setting the methodology for tariff calculation and reviewing tariffs. Other responsibilities of the ERO include supporting competition and supervising markets in the energy sector; supporting the use of renewable and waste energy sources; supporting the use of combined heat and power generation; protection of customers; and protection of the interests of regulated licensees. The ERO also resolves disputes regarding contracts between licensees or between a licensee and a customer, including disputes about the restriction, interruption resumption, or unauthorized consumption of heat. The ERO is headed by a five-member board. The board and its chairman are appointed and removed by the Ministry of Industry and Trade and serve for 5-year terms. The ERO currently has about 320 employees.⁴

The ERO and DH companies are the only participants in the tariff setting process. DH companies are responsible for setting tariffs according to the rules specified by Act No. 526/1990, *On Prices*, as well as the ERO's annual price decisions, which set conditions for calculating heat tariffs in the

³ https://www.csas.cz/content/dam/cz/csas/www_csas_cz/dokumenty/analyzy/Tepl%C3%A1renstv%C3%A1D%20v%20C4%8CR_2018_10_public.pdf.

⁴ <https://erranet.org/member/ero-czech-republic/>

relevant year. All DH companies are regulated by the ERO; there are no parameters for DH to meet to be regulated by the national regulator.

Municipalities have a limited role in tariff setting and, in general, can only influence DH operations through development of a regional energy concept. In cases where municipalities own DH companies, the municipality approves the company's investment plan. However, most DH companies in Czechia are privately owned.

DENMARK

Legal basis

In Denmark, the rules for DH tariff setting are set nationally under the Heat Supply Act⁵ which defines which costs can be included in the heat tariffs. The Danish Utility Regulator (DUR, or *Forsyningstilsynet* in Danish) is the regulatory body for the DH, electricity, and gas sectors. DUR does not set the tariffs but oversees that tariffs are in accordance with the Heat Supply Act. DUR was established in July 2018 as an independent authority under the Ministry for Climate, Energy and Utilities, replacing the former Danish Energy Regulatory Authority. The goal of this restructuring was to implement consistent and interconnected policies to improve integration between sectors.⁶

Key institutions

DUR's primary role is to ensure that DH companies, who are the ones that set the tariffs, reflect the necessary incurred costs (based on cost plus regulation) in the tariffs, and not more than that. Specifically, it confirms that the tariffs only include the allowable costs set out in Article 20 of the Heat Supply Act. On a case by case basis, DUR also verifies that the calculation between the fixed costs and the variable costs is fair.

DUR's role is limited with respect to setting tariffs. Mainly, it gets involved in three ways. The most common way DUR gets involved is when there is a complaint, be it from a company, a customer, or an organization representing customers. DUR handles general complaints which affect all end users. If there is reason to believe that a tariff was not fairly set, DUR will handle the dispute.

Another way that DUR gets involved is by performing periodic reviews or audits. Each review cycle samples 50 to 60 of the 400 DH companies. DUR studies companies with a heat production capacity of more than 25 MW as established in Article 20 of the Heat Supply Act. It picks a representative selection of companies. For example, DUR selects companies of different sizes and from different geographical regions (for instance, some in urban areas and others in rural areas).

DUR's third role with respect to DH tariffs is to provide advice. For instance, a company might want to consult DUR to find out if something is legal before the company puts a decision into action. The Heat Supply Act provides limited guidance on how companies should calculate the tariffs. This results in a wide interpretation of how fixed and variable costs should be allocated. For example, the Act states that at least 20% of the total costs should be fixed costs, but beyond that, does not provide much detail. The definition of what constitutes necessary costs derives from Article 20 of the Heat Supply Act, which states that companies have to factor in costs such as wages,

⁵ The Heat Supply Act: <https://danskelove.dk/varmeforsyningsloven/20>.

⁶ <https://www.mdpi.com/1996-1073/13/7/1670/pdf>.

maintenance, and investments, but does not say anything about how large the wages should be, what type of wages, any limits on investments, etc. In other words, the law sets the boundaries but does not provide the details; therefore, how the rules are put into practice may vary from one case to another. In this way, DUR serves as the ultimate interpreter of the law as needed. If there is a complaint, then DUR will look into the specific case and determine whether the company is acting within the boundaries of the law. Thus, at the national level, Denmark has a light-handed regulatory approach to DH tariffs, giving DH companies a fair amount of freedom in how they set the tariffs.

One of the reasons this soft approach to regulation works is that Danish DH companies are structured to work in the public interest. Many DH companies are owned by consumers, so they do not have a profit motive. There are three main DH company ownership structures in Denmark. Danish municipalities own the largest DH companies, which represent around two thirds of all district heat delivered. The remaining DH companies are primarily consumer-owned cooperatives. The third type of ownership are commercially owned DH companies. DH companies are subject to non-profit rules. This is aimed at protecting customers, because in most cases DH companies act as monopolies and customers are required to connect if they live in DH zones. In addition to owning DH companies, local governments also prepare heat plans and approve investment projects. This also protects customers by ensuring that DH zones and investments are economically justified.

The DH providers are divided into two associations: the Danish District Heating Association (DDHA or *Dansk Fjernvarme* in Danish) and the Association of Danish CHP Plants.⁷ These organizations provide a platform for the DH companies to coordinate and represent the companies and their interests to authorities and other organizations. These organizations are important resources for providing guidance and building capacity among DH companies. The DDHA, for example, organizes trainings, seminars, and conferences for its members.⁸ It also collects and publishes technical and economic data on DH companies. It has also set up working groups that work to make improvements in both the tariff system and training programs, prompted in part by a new regulation that aims to increase efficiency and may require changes to the regulatory approach.

LITHUANIA

Legal basis

Lithuania has a common set of rules for regulating tariffs captured in the *Ruling on the Methodology for Setting the Prices for Heat*⁹. This regulatory document, which is set by the National Energy Regulatory Council (NERC), is referenced when setting tariffs for all regulated companies.

NERC is the decision-making body and sets the rules for DH tariffs. These rules are captured under Lithuania's *Law on the Heat Sector*¹⁰ and are established based on legal documents issued by NERC.

⁷ Source: Bæk M. (2015). Regulation and planning of district heating in Denmark. Danish Energy Agency, https://ens.dk/sites/ens.dk/files/Globalcooperation/regulation_and_planning_of_district_heating_in_denmark.pdf.

⁸ Dansk Fjernvarme (2020). Danish District Heating Association. <https://www.danskfjernvarme.dk/sitetools/english/about-us>.

⁹ Ruling on the Methodology for Setting the Prices for Heat. (2009 July 8; updated 1 January 2019). <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/d145d7d0b28511e8aa33fe8f0fea665f?jfwid=11dyhejazi>.

¹⁰ Law of the Heat Sector (20 May 2003) <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/d145d7d0b28511e8aa33fe8f0fea665f?jfwid=11dyhejazi>.

NERC is composed of five Council members. The Council members are nominated by the President of Lithuania and appointed by the Parliament (Lithuania's Seimas) for 5-year terms.¹¹

Key institutions

NERC has a central role in DH, including:¹²

- Approving the methodologies for calculating DH and hot water tariffs and setting the main constituent parts of these tariffs;
- Issuing heat supply licenses for companies which produce more than 10 GWh of heat per year (a heat supplier must hold a license to operate¹³);
- Investigating the complaints and disputes of the customers and energy undertakings; and
- Intervening if there is any violation in the tariff setting procedures, and if necessary, unilaterally setting the tariffs.

Municipalities issue licenses to companies who sell below 10 GWh of heat per year. For these small companies, the municipalities follow the methodology set by NERC, set the tariff constituents and the tariffs, and regulate the supply of heat to customers. For large companies (those which produce more than 10 GWh of heat per year), NERC sets the tariff constituents and the municipalities set the tariffs. Only when the municipality fails to set the tariffs timely does NERC intervene and set the tariffs unilaterally. The methodology is the same for all companies regardless of the company size.

Individual municipalities regulate the sector within their respective territories according to municipal heat supply schemes and heat development plans which municipal councils approve¹⁴. These plans are reviewed every five years, depending on factors such as heat production, technology development, and environmental pollution.

NERC sets long-term tariff constituents for 3-5 years. The municipality then issues annual tariffs using the constituents' formula from NERC. NERC revises and approves the tariff, ensuring that the tariff is set properly. If the company feels that the municipality was wrong in issuing the annual tariff, it can appeal to NERC. NERC would then analyze the case and decide on the tariff which must be implemented unless appealed in the court. Also, if the municipality does not issue an annual tariff within the required three-month period, the company can go to NERC for a decision. In this case, NERC would set the tariff instead of the municipality.

The *Methodology for Setting the Prices for Heat* is a living regulatory document. It goes through changes almost every year. As a result, there have been appreciable changes since 2009 when Lithuania introduced its first comprehensive methodology. The methodology in 2009 was more incentive-based. Regulatory asset base (RAB) and return on investment parameters and several components

¹¹ National Energy Council. (2019). The Council. <https://www.regula.lt/en/Pages/about-us/board.aspx>

¹² NERC (National Energy Regulatory Council) (2019a). District Heating Sector. <https://www.vert.lt/en/Pages/Activities/district-heating-sector.aspx>.

¹³ NERC (National Energy Regulatory Council) (2019b). Licensing. <https://www.vert.lt/en/Pages/licencing.aspx>

¹⁴ Law of the Heat Sector (20 May 2003) <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/d145d7d0b28511e8aa33fe8f0fea665f?jfwid=11dyhejazi>

for fixed costs and incentives were based on benchmarking. There were additional incentives if the DH company invested in fuel switching to biomass. In 2013 to 2014, fixed costs were left with the general approach of incentives and benchmarking but made more rigid. Also, the additional incentive for fuel conversion was eliminated. Thus, the methodology became closer to cost plus, even though it kept several elements of an incentive-based regulation.

Two other major changes have occurred during the past ten years. The first was the introduction of the detailed regulatory accounting system in 2013 when the tariff methodology was changed. This methodology entered into force in January 2014. In the interim, Lithuania implemented multiple training sessions for key market players to apply the regulatory accounting and reporting system, and the regulator developed a software engine open for all sector entities to use free of charge to implement the new regulatory accounting and reporting system.

The second major shift was a change in Lithuania's laws in 2018 that enabled the regulator to establish a requirement for auditors to audit the new regulatory accounting reports. Thus, 2018 was the first year that reports were audited according to the requirements set by NERC. Prior to this, licensed audit companies performed the audits to determine whether the DH company in question properly followed NERC rules on tariff methodology when making a tariff case submission. NERC acknowledges that there are some issues that can be improved, but the data they are acquiring is much more reliable. The number of licensed DH companies have remained stable in Lithuania, but the number of heat producers increased significantly. Competition has resulted in 20-30 new generation companies. There have been no changes in who regulates tariffs since 2003.

Improvements in Lithuania's current methodology include the almost immediate reflection of changes in fuel prices and changes in procured thermal energy prices in the DH tariffs. It has a clear differentiation between costs for generation, transportation and supply. The methodology is part of a wider package of regulations which includes regulatory accounting, regulatory assessment, investment approval rules and procedures, and the establishment of the weighted average cost of capital (WACC). Another benefit of the current Lithuanian framework system is that the regulator is legally mandated to mitigate political risks and ensure the protection of DH entities against politically influenced delays in tariff approvals and reductions of tariffs.

POLAND

Legal basis

The Polish regulatory system has been evolving for several decades. Until 1998, heat tariffs were primarily set at the national level. At the time, the Ministry of Finance set the official heat tariffs for the whole country with some regional variations. In 1997, the Polish Parliament passed the Energy Law, which introduced radical changes to the rules on energy sector operation. The Energy Law required to create a central body to regulate energy-related issues, review and approve heat tariffs prepared by district heating companies and promote competition.

Key institutions

The Polish Energy Regulatory Office (Urząd Regulacji Energetyki (URE) is a central government administration body established by the Energy Law. URE was founded in 1998 to regulate the electricity, gas, and heat markets. It has twelve bureaus and departments, including the Department of Electricity and Heat Markets. Due to the local nature of the DH sector, URE has 8 regional offices to regulate DH companies. These regional offices issue licenses for generation, transmission,

distribution, and trade of heat and approve heat tariffs. They also investigate complaints from DH companies, prepare information, documents, and opinions on development plans of DH companies for the President of URE.¹⁵ The President issues all of URE’s decisions regarding tariff settings in the DH sector.

About 370 people worked at URE in 2019. The budget of URE was around 51.3 million PLN (\$13.7 million) in 2019, or about \$340 per capita.¹⁶

Evolution of the institutional/regulatory system

Before 2002, URE set tariffs for 1,000 of the 3,000 DH producers. Since 2002, the number of licensed heating companies regulated by URE has decreased by almost 50% (Fig. 1) mainly because of the changes in the licensing threshold (from 1 to 5 MW¹⁷) and various organizational and ownership transformation.

As of 2019, URE regulated 396 DH companies which account for the overwhelming majority of systems and sales.¹⁸ URE does not set heat tariffs for companies with a heat capacity below the 5 MW threshold. These companies calculate the tariffs using the methodology developed by URE, but there is no approval process. This lack of regulation can potentially create conflicts between private DH companies and municipalities. There were cases in Poland when small towns built their own DH facilities when they were not satisfied with heat prices offered by private companies.

In 2002, URE started a large-scale annual survey of major DH systems. The Polish regulator uses the survey results to track trends in the sector and provide benchmarking for energy efficiency measures as well as to develop future policies concerning the sector.

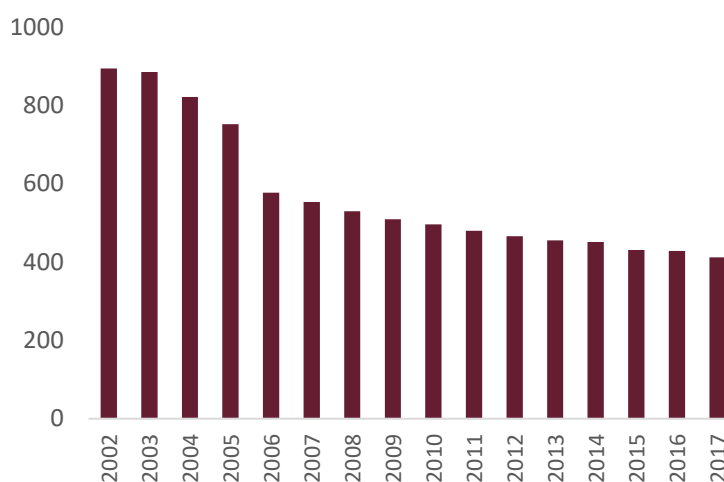


Fig. 1. Number of DH companies regulated by URE.

Poland has privatized most of its DH companies. Of the 389 regulated companies included in the 2018 survey of DH companies in the country, 77% were limited liability companies, 18% were joint-stock companies, and the remaining 5% were other companies. The limited liability companies are usually small and sell 37% of the total DH heat, while joint-stock companies deliver 61% of the heat to the customers.¹⁹ It is worth noting that municipalities can own limited liability companies.

¹⁵ <https://www.ure.gov.pl/en/about-us/organisational-structu/branch-offices>.

¹⁶ <http://www.ure.gov.pl/download/9/11109/Sprawozdanie2019.pdf>.

¹⁷ <http://isap.sejm.gov.pl/isap.nsf/download.xsp/WDU20050620552/T/D20050552L.pdf>.

¹⁸ <http://www.ure.gov.pl/download/9/11109/Sprawozdanie2019.pdf>.

¹⁹ Energetyka ciepła w liczbach – 2018. Table 3 and 18. <https://www.ure.gov.pl/download/9/10380/Energetykacieplawliczbach-2018.pdf>.

According to expert judgment, cities may own about half of DH companies in Poland, either directly or indirectly. Cities do not have the right to get involved in the tariff process. They only can set strategic directions for the companies they own through supervisory boards and control the implementation of heat supply schemes.

DH companies with heat licenses are required to pay an annual fee to the state budget. The fee is a fixed percentage of the DH company's revenue, as defined in the regulations, and it can range from PLN1,000 (\$270) to PLN 2,500,000 (\$670,000).²⁰ The fees collected are partially used to finance URE, and about half the revenue collected goes back to the state budget.

WHAT: TARIFF SETTING METHODOLOGY

This section gives an overview of the tariff methodologies in each of the case studies, where applicable, distinguishing between processes for licensees of the regulator and non-licensees. This includes information on which costs are covered, and the types of tariffs used. The methodology for tariff setting varies by country. For example, in Poland tariffs can be calculated using either the cost-plus method or the benchmarking method, in Lithuania the methodology is similar to cost-plus but with mandatory elements of incentive-based tariffs. The MERP reports (see references on page 9) provide additional details of tariff methodologies in other countries. For example, in Latvia, the regulator can impose an obligation for cost savings and energy efficiency. Hungary has a unique regulatory system where the national energy regulator proposes tariffs, but the final decision on tariffs are made by the energy minister. In Slovakia, the regulator sets a revenue cap for the fixed part of the heat tariff and regulates the variable part according to the fuel input.

Denmark regulates tariffs based on non-profit principles, while in the other countries DH companies are allowed a certain amount of profit set by the regulator. It is also important to note that in many Western European countries, DH is subject to market competition with other types of space heating, so there is no or limited regulation. However, this assumes that the energy markets have well-established and balanced competition, with no major distortions, which is not the case in Ukraine. In Finland, DH is regulated in accordance with the general principles of competition regulation, but the Competition Authority can assess if heat tariffs are set at a reasonable level. In the United Kingdom, DH tariffs are not regulated. Germany does not have special legislation on DH regulation.

In all countries which apply conventional regulation tariff methodologies are set to fully cover economically justified costs.

CZECHIA

The ERO sets the methodology for calculating heat tariffs in its annual tariff decisions. The tariff decisions determine binding conditions for calculating heat tariffs for that calendar year, including a formula for calculating tariffs, definitions of economically justified costs, and conditions for determining their amounts. Heat tariffs are based on the cost-plus principle and may only include economically justified costs, a reasonable profit, and value added tax (VAT), as specified in the Act on Prices. Economically justified costs are shown in Table 1 below. In addition, assumed fuel prices must reflect usual prices (which the regulator evaluates based on other utilities and their actual fuel

²⁰ Energetyka ciepła w liczbach – 2018.

<https://www.ure.gov.pl/download/9/10380/Energetykacieplawliczbach-2018.pdf>.

costs) and the amount of fuel must reflect typical boiler efficiency. There are also cost caps in some cases, such as a cap on maximum allowed rent for DH facilities in CZK/GJ.²¹

Table I. Allowable costs in heat tariffs in Czechia

ALLOWABLE FIXED COSTS	ALLOWABLE VARIABLE COSTS
<ul style="list-style-type: none"> • Asset depreciation • Repairs and maintenance of equipment • Wages and statutory insurance • Rent • Financial leasing • Production overheads 	<ul style="list-style-type: none"> • Fuel costs (main component) • Purchase of heat • Electricity for the heat production and distribution • Process water • Taxes and environmental charges (e.g. air pollution charges, required purchase of emissions allowances)

A reasonable profit, as specified in the Act on Prices, is assessed based on ensuring a return on capital investments in a reasonable period of time, while also comparing to profit in comparable economic activities. It is difficult to determine a single profit ratio or range for all heat suppliers, as the district heating sector is diverse, so reasonable profit in heat tariffs is assessed individually based on the specific conditions of production and distribution in a given location.

The ERO also sets a minimum limit tariff in its annual tariff decision of approximately one-fifth of average DH tariffs (in 2020 this value was 36.5 CZK/Gcal)²². If DH companies charge tariffs lower than this limit, the tariffs are not regulated. In practice, however, companies do not set tariffs this low, and so they are regulated to ensure that tariffs include only economically justified costs and allowable profit.

Tariffs can be set as either a one-tier tariff in CZK/GJ, or a two-tier tariff with a fixed monthly component according to heat load, in CZK/MW, and a second component in CZK/GJ. DH companies generally prefer to use two-tier tariffs. Tariffs are not differentiated by type of consumer. They do vary based on geographic location, technical and economic conditions of heat supply, such as the amount of heat supplied, fuel used in production, size of the installed heat capacity, technology type and condition, and ownership of equipment.

DENMARK

Denmark is one of a few countries that regulates DH and heat generation based on a non-profit business model. Common across all DH areas is that the heating supply is controlled by the consumers' heating demand.²³ Consumer metering measures the actual heating demand which provides an incentive for consumers to save heat. Payments for heating are often divided into a fixed part (per installation and/or capacity) and a variable part (per gigajoule of consumption) (Table 2).

²¹ http://www.eru.cz/documents/10540/5890146/ERV5_2020.pdf/45de5af0-5089-46d2-b94a-ffa7c726847d.

²² http://www.eru.cz/documents/10540/5890146/ERV5_2020.pdf/45de5af0-5089-46d2-b94a-ffa7c726847d.

²³ Source: Bæk M. (2015). Regulation and planning of district heating in Denmark. Danish Energy Agency, https://ens.dk/sites/ens.dk/files/Globalcooperation/regulation_and_planning_of_district_heating_in_denmark.pdf.

The tariff covers all necessary costs, including interest payments, but the profit component is zero in the tariff. While the price of heating varies across Danish DH areas, the principles for determining the heating tariff are set by the Heat Supply Law. The legislation states that the heating tariff by the consumer should cover all necessary costs related to supplying heat, but the DH company is not permitted to make a profit.²⁴ Thus, companies cannot charge more for heating than the costs of producing and transporting heating to the consumers. Nevertheless, for the companies to be financially sustainable in the short and long term, the costs also include depreciation of assets and financing costs. DH companies provide these costs in a heat calculation worksheet they must report to DUR.

Table 2. DH tariff cost composition

COSTS REGARDING HEAT SUPPLY
<p>Net production costs</p> <p>Total production total, total purchase heat, sales of electricity, total maintenance production, reversed depreciation on maintenance, electricity total, total production management cost, reversed depreciation on production management, total other control, reversed depreciation on other control, environment research and development costs</p>
<p>Transmission costs</p> <p>Total electricity, total transmission lines, reversed depreciation transmission lines, operation and maintenance transmission total, reversed depreciation on wells in transmission system</p>
<p>Distribution costs</p> <p>Total piping network, reversed depreciation on distribution network, total wells, reversed depreciation on wells, other distribution system total, installations in buildings total, reversed depreciation installations buildings, total metering costs, reversed depreciation metering costs, total electricity, management total, reversed depreciation management, other control total, reversed depreciation other control, total drawing piping network, environment research and development</p>
OTHER COSTS
<p>Administrative expenses</p> <p>Total administrative expenses, reversed depreciation administrative expenses, reversed depreciation for covering losses</p>
<p>Other</p> <p>Total other operational income, total other operational costs, total income interest, total interest costs, reversed unrealized exchange rate gains/losses, reversed exchange rate adjustment loans in foreign currency, total extraordinary items, total tax on year result, total after taxes</p>
<p>Depreciation and allowances total</p>

²⁴ Source: Bæk M. (2015). Regulation and planning of district heating in Denmark. Danish Energy Agency, https://ens.dk/sites/ens.dk/files/Globalcooperation/regulation_and_planning_of_district_heating_in_denmark.pdf.

Total depreciation, reversed not used depreciation, depreciation according to heat act, total CNY, A: number of consumers (Meters), B: floor area total (m²), C: sold energy (kWh, MWh, GJ, m³), price per unit ex. VAT, price per unit including VAT

Each DH company sets the tariffs according to its own budget. They must report this budget to DUR along with other supporting information before the heating year begins. The Heat Supply Law instructs companies to report through an electronic reporting system. As part of this process, the companies use a standardized heat tariff calculation spreadsheet to report their budgets.²⁵ The spreadsheet consists of fixed and variable costs (and the prices reflecting the costs), as well as their earnings which must balance with the costs. The Heat Supply Act outlines that the fixed tariff should be at least 20% of the costs, and historically, fixed tariffs have corresponded to around 31% of costs.²⁶ However, the specific methodology that a company uses to calculate the tariff is left up to the company and DUR does not regulate or oversee this process, with the exception of the 50-60 companies that it periodically selects to do a more thorough analysis.

There are, however, some common practices for setting tariffs in Denmark. Most companies design their tariffs with two parts: a variable and a fixed component. For variable tariffs, one best practice is to set the tariff at the long-run marginal costs of the DH network.²⁷ Many DH networks will set a variable tariff at a price higher than the short run marginal cost and keep it at a constant level throughout the year. At a minimum, variable tariffs should cover variable costs. These practices promote investment in viable energy saving measures. With respect to fixed tariffs, one best practice includes setting the tariff relative to the registered living area (heated area) of a home with the tariff consisting of a

Box 1. Incentive-based tariffs in Denmark

Over the past decade, Denmark began to promote tariffs that reward customers who are willing to actively manage their heating consumption. The discount must be balanced with the average price. A 2019 study by Energy Lab I highlighted a few examples of companies that are doing this.

In 2016, another utility, Kalundborg, introduced a new tariff system which rewards heat customers who reduce their DH return temperature. Customers with a return temperature lower than 45°C (which is considered the standard) will see a reduction in their heating bill equal to 3.75 Kr/MWh per degree below 45°C. Conversely, if the return temperature exceeds 45°C, customers pay an additional penalty that would be equal to the reward (reduction in the heating bill). Similarly, the DH company of Copenhagen, HOFOR, introduced a tariff which rewards/penalizes customers with a return temperature lower/higher based on the standard return temperature. In 2018, the target return temperature was 32°C.

²⁵ Information on reporting is found here: <https://forsyningstilsynet.dk/varme/indberet>.

²⁶ Source: LE London Economics. (2015). Best practice from Denmark in price setting for heat tariffs. Presentation to the Vanguard District Heating Conference. <https://londoneconomics.co.uk/wp-content/uploads/2015/08/Vanguards-Best-practice-from-Denmark.pdf>.

²⁷ Source: LE London Economics. (2015). Best practice from Denmark in price setting for heat tariffs. Presentation to the Vanguard District Heating Conference. <https://londoneconomics.co.uk/wp-content/uploads/2015/08/Vanguards-Best-practice-from-Denmark.pdf>.

subscription tariff and a step-wise decreasing cost per m² to ensure equal competitiveness for larger and smaller customers.²⁸

Another practice consists of setting the tariff relative to expected annual capacity demand. This method however may be more difficult to implement depending on customer acceptance of the method for calculating the expected annual demand. Other options include basing the fixed tariff on flow capacity with a focus on delivered flow temperature or basing the tariff on the past three years of heat demand (normalized for annual temperature). It is important to note that, in general, the higher the fixed component relative to the variable one, the less incentive the customer has to invest in energy efficiency. In addition, Denmark permits incentive-based tariffs which are used to make consumers with a low efficiency system pay more, and conversely, to give consumers with a highly efficient system a discount. Box 1 provides a few examples.

LITHUANIA

DH tariff setting in Lithuania involves multiple steps. From a procedural point of view, the first step is to reach an agreement with the regulator on the long-term investment program. The municipality must also approve the long-term investment program, and the proposed program goes through public consultation and hearings before it is approved. The second step is approval of a long-term tariff constituents. The company provides calculations and projections which it must file with the regulator five months before the long-term tariffs go into effect. NERC reviews the proposal, asks questions, and may request revisions. After its analysis is complete, NERC approves the long-term constituents. The municipality then sets the tariff. NERC reviews it and indicates whether it is fine or requests that the municipality amend the tariff. The third step is annual adjustments to the long-term tariff. The municipality oversees review of this adjustment, and the national regulator only becomes involved if there is a dispute with the DH company. NERC confirms whether the annual tariff is set appropriately. The fourth step is that the company itself can make monthly adjustments, but these are reviewed in detail when the next annual and long-term tariff is set, and there are penalties for overcharging. Small companies do not go to the regulator, only to the municipality, but small companies must have a long-term investment plan, long-term tariff, and annual tariff. There is a rule that the regulator must issue all parameters for the weighted average cost of capital (WACC) and benchmarking before July 1, although sometimes there are delays.

To ensure that tariffs reflect actual costs of all inputs, DH companies can change their variable cost portions of their tariffs monthly. Table 3 has a list of fixed and variable costs included in the DH tariffs.

Table 3. Costs factored in the DH tariff

FIXED COSTS	VARIABLE COSTS
<ul style="list-style-type: none"> Long-term assets, and long-term asset basis (depreciation and Weighted Average Cost of Capital or WACC) are included in the regulatory asset base (RAB); 	<ul style="list-style-type: none"> Fuel, procured heat, electricity for technical needs, water for technical needs; Water and electricity (these have known, public prices, thus are easy to calculate);

²⁸ LE London Economics. (2015). Best practice from Denmark in price setting for heat tariffs. Presentation to the Vanguards District Heating Conference. <https://londoneconomics.co.uk/wp-content/uploads/2015/08/Vanguards-Best-practice-from-Denmark.pdf>.

<ul style="list-style-type: none"> • Investments become part of the RAB only after it is commissioned; • Grant funds, such as EU grants, are not included in the asset base; and • Costs for employees, administration and financial costs are also included in the fixed costs since these do not fluctuate based on the volume of heat sold. 	<ul style="list-style-type: none"> • Fuel and procured heat; and • Biofuels (there is a separate methodology that explains how to calculate biofuels; these prices vary significantly).
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POLAND

Two methods exist in Poland for calculating heat tariffs. One is the cost method, which is based on planned revenue and costs. The other is the benchmark method, which may be applied to CHP.

Using the cost method, tariffs are based on the historical cost-plus principle and include depreciation, justified cost of operations, and a return. Benchmarking factors in efficiency for tariffs that are approved for multiple years; however, in reality, few tariffs are set this way, so most Polish tariffs are based on a cost-plus methodology. Most of these multi-year benchmarking tariffs were set in connection with loans from international financing institutions (IFIs).

The Ministry of Economy approved the *Regulation on detailed principles for the setting and calculation of tariffs and settlements for heat supply* on September 17, 2010.²⁹ The two important provisions of this regulation are that DH tariffs should cover all justified costs and cross-subsidies are not permitted. Heat tariffs may include the costs of projects and services aimed at reducing energy consumption by consumers, as these constitute avoided costs of constructing new energy sources and networks.³⁰

In December 2015, the President of URE approved the model for tariff approval, which describes rules and methods for including the cost of capital in heat tariffs for 2016-2020. The key principle that DH companies must provide justification for the maximum planned revenue, which is the sum of justified costs and a reasonable return on capital. The purpose of this model was to develop a tool for establishing a reasonable cost level. In 2002-2018, there was a significant increase in the replacement of the fixed assets ratio. In 2018, the level of investments exceeded the level of depreciation of fixed assets as 79% of DH companies implemented investment projects.

DH companies differentiate heat tariffs for the customers depending on how the heat is generated and supplied to the customers. Specifically, large DH companies typically calculate 3 to 5 tariffs, which differentiate between who generated the heat and whether the individual heat substation is owned by the company or the consumer.³¹ DH companies are allowed to develop differentiated tariffs based on differences in cost, but unlike in Ukraine, they cannot differentiate by customer class.

The average heat tariff in Poland in 2019 was 52 zł/GJ (about \$59/Gcal)³². However, heat tariffs include several components. Table 4 below shows the heat tariff components in Przemysl. Payments for ordering heat, price of heat and price of water are the same for all customers. Fixed and variable

²⁹ <https://uokik.gov.pl/download.php?id=754>.

³⁰ The Energy Law (Prawo energetyczne). Article 45-2. <https://www.ure.gov.pl/download/9/11230/Prawoenergetyczne-wersjana24-06-2020.pdf>.

³¹ For example, the DH company in Przemysl has five different types of heat tariffs <http://bip.mpec.przemysl.pl/56/archiwalne-taryfy-dla-ciepila-mpec-przemysl-sp-z-oo.html>.

³² Energetyka ciepła w liczbach – 2019.

costs for heat transmission depend on heat load, type of heat source, araciality of individual heat substations and other factors.

Table 4. Types and size of payments and prices in Przemysl

CATEGORY	UNIT
Payment for ordering heat load	(Zl/MW/year)
Price of heat	(Zl/GJ)
Price of heat carrier	(Zl/m ³)
Fixed fee rate for transmission services	Zl/MW/year
Variable fee rate for transmission services	Zl/GJ

CHPs account for almost two-thirds of heat supply and 14% of the electricity produced.³³ The average tariffs for heat from CHPs were 17% lower than the tariffs for heat from heat-only boilers in 2018. Recognizing the efficiency of CHP, 95% of the approved tariffs for CHPs were based on the benchmarking methodology.

Regarding methods to split the cost between heat and electricity for CHPs, there are no strict rules. However, DH companies need to adequately justify the chosen methodology and document the history of electricity market prices. For a given DH company, the methodology remains in force for years to come, and it is not easy to change it.³⁴

In 2009, the Council of Ministers adopted Poland’s *Energy Policy to 2030*, which set a goal to replace heat-only boilers with CHPs by 2030³⁵; however, Poland is behind schedule to reach this goal.

HOW: PROCESS FOR TARIFF CALCULATION AND APPROVALS

This section provides more detail on the processes for tariff calculation and approval in each country. This includes step-by-step overviews of the tariff calculation and review process, the timeline for tariff setting, how fluctuations in fuel prices are addressed, and appeals processes. A common feature is to set tariffs on an ongoing basis and have mechanisms to allow for adjustments, since costs of inputs can fluctuate. In Poland and Czechia tariffs are set annually, but there are processes for DH companies to request adjustments from the regulator if fuel prices change. In Lithuania, long-term tariffs set a framework for 3-5 years, but tariffs can be adjusted annually or monthly to reflect variance in input costs, with a less stringent regulatory approval process. There is also information on regulatory transparency. Most countries have practices to make regulatory data available, such as public consultations or publishing records of price decisions and negotiations online. All four countries considered here also have some systems of appeals in place if customers or

³³ Energy Policies in IEA countries. Poland. 2016.

³⁴ Energetyka ciepła w liczbach – 2017. <https://www.ure.gov.pl/pl/cieplo/energetyka-ciepna-w-l>.

³⁵ Energetyka ciepła w liczbach – 2018. <https://www.ure.gov.pl/download/9/10380/Energetykacieplawliczbach-2018.pdf>.

companies do not agree with tariff decisions. A typical model, seen in countries such as Lithuania, Denmark, and Poland, is to have the appeals body one level above the regulator. For example, if municipalities set the tariffs, appeals can be made to the national regulatory body. When the national regulator sets tariffs, independent bodies such as courts or appeals boards that can resolve disputes between companies and the regulator, or between customers and companies.

CZECHIA

Tariff setting and review process

Each year, DH companies calculate prices based on their economically justified costs in accordance with Act on Prices and the ERO's price decision and submit them to the ERO. They also provide the ERO with documentation on heat tariff calculations, as required by the ERO's Decree No. 262/2015, *On Regulatory Reporting*. The ERO does not approve tariffs in advance or automatically review all DH tariffs each year but does review tariffs of selected companies – for example, the highest tariffs and the largest tariff increases, or in the case of customer complaints. If a breach of regulations or obligations is found, the ERO imposes fines or measures to correct the issue.

During the calendar year, the heat tariff is preliminary, and is based on the assumed economically justified costs and estimated amount of heat for the year. DH companies must determine the preliminary amount of heat for a given year based on the average delivered heat for the previous 3 to 5 years. Each company calculates its own estimated fuel costs as there are no official forecasts or benchmarks for fuel prices used. Customers pay the preliminary tariff. After the end of the year, the DH company recalculates a final tariff using the actual economically justified costs and actual amount of heat for the completed calendar year. Customers then either have the balance returned to them or pay the balance between the estimated and final tariff. The deadlines for billing and payment of the readjusted price is set in the heat supply contract between the DH company and customer.³⁶ The regulator does not approve these adjustments in advance, but customers can appeal to the regulator if they have a dispute about the billing and the calculations will be checked.

Companies sign a heat supply contract with customers when they connect customers to the network and start to supply heat. The contract includes the planned quantity of heat consumption, place of transmission and measurement, supply and return temperature and pressure, and dates and method of payment for the heat consumed. If the DH company applies a two-tier tariff, the contract also includes the individual components of the heat tariff. A new heat supply contract is signed if a customer needs to permanently adjust the amount of heat consumed (for example, due to thermal insulation of the building), and the DH company must take changes in the amount of heat supplied into account when determining the tariff for the next year (in cases where a two-tier tariff is applied).

Changes in heat tariffs between years are mainly due to changes in fuel costs, fixed costs, and the volume of heat supplied. It can also be affected by changes in VAT rates. Over the past ten years, the

³⁶ Examples of the price clause in the heat supply contract to allow for tariff adjustments are provided in a model contract at: https://www.ero.cz/documents/10540/462920/Vzorova_smlouva_o_dodavce_tepelne_energie.pdf/1bfb905c-e3be-4f70-81bd-1410eca2dadc

VAT for heat has been increased several times, from 9% to 15% (though district heating and cooling is subject to a reduced VAT compared to the standard rate of 21%).³⁷

Transparency and appeals process

The ERO publishes information on tariffs and average DH prices for each DH supplier, typical eligible costs per category, methodology for tariff calculation, and model contracts. Information about the activities of the ERO, including regulations, decisions, licenses, decrees, and annual reports, is also publicly available on its website. Amendments to decrees are subject to a public consultation process, in which comments and suggested amendments can be submitted, and the ERO decides whether to accept, partially accept, or reject the suggestions.³⁸

The ERO can resolve disputes over the fulfillment of contractual obligations in cases where the court would otherwise have jurisdiction to resolve the dispute, if all parties to the proceedings agree.³⁹ DH companies can appeal to the ERO if the regulated tariffs do not allow the company to cover its economically justified costs in the long run. In such cases, the ERO may allow different conditions for setting the heat tariffs than those defined in the annual price decision. All requests for setting different tariffs must be substantiated using the required documents, in order to prove that the heat price does not cover the DH company's costs.⁴⁰ Similarly, heat customers can contact the ERO if they have a dispute over the heat tariff applied by the DH company, and the ERO checks that the tariff is compliant with the regulations.

DENMARK

Tariff setting and review process

The process for approving tariffs in Denmark varies depending on the company ownership type. Municipally-owned companies which make up the majority of companies in Denmark have an internal budget approval process within their organization. Following this internal approval, the municipality must get the budget cleared through the mayor's office before they submit it to the regulator, DUR. Municipalities are responsible for preparing and updating the municipal heating plans and approving the heating projects. The City Council makes the final decision on heating planning and expansion of heating supply in the municipality. The process for a consumer-owned company is similar, but they obtain their budget approval in a general assembly. A commercially owned company has an internal board which approves the tariff.

Once this approval is obtained at the local level, each DH company uses and submits a standardized heat tariff calculation spreadsheet to DUR. The tariff worksheet is the same for all DH companies. National regulations are high-level; this allows companies to develop their own detailed methods. However DUR audits a sample of companies on a periodic basis. The case record of these audits results in improvements of the detailed methodologies for tariff setting.

³⁷ https://www.csas.cz/content/dam/cz/csas/www_csas.cz/dokumenty/analyzy/Teplo%20v%20C4%8CR_2018_10_public.pdf

³⁸ <https://www.ero.cz/documents/10540/5539668/P%20C5%99ehled+p%20C5%99ipom%20ADnek+z+VKP+a+jejich+vypo%20C5%99C3%AId%20C3%AIn%20AD.pdf/961b56ec-7263-4f91-9b39-9080bdf9bb5a>

³⁹ <https://www.ero.cz/cs/teplo/casto-kladene-dotazy>

⁴⁰ <https://www.ero.cz/cs/teplo/casto-kladene-dotazy#12>.

Changes in market prices do trigger automatic tariff adjustments in Denmark. There are different approaches. At one end of the spectrum for example, if a municipality is seeking to have its costs approved by the major's office and the municipality observes that the costs are rising during the heat year, the municipality may choose to wait until the next year to correct the budget, acknowledging that they will have higher costs than expected; thus, the income will fall below the tariff and the municipality will incorporate the difference (additional amount) into next year's tariffs. At the other end of the spectrum, another company may set a tariff for everyone upfront if they assume that heating prices will be lower during the summertime due to lower energy consumption, and conversely, higher in the wintertime due to higher energy consumption. A few Danish companies do this. Whatever the approach however, companies must publish their tariffs in DUR's system before they set the tariff. As long as this requirement is met, companies can adjust a tariff as often as they would like. In practice, companies report a new tariff once a year and some companies twice or even three times a year. There is also a special requirement if there is an extraordinary price increase. DUR recently established that an extraordinary price increase means a price increase of 20% or more. In this case, companies must report the increase three months in advance before the tariff takes effect.

Why Denmark has been able to increase energy efficiency, decouple the development in energy consumption and economic growth, and reduce carbon emissions over several decades is in large part due to the widespread use of DH combined with a large share of cogeneration with electricity.⁴¹ There are two ways Denmark includes CHP in heat tariffs. If the DH company owns the CHP plant (and many DH companies do⁴²), the income from power production is included directly in the budget and heat tariffs are lowered according to income. If the DH company does not own the CHP plant, the heat delivery (i.e., the heat part of the costs) tariff is negotiated. In the CHP cost allocation methodology, CHP can maximize its profit by selling electricity. However, there is a regulation that applies to small-scale CHP plants that forbids them from earning a profit on electricity generation as well.

Transparency and appeals process

At least once a year, DUR publishes standard DH consumer prices for all DH networks. This helps to protect the transparency of the DH sector and brings an element of competition to the consumer-owned DH companies. That is, consumers and company directors can see the prices in DH systems that are comparable to their own. Thus, they have an efficiency incentive to at a minimum match or fall below the prices of their comparable companies.⁴³

While DUR handles general complaints which affect all end users, the Energy Board of Appeal handles these complaints for private consumers' complaints about DH companies concerning the

⁴¹ In 2014, more than 68% of DH was from CHP. Source: Bæk M. (2015). Regulation and planning of district heating in Denmark. Danish Energy Agency, https://ens.dk/sites/ens.dk/files/Globalcooperation/regulation_and_planning_of_district_heating_in_denmark.pdf.

⁴² Source: Gorroño-Albizu, L. (2020). The Benefits of Local Cross-Sector Consumer Ownership Models for the Transition to a Renewable Smart Energy System in Denmark. An Exploratory Study. *Energies*, 13(6), 1508.

⁴³ Mobilizing Grassroots (n.d.) Denmark: How to organise consumer-owned district heating? The Danish example. <https://grassroots.aau.dk/challenge-denmark/#>.

purchase and delivery of heat.⁴⁴ Appeals against decisions of public authorities in individual cases are also directed to the Energy Board of Appeal.⁴⁵

LITHUANIA

Tariff setting and review process

In Lithuania, tariffs are set in three ways:

- Long-term tariffs set a tariff framework for 3-5 years. These tariffs involve significant scrutiny from the national regulator, NERC, on all historical costs and planned investments.
- Each year, the municipality works with the DH company to develop annual tariffs. These work within the approved investment plan from the long-term tariffs, but update fuel cost and other elements as needed. The national regulator must sign off on annual tariffs, but because there is generally little variance from the long-term tariff and clear rules on what municipal authorities can adjust do exist, the approval process is faster.
- Each month, the DH company can adjust its tariff based on changes to variable costs like fuel. These changes do not need to be approved by a regulator in advance, but during the next review of costs to set the subsequent long-term tariff, all the underlying costs will be scrutinized, and the DH company will face stiff fines for any deviations from the tariff methodology. Thus, the DH companies have a strong incentive to keep monthly tariff adjustments in line with the methodology.

The long-term tariffs are set based on recent historical costs to produce and provide the heat and collect the fees from consumers. Effectively, all the costs are summed and then divided by the planned heat sales to develop the heat tariff per gigajoule (GJ). The *Methodology for Setting the Prices for Heat* defines all the allowed (or necessary) costs that can be included in the tariffs. They include fuel, electricity, water, ash removal and other costs that are directly linked with heat production and distribution, as well as depreciation of assets and repair costs, salaries, taxes, bank charges, administrative expenses and other costs associated with the operation of the company.

The annual adjustments that municipalities approve address both changes in fixed and variable costs and focus on changes with respect to the approved long-term tariff. For example, major new investments need additional approvals. In all cases, investments must be preapproved by two separate procedures before they are included in the tariffs: first, the investment project needs approval by the municipal council and the regulator; and second, the investment program amendment needs approval. However, changes in the cost of fuel or administrative costs could be approved annually by the municipality. NERC also has the opportunity to overrule such changes. All investment projects with a value of 3,000 EUR or greater go through an individual approval process.

⁴⁴ Source: Bæk M. (2015). Regulation and planning of district heating in Denmark. Danish Energy Agency, https://ens.dk/sites/ens.dk/files/Globalcooperation/regulation_and_planning_of_district_heating_in_denmark.pdf.

⁴⁵ The Energy Board of Appeal is an independent board under the Ministry of Environment and Food and is the highest appeals body for decisions made by DUR, the Danish Energy Agency, and municipalities in the energy sector. (Source: <https://naevneneshus.dk/start-din-klage/energiklagenævnet/om-naevnet/>).

Investment projects less than 3,000 EUR in value are approved together with other small projects. An entire investment program (with a long list of projects) is approved under a separate procedure.

As with most DH tariffs, variable costs for fuel are the dominant drivers of tariff costs. Variable costs change monthly. A company bases the monthly price from the annual tariff. Thus, tariffs change quickly when prices change. Companies announce the price by the 25th for the next month. There is a general understanding that the regulator will check every invoice before setting the next long-term tariff, and if there are any discrepancies, the regulator can issue a fee, which is very significant.⁴⁶ Thus, companies do not have an incentive to cheat. Assets created by subsidies are not factored into the calculation of the tariffs.

Transparency and appeals process

From the beginning, the Lithuanian DH regulator strived to be as transparent as possible. In Lithuania, confidential data is not allowed with respect to tariffs. Tariff applications that companies submit, rejections of these applications, letters from the regulator to a company, responses and arguments can all be accessed online. Although the level of what is reported has changed over the years, at a minimum, regulators issue a letter on the justification of the methodology used. However, the online repository for this data is not very user-friendly. A user needs to know where and how to search for the data.

When there are disputes related to DH tariffs, the courts are the arbiter. However, NERC handles some appeals. A DH company can apply to NERC for pre-trial procedures which are faster.

POLAND

Tariff setting and review process

DH companies regulated by URE are required to prepare their tariff proposals in accordance with the principles set out in the *Energy Law* of 1997 and secondary regulation on DH tariffs and submit them to URE for approval. According to the *Energy Law*, heat tariffs should include reasonable costs for generation, transmission and distribution or trade of heat, as well as the costs of modernization, development, and environmental protection. They should also ensure the protection of consumers' interests against unjustified tariff levels⁴⁷. The president of URE must respond within 30 days with approval, rejection, or requests for further clarification. In practice, approval usually takes much longer than 30 days while the regulator works with the DH company to clarify specific questions to ensure the tariff meets the rules. The average time varies between three and six months, so companies usually initiate their tariff proposals well in advance. Final decisions on heat tariffs are published in the local official newspapers and on URE's website. They do not typically provide detailed explanations for decisions.

Heat tariffs set for licensees by URE are valid for one year.⁴⁸ Heat tariffs are based on the amounts planned for the first year of the tariff application.

⁴⁶ The penalty can be up to 10% annual turnover.

⁴⁷ Article 45 of the Energy Law <http://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=wdu19970540348>.

⁴⁸ Here is an example of URE's tariff approval for Krakow with instructions how to appeal this decision <https://www.mpec.krakow.pl/files/dokumenty/DVzWyAXIsa.pdf>.

Changes in energy prices do not trigger automatic tariff adjustments. If a company needs to adjust the tariff, it can submit an application to URE. Usually, URE approves a tariff adjustment application within a month. Domestic coal dominates the energy mix for the DH sector. Unlike in many other countries where natural gas is the dominant fuel, in Poland coal plays the most significant role, accounting for 73% of the energy mix. Natural gas provides only 9% of energy in the DH sector.⁴⁹ Quite often, coal is the primary fuel, and natural gas is used to cover peak demand.

Transparency and appeals process

URE publishes all decisions on heat tariff approval on its website. At the same time, district heating companies publish URE's decisions on their websites along with additional explanations. As noted above, heat tariffs for small DH systems (below 5 MW) are calculated and set by the DH companies themselves, following the regulation.

When a DH company believes that the decision of the President of URE to reject a tariff application was unjustified, it may appeal the decision to the Court of Competition and Consumer Protection.⁵⁰ In parallel to the legal process, the company can submit a new tariff application to URE.

Polish DH companies have built their capacity to calculate heat tariffs. The role of the regulator in building capacity of the DH companies was quite significant in the early 2000's when URE regulated more than half of the DH companies in the country. DH companies also benefited from cooperation with international partners and investors, mostly from Germany.

URE has also built its own capacity by creating the Tariff Commission in URE's Central Office, which for several years was approving the tariff cases submitted by the regional branches. In this way, URE checked the work of the regional branches until the capacity of the local branches was improved. In the initial few years of its operations in the 1990's, URE received considerable assistance from USAID programs. Some help was also provided by various EU pre-accession assistance programs. Since the early 2000's, URE has relied on self-training and has occasionally hired local consultants.

⁴⁹ Energetyka ciepła w liczbach – 2018.

<https://www.ure.gov.pl/download/9/10380/Energetykacieplnawliczbach-2018.pdf>.

⁵⁰ URE includes information on the appeal process in the decision document. See, for example http://www.kos-eko.pl/index.php?option=com_attachments&task=download&id=152.

7. LEGAL BASIS AND INSTITUTIONAL SET-UP IN UKRAINE

Information provided in this section is valid as of March 2021.

The following sections provide an overview of the tariff setting and regulatory system in Ukraine. International experiences can provide best practices, but these must be assessed in the context of the current situation in Ukraine to provide recommendations on what might be possible. Particular challenges to be addressed in Ukraine when considering how to implement tariff reform include the two parallel systems of tariff regulation, lack of cost coverage in most DH tariffs, liberalization of the gas market, and lack of investments and maintenance of DH systems, which causes deteriorating service quality and customer disconnections. Detailed information on these topics is provided here, following the same topic structure as the international case studies: the legal basis and institutional structure, tariff methodologies, and processes for tariff calculation and approvals.



EVOLUTION OF THE REGULATORY SYSTEM

After the collapse of the Soviet Union, the regulation of the DH sector in Ukraine was performed by the Government and Minregion⁵¹, which in particular developed and adopted the rules and procedures for tariff setting for all DH companies (including heat produced by CHP (combined heat and power)). Approval of the tariffs (i.e. application of these rules and procedures) were carried out by local authorities.

In 2011, the specialized National Commission for State Regulation of Utility Services was established. In 2014, the National Commission for Regulation of Utility Services and the National Commission for Energy Regulation merged into the single authority, the National Energy and Utilities Regulation Commission (NEURC).

Before 2017, NEURC regulated more than 200 of the largest DH companies (with annual heat production over 20,000 Gcal per year) – it issued licenses, adopted the tariff rules and procedures and approved tariffs for these companies, which cumulatively accounted for more than 90% of DH supply in the country. Over 1,000 of small DH companies providing less than 5% of supply remained under the “old” regulatory system and were licensed by Oblast State Administrations (OSAs). They received tariffs approvals from local governments under the rules and procedures developed by Minregion.

Figure 2. Current criteria for licensing authority

Criteria	OSA licensee	NEURC licensee
 I Annual production volume	Less than 170 thousands Gcal	More than 170 thousands Gcal
	<i>and/or</i>	<i>and</i>
 II Commercial metering level (building meters)	Less than 90%	More than 90%
	1 400+ DH companies ~50% of the supply	26 DH companies ~50% of the supply

Source: NEURC Resolution #308 dated 22.03.2017, Tetra Tech analysis.

⁵¹ Official name of the ministry changed several times.

In 2018 NEURC updated the criteria determining under which regulatory system DH companies belong to. The annual heat production threshold was increased to 170,000 Gcal and a new rule was added: at least 90% of the consumption had to be commercially metered. NEURC would no longer license companies that failed to meet these two criteria. As a result, 80% of the companies switched back from NEURC to the “old” regulatory system. This includes Kyivteploenergo, the largest DH supplier in the country, which does not fulfil the metering criteria.

LEGAL FRAMEWORK

Several laws create the foundation of the legal framework for DH tariffs in Ukraine, including the laws “On heat supply”, “On NEURC”, “On housing and utility services”, “On state regulation of utility services” and “On self-government” (see more details in Annex 2). The powers these laws provide to different institutions are summarized in the table below:

Table 5. DH licensing and tariff regulation powers of various institutions

POWERS	INSTITUTIONS	
	FOR NEURC LICENSEES	FOR OSA LICENSEES
Adoption of licensing criteria for DH companies and defining rules for determining licensing authority	NEURC (provided by law «On NEURC»)	
Adoption of tariff rules and procedures	NEURC (Law “On heat supply”, “On NEURC”, “On state regulation of utility services”)	CMU/Minregion ⁵² (Law “On heat supply”, “On housing and utility services”)
License issuance	NEURC (Law “On heat supply”)	Oblast state administration (Law “On heat supply”)
Approval of the tariff and investment program	NEURC (Law “On heat supply”, “On NEURC”, “On state regulation of utility services”)	Local government (Law “On heat supply”, “On housing and utility services”, “On self-government”)
Tariffs control and auditing	NEURC (Law “On NEURC”)	Local government (CMUR #869 dated 01.06.2011)

As clearly seen, the legal framework creates two systems for tariff setting (where NEURC decides who it governs):

- one system where NEURC both adopts the methodologies (i.e. rules and procedures) and approves the tariffs;
- an alternate system where CMU/Minregion adopts alternative methodologies and local authorities set tariffs.

⁵² The rules and procedures are adopted by CMU but developed and submitted for adoption by Minregion

However, licensing and tariff setting for heat produced at CHPs (regardless of other conditions) is always done by NEURC, so many DH companies (for instance, Kyivteploenergo) effectively have two different regulators operating with different rules depending on how the heat is produced.

PROFILES OF KEY INSTITUTIONS

NEURC has 7 members or regulators, according to the law “On NEURC”, including the Head of NEURC. Each member is responsible for specific regulatory areas. NEURC is funded through licensing fees; in 2019, its budget was UAH 450 million.

NEURC has a central office (482 employees), and 24 local offices⁵³ (118 employees). The DH Department consists of 71 employees, of which 17 are in the DH tariffs sub-department. On the other hand, the Electricity Department is responsible for CHP-based heat production tariffs; the Electricity Department has 52 employees, 14 of whom work in the Electricity Prices and Tariffs Sub-department).

The main functions of NEURC in the DH sector include:

- Setting the licensing criteria for DH companies
- Licensing DH companies
- Developing tariff methodologies (for heat production, transportation and supply)
- Setting the heat tariffs for all types of customers
- Monitoring and auditing the tariffs of NEURC licensees.

The Ministry for Communities and Territories Development (Minregion) was established in 2010, and as a ministry, it reports to the Cabinet of Ministers. The ministry employs 383 employees. The department responsible for DH tariffs legislation is the Economic Department, with 20 employees. This department is also responsible for developing tariffs regulations for other utilities services (water supply and sewage, housing management, waste management services).

The main functions of Minregion in DH sector are:

- Developing and implementing national policy in the DH sector (developing tariff methodologies, tariff setting procedures and other documents for OSA licensees)
- Coordinating with local authorities

Oblast State Administration (OSA) is established in each oblast and in city of Kyiv. OSA is a local body of state executive authority; Head of OSA is appointed by the President. OSA has a wide range of responsibilities, but in DH sector they are limited to licensing of DH companies.

⁵³ Local offices are responsible for calculation and verification of membership fees, acceptance of licensees reports, ex post control (scheduled and unscheduled) of licensees, etc.

Each OSA may have different organizational structure, different number of employees responsible for utility services regulation and different capacity. Usually, DH licensing is performed by Utilities department. OSAs also approve fuel consumption norms, which are important element in tariffs calculation.

Local government (LG) is the elected body, that establishes executive bodies to perform its functions. Local authorities may have different institutional capacity, budget, etc., depending on the city. Usually, DH tariffs are managed by Economic Department of local self-governance. Functions of local self-governance in DH sector are:

- Approval of investment programs for both OSA and NEURC licensees,
- Setting the tariffs for OSA licensees,
- Control and auditing tariffs for OSA licensees,
- Pre-approval for tariffs for NEURC licensees.

TARIFF METHODOLOGIES

REVIEW OF TARIFF SETTING METHODOLOGIES FOR NEURC AND OSA LICENSEES

The Ukrainian current tariff regulation system is based on the cost-plus methodology. According to the law “On heat supply”, DH tariffs have to cover all operational and capital expenditures (tariffs shall cover all economically justified expenditures) and ensure required level of profitability.

In Ukraine, there are two tariff systems (both are based on cost-plus principles though they are overseen by different regulatory authorities):

- For OSA licensees, the tariff methodology for heat and hot water supply services is developed by Minregion and approved by CMU (CMU Resolution #869 dated 01.06.2011);
- For NEURC licensees, the tariff methodology is developed and approved by NEURC (methodology for heat tariffs set by NEURC Resolution #1174 dated 25.04.2019, and methodology for hot water supply services set by NEURC Resolution #767 dated 08.04.2020).

In the following sections, we will describe the methodologies and emphasize key differences among them.

KEY ELEMENTS AND CALCULATION ALGORITHM OF DH TARIFFS

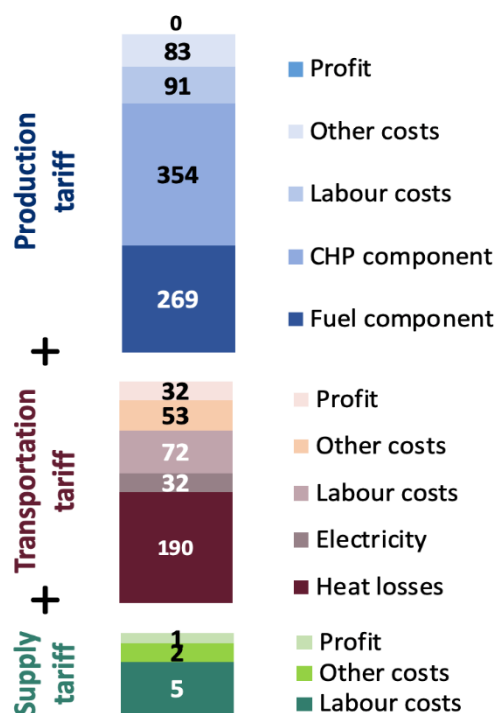
The final DH tariff for end-users (tariff for thermal energy according to Ukrainian legislation) consists of three components (for both OSA and NEURC licensees):

- Production tariff;
- Transportation tariff;
- Supply tariff.

The production tariff has the largest share and usually accounts for 60-80% of the final tariff. The main components of production tariff are energy related, including the fuel component, CHP component and/or costs for purchased heat (more detailed on production tariffs for heat produced by CHP and by alternative sources see Section “Tariffs for heat from CHP and RES”). However, their share has declined for the last several years due to decrease of energy prices.

The transportation tariff largely depends on the production tariff, as nearly half of the transportation tariff is heat losses in the network.

Figure 3. Kyivteploenergo DH final tariff for residential customers w/o IHS, UAH/Gcal (w/o VAT)



Final DH price 1 183 UAH

Source: data of Kyivteploenergo

Heat losses cost (eligible for coverage by the tariff) are calculated by multiplying normative heat losses⁵⁴ (in Gcal) by production tariff (in UAH/Gcal). Actual heat losses in network are not the same as normative, and sometimes are significantly higher (sometimes twice higher) and is one of the key sources of financial losses of DH companies.

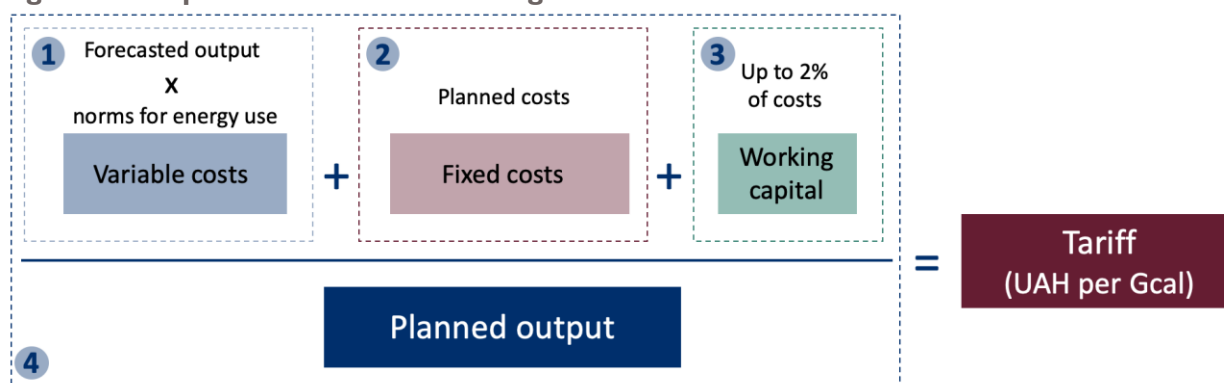
The supply tariff is usually the smallest part of the final DH tariff. However, for buildings with IHS serviced by DH companies, it may account up to 10% but the heat consumption is much lower due to better regulation.

Operational expenditures are included in the tariff based on planned DH expenditures for the next year (for example, labor, administrative expenditures, etc.) or based on approved norms (for example, fuel use, heat losses in network, etc.), but still cannot be higher than actual expenditures (if actual expenditures are lower than envisaged by tariffs, the next tariffs are decreased to account for this difference).

⁵⁴ Normative heat losses are calculated according to the industry methodologies based on parameters of company’s network (length, diameter, etc) and equipment

Capital expenditures are covered by depreciation (part of other cost in Figure 4) and profit components. Capital expenditures should align with approved investment program for 1 year.

Figure 4. Simplified tariff calculation algorithm for 1-tier tariff



Source: Tetra Tech analysis

Tariff calculation algorithm (for 1-tier tariff) could be divided into 4 key stages:

1. variable costs are calculated by multiplying forecasted heat output by approved norms/standards for energy/water/etc. use;
2. all planned fixed costs (including administrative costs, maintenance, capital expenditures, etc.) of the DH company for the next year are added to the variable costs;
3. working capital costs could be included in the tariff, but cannot exceed 2% of all variable and fixed costs
4. all planned costs are divided by the planned output for the next year.

It is worth noting, that in many cases, planned output is materially higher than factual leading to under-coverage of all fixed costs under 1-tier tariffs approach. This is one of the key sources of DH companies' financial losses. Also use of 1-tier tariffs leads to lack of incentives for DH companies to improve efficiency (i.e. decrease thermal energy output).

DIFFERENTIATION OF FINAL DH TARIFFS (HEAT TARIFF)

Tariffs could be differentiated by tiers, by customers and by technological model.

1-tier and 2-tier tariffs

Both tariff methodologies (for OSA and NEURC licensees) allow for 1-tier or 2-tier tariffs. For 1-tier tariffs, the customer bill is proportional to consumption volume. For 2-tier tariffs, customers pay variable part of the tariff for consumed DH services and fixed part, which does not depend on consumption and is calculated based on the heat load (the fixed part is the same each month).

The choice between 1-tier or 2-tier tariffs is made by DH companies subject to approval by local government. As of June 2020, 5 NEURC licensees applied 2-tier tariffs, and 17 licensees applied 1-tier tariffs (there is no consolidated information available on application of 1-tier and 2-tier tariffs by OSA licensees).

Differentiation by customer

Both tariff methodologies (for OSA and NEURC licensees) and tariff methodology for heat produced by CHP or alternative energy prescribe differentiation of production tariff (part of final DH price) for the following customer types:

- Residential customers;
- Budgetary institutions;
- Religious institutions;
- Other.

Therefore, different types of customers have different final user tariffs even if they are served by the same DH company.

Differentiation by technological model

Transportation and supply tariffs are differentiated by technological model:

- The transportation tariff (for both OSA and NEURC licensees) may or may not include cost related central heating substation (CHS);
- The supply tariff (for OSA licensees only) may or may not include cost related to individual heating substation (IHS).

In other words, there are 3 options for the final DH tariff (for the same customer type) depending on the technological model:

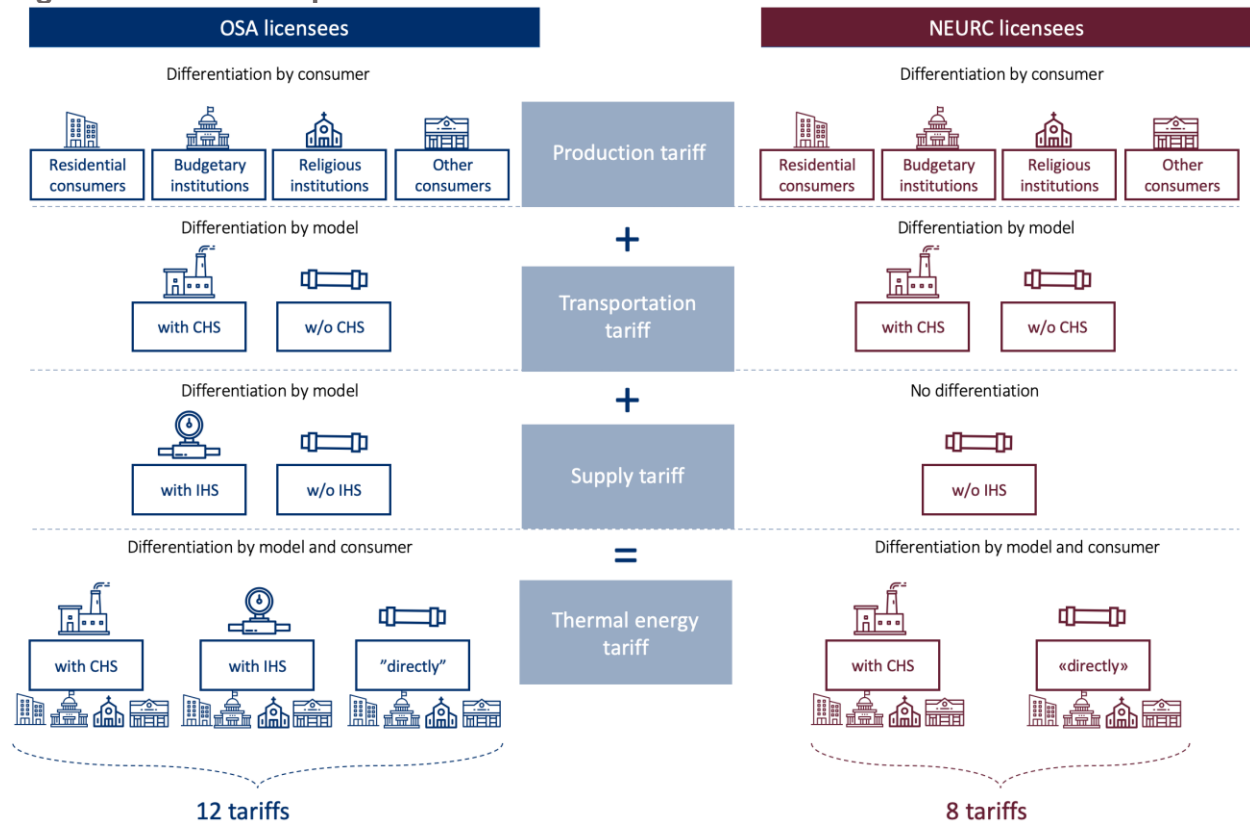
- With CHS costs;
- With IHS costs (only for OSA licensees);
- Without CHS or IHS costs (customers connected to the network without CHS or IHS).

Tariffs for heat produced by an autonomous heating system⁵⁵ (AHS) is calculated for each AHS separately.

Figure 5 presents a composite picture of all the possible DH tariffs options for OSA and NEURC licensees.

⁵⁵ Heat generation is located near the consumption and is not connected to the DH network (transportation tariff does not apply).

Figure 5. Matrix of all possible DH tariffs for OSA and NEURC licensees*



*all these tariffs could be 1-tier or 2-tier tariffs

**this figure does not show possible tariffs for heat produced by an AHS

Source: Tetra Tech analysis

Hot water supply (HWS) tariffs

HWS tariffs have the same differentiation as a heat tariffs, as heat is the main component of the HWS tariff (cold water cost also included to the tariff). Law “On housing and utility services” has the norm, that separate tariff should be calculated for each multifamily building with IHS serviced by DH company.

IMPLEMENTATION OF INCENTIVE-BASED TARIFFS (CURRENT STATUS)

The process of implementing incentive-based methodology for heat transportation started in Ukraine in 2012 by amendments to the law “On natural monopolies”. However, as of November 2020, no DH company has applied for incentive-based tariffs.

In 2017, NEURC approved Resolution #967 dated 27.07.2017 “The methodology for DH transportation tariff calculation based on incentive-based principles” and other legislative acts, required to approve incentive-based tariffs (for transportation only) for NEURC licensees. There is no required legislation to approve incentive-based tariffs for OSA licensees.

To switch to incentive-based regulation, DH companies must re-evaluate their assets according to the State Property Fund of Ukraine (SPFU) methodology (SPFU Order #293 dated 12.03.2013

№293). However, this methodology needs further improvement to take into account specifics of the DH sector and currently is the key bottleneck for application of incentive-based tariffs.

TARIFFS FOR HEAT FROM CHP AND RES

Tariffs for the heat produced by CHP and/or by alternative sources⁵⁶ are calculated and approved separately. These tariffs, thereafter, are accounted for in the total production tariff for DH company.

For example, Kyivteploenergo, the largest DH company of Ukraine, produces heat with boilers, CHPs, and the waste-to-energy plant. So, in order to calculate production tariffs, the company first must have approved tariffs for heat generated by CHPs and the waste-to-energy plant.

CHP tariffs for all DH companies (even if they are OSA licensees) are approved by NEURC. CHP costs for production are divided between electricity and heat.

Tariffs for heat produced by alternative sources are approved by local authorities for all DH companies. Tariffs are calculated as 90% of the average heat tariff in the region.

⁵⁶ Renewable energy sources, in particular - solar, wind, geothermal, hydrothermal, aerothermal, wave and tidal energy, hydropower, biomass energy, gas from organic waste, gas from sewage treatment plants, biogas, etc.

PROCESSES FOR TARIFF CALCULATIONS AND APPROVALS

REVIEW OF TARIFF SETTING PROCESS FOR NEURC AND LOCAL AUTHORITIES' LICENSEES

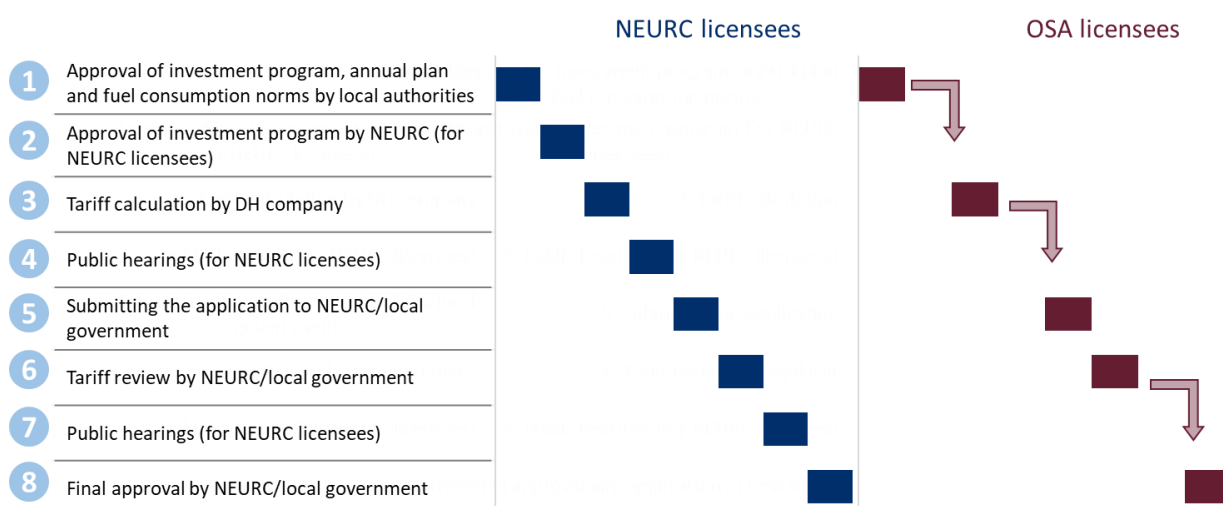
Tariff setting procedures for OSA and NEURC licensees are based on the same principles and are quite similar. However, for NEURC licensees, the process is more complicated, as some of the decisions have to be approved both by the local government and NEURC.

In the following sections, we will describe the tariff setting process.

KEY STAGES OF TARIFF SETTING PROCEDURE

The minimum time required for approving tariffs after the DH company's submission of the initial application is nearly 50 days for NEURC licensees and nearly 30 days for OSA licensees. But, in fact, the tariff setting process starts much earlier as some crucial elements for tariffs calculation shall be developed and approved.

Figure 6. Tariff setting procedure for NEURC and OSA licensees



Source: Tetra Tech analysis

Approval of annual investment program, annual plan and fuel consumption norms

The DH company's annual investment program, annual plan and fuel consumption norms have to be approved before tariff calculation and submitting an application for tariff setting to regulator. Annual investment program defines the amount of investment component in the tariff. Annual plan defines the planned output, planned losses in the network and other planned operational performance indicators. For all licensees, approval of investment program and annual plan is carried out by local government, but for NEURC licensees, investment program also has to be approved by NEURC afterwards.

Fuel consumption norms are very important for the calculation of planned operational expenditures (fuel is the largest cost component) and are approved separately by OSA for all DH companies.

Tariff calculation, public hearings (for NEURC licensees) and submitting an application

After approval of DH company's investment program and annual plan, the DH company calculates all planned costs (both operational and investment) for the next year and divides them by planned output volume (according to approved annual plan). After tariffs are calculated, NEURC licensees have to carry out public hearings for 14-20 days. There is no such requirement for OSA licensees.

According to the legislation, OSA licensees must submit application to set tariffs to local governments before June 1st and NEURC licensees must submit application before April 1st.

Tariffs review, public hearings (for NEURC licensees only)

NEURC has 30 days to review submitted application by DH company. There is no such deadline for local governments to review applications.

For NEURC licensees, tariff setting procedure requires public hearings regarding setting or amendments to the tariff. The public hearings are held with the obligatory involvement of local governments and lasts for at least 12 days. Local government shall pre-approve draft tariffs before NEURC approves them. If during the tariffs review some factors have led to an increase of the draft tariffs, the procedure of holding public hearings must be repeated.

Both regulators (NEURC and local government) can suspend the tariff review process for an undefined period, if there are doubts regarding correctness of the calculation or supporting documents.

Final approval and application of new tariffs

When approving the tariffs, NEURC sets the date when the tariffs come into force.

For OSA licensees, new tariffs come into force since October 1st. DH companies must inform customers about the new tariffs at least 20 days before the date tariffs come into force (i.e. before September 11th).

SETTING THE TARIFFS FOR CHPS AND RES

Tariffs for heat, produced by CHPs are set by NEURC for all DH companies. To set tariffs, DH companies has to submit application and supporting documents to NEURC 90 days before setting the tariff.

Tariffs for heat produced by renewables are set as 90% of the company's heat tariff for heat produced from gas. If there is no such tariff, heat tariff produced by renewables is set as 90% of region average heat tariff for heat produced from gas.

The updated (or new) tariffs for heat produced by CHP and RES are not incorporated to the final DH tariff automatically, if the final DH is set by local government – they are accounted for only after DH company submit the application to adjust / set the new DH final tariff. If the company is licensed by NEURC, the tariff for heat produced by CHP and the final tariff could be updated simultaneously.

FREQUENCY OF TARIFF ADJUSTMENT

Tariffs could be adjusted any time during the year:

- For NEURC licensees – tariff adjustments could be initiated either by DH company or NEURC if there are justifications for the tariffs to be changed by more than 2%;
- For OSA licensees – tariff adjustment could be initiated by DH company if some of tariff components, which it does not control (such as taxes, minimal salary, fuel price, etc.), changes.

Tariffs for heat produced by CHPs could be adjusted both at the initiative of DH company and at the initiative of NEURC. The usual period of tariff adjustment is nearly 1,5 months

Both methodologies (for NEURC and OSA licensees) provide the opportunity to include a separate component compensating for losses incurred if some of cost (e.g. gas price) were not fully covered by the previous tariffs. However, for OSA licensees this component can cover losses only for the period since the company applied for new tariffs till the new tariffs entered into force; for NEURC licensees, it can cover entire period during which the previous tariffs were valid.

REFLECTION OF FUEL PRICES CHANGES IN DH TARIFFS

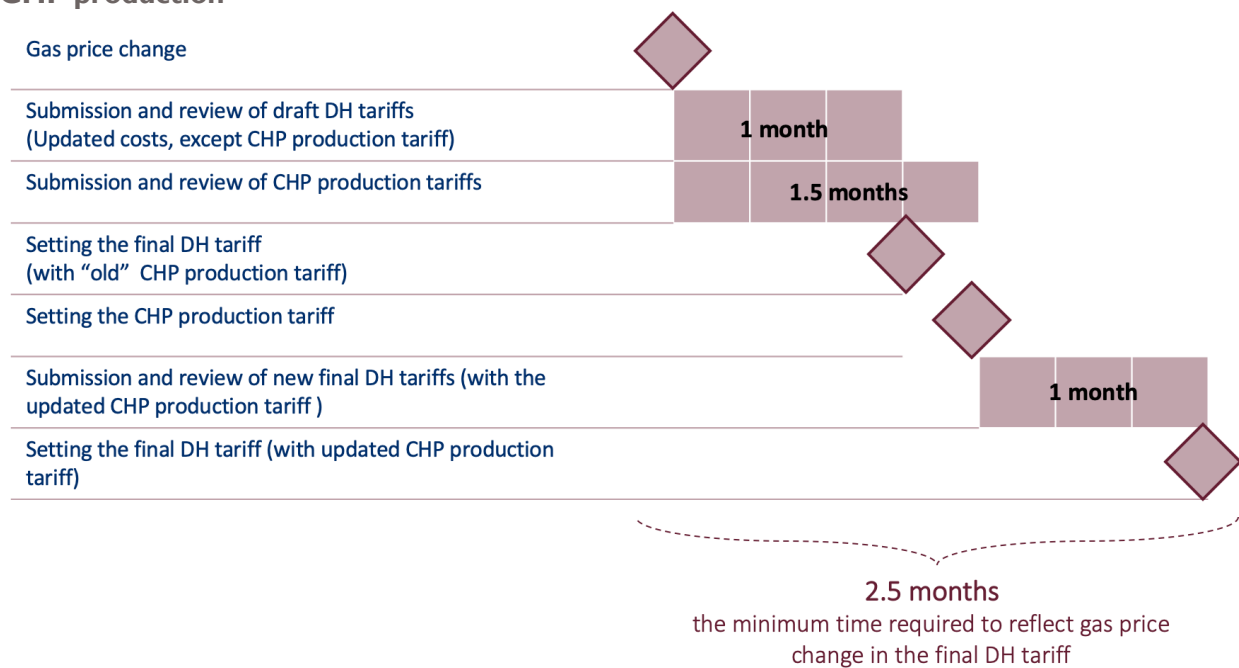
The gas price for DH companies is still regulated by the government via the public service obligation (PSO) imposed on state owned Naftogaz group (the largest gas producer and wholesaler in Ukraine). Until 2019, PSO price was set on a long period (at least half a year), so there were no issues to incorporate PSO gas price in DH tariffs. Since May 2019, PSO gas price is changed every month (calculated based on TTF (Title Transfer Facility – a trading point for natural gas in the Netherlands) gas prices). According to the existing legislation gas PSO for DH companies shall be fully ceased in May 2021 – each DH company would need to procure gas on open market without state intervention on prices or payment terms (gas prices would be different for different utilities and may significantly fluctuate).

Current tariff setting methodologies don't provide for any specific simplified tariff adjustment procedure for fuel component change. The general tariff adjustment procedure (even if DH company calculates and submits new tariffs for approval each month) cannot ensure timely incorporation of changing gas prices.

There are additional challenges for DH companies, that produce thermal energy on CHPs (tariff set by NEURC) and are licensed by OSA. In such case, in order to reflect changes in gas price in the final tariff, the company must pass relevant procedures with both NEURC and local government:

- Firstly, tariff for thermal energy, produced by CHP, should be adjusted (tariff setting procedure is nearly 3 months, tariff adjustment procedure is nearly 1,5 months);
- After this, DH company has to recalculate final DH tariffs and submit the relevant application for tariff setting to regulator (local government). The normative term for tariff adjustment procedure is nearly 1 month for OSA licensees.

Figure 7. Time required to fully reflect new cost component for OSA licensees that has CHP production



Source: Tetra Tech analysis

TRANSPARENCY AND APPEALS

Both tariff setting procedures (for OSA and NEURC licensees) envisage stages, aimed at informing and involving public to the tariff setting process.

For OSA licensees, tariff setting (and adjustment) procedure provide procedure for informing customers about the intention to change tariffs (at least 20 days before the tariffs set). Information should be provided via:

- Its own website;
- Local government`s website;
- Local print media;
- DH company`s informational posters;
- Local government`s informational posters.

Based on this information customer can submit suggestions (appeals) regarding draft tariffs during at least 7 days and no more than 14 days since the notification on the intention to change / set tariffs. For such suggestions (if filed properly) the reasonable response shall be provided by DH company.

For NEURC licensees, the tariff setting procedure incorporates public discussion (public hearings) regarding the need to set or adjust tariffs. The public hearing is held with the obligatory involvement of local government and lasts for at least 12 days. Customers can submit suggestions (appeals) regarding draft tariffs during the public hearings. For such suggestions (if filed properly) the reasonable response shall be provided by DH company.

However, in both cases customers are not provided with the necessary information in order to formulate a justified appeal. The key principle of tariff calculation embedded into the law is that tariffs need to cover all economically justified expenditures. In order to challenge this (and verify correctness of tariff calculation), one needs to have quite detailed information about DH companies cost profile and corresponding tariff calculation, which are not disclosed (publicly available information is consolidated and little analysis can be performed). Therefore, customer appeals usually are based on social or other arguments rather than correctness of applied methodology.

During tariffs review process DH companies discuss and defend with the regulator proposed tariffs calculation and can address all questions and inquires the regulator might have (including provision of additional justification). There is no separate formalized appeal procedure, which utilities might use in case they do not agree with the decision of the regulator (NEURC or local government). However, decisions by the regulator can be challenged by customers or DH company in court.

8. RECOMMENDATIONS AND CONCLUSIONS

This section provides recommended actions for Ukraine to reform the tariff regulatory system. The recommendations were developed considering the specific system in Ukraine and current barriers to effective tariff regulation, as well as linkages with priority areas for comprehensive DH reform. Where relevant, we also provide examples from international experience to highlight how other countries have addressed these issues in line with the recommended actions.

1. Develop a clear policy and a single and consistent set of rules/regulations for approving tariffs, avoiding duplicative regulatory procedures. The institution that sets the tariff should have strong regulatory capacity and experience. The decision on the regulator should be consistent nationally and any thresholds set for small systems ideally should be set by the Cabinet of Ministers, not regulators.

RECOMMENDATIONS FOR UKRAINE	INTERNATIONAL EXPERIENCE
<ul style="list-style-type: none"> • A single system of licensing and setting tariffs should be developed and approved at the central level. One single state body (NEURC or Minregion) should be responsible for developing tariff setting rules and methodologies. Institutions responsible for enforcing the rules should be identified based on discussions with key stakeholders and detailed analysis. This should replace the current rule that the regulatory body is determined by the percentage of buildings with heat meters installed. • Clearly define the respective roles and responsibilities of central and local authorities in tariff regulation and investment planning. Consider eliminating the need for DH companies to hold public hearings on potential tariff changes before submitting an application to the regulator. • Remove requirements to differentiate tariffs by category of consumer to simplify tariff setting and avoid cross-subsidies. Also eliminate the requirement to calculate individual tariffs for hot water for buildings with IHS. 	<p>The countries considered here all have one set of regulations that applies to all DH companies; no country has two separate sets of rules for different types of DH companies. In some countries, small DH companies are regulated by municipalities rather than the national regulator, but in such cases the size threshold is clear, and they still need to use methodologies developed by the regulator for tariff calculations. In Poland and Lithuania, the size threshold for national regulation is much lower than it is in Ukraine. Effective tariff-setting methodologies avoid duplicating efforts by different entities or in different steps of the process. Countries usually do not differentiate tariffs by category of consumer.</p>

2. Reform tariffs to cover all economically justified costs and provide incentives for DH system improvements.

RECOMMENDATIONS FOR UKRAINE	INTERNATIONAL EXPERIENCE
<p>Develop a framework for full inclusion of costs in the tariff, including proper and timely reflection of fuel costs and working capital costs (especially crucial in a view of upcoming Public Service Obligation ceasing for DH companies). Enable adjustments to be made; for example, by developing long-term tariffs and adjusting annually or monthly, or by requiring an annual recalculation.</p> <p>If tariff adjustments are not approved in advance by the regulatory body, ensure that changes are later reviewed and there are backstops, such as adjustments in the following period so that the tariff changes adhere to the methodology.</p>	<p>In the countries considered here, tariffs are comprehensive and include all reasonable operating and capital costs. Cross-subsidies are not allowed. Since costs of inputs fluctuate, tariffs are set on an ongoing basis and have mechanisms to facilitate adjustments. For example, Lithuania has several levels of tariff setting: long-term tariffs, which are scrutinized in detail by the regulator before setting (a lengthy procedure); annual tariffs, which are set by municipal councils and confirmed by the regulator (a quick procedure); and monthly tariffs, which are adjusted by DH companies to reflect fuel prices and are not approved by the regulator in advance. However, the underlying costs are later scrutinized, and DH companies are fined if deviations from the allowed methodology are found.</p>

RECOMMENDATIONS FOR UKRAINE	INTERNATIONAL EXPERIENCE
<p>In combination with tariff reform, ensure that subsidies cover the heating needs of the most vulnerable customers.</p> <p>Ukraine should depoliticize the tariff setting process. All heat tariffs should cover all economically justified costs. Political decisions should not be used to change the cost-recovery tariffs.</p>	

3. Build strong capacity for tariff setting, e.g., center of excellence on training and tariff setting questions.

RECOMMENDATIONS FOR UKRAINE	INTERNATIONAL EXPERIENCE
<p>Ensure there is strong capacity for tariff regulation. This includes capacity of the national level to set rules and draft legislation, of institutions that will implement the regulations, and of DH companies. Capacity building on training and tariff setting questions could be facilitated through the DH association, a non-governmental organization, or by establishing a national regulatory center of excellence. These capacity building efforts can be initially supported by international development partners.</p>	<p>Countries have developed tariff setting capacity in different ways, including by organizing trainings and resources through DH associations, creating a national tariff commission to approve tariff cases of regional branches of the regulator, learning from previous regulatory changes for electricity and gas, and hiring consultants. Often after the initial phase, countries later rely on in-house training.</p>

4. Any major changes in the system (regulatory roles, rules) should have some transition period.

RECOMMENDATIONS FOR UKRAINE	INTERNATIONAL EXPERIENCE
<p>Allow for 1-2 years of transition before changing the regulator, to give time to prepare for the heating season and build capacity.</p>	<p>All countries have implemented changes to their regulatory systems over time (e.g. establishing new regulatory entities, changing tariff methodologies and allowable expenses,). In such cases, it is important to allow time for stakeholders to adjust to new procedures. Lithuania allowed for a one-year transition period when the country changed the tariff setting system.</p>

5. Create a transparent and public reporting system for the regulator and DH companies.

RECOMMENDATIONS FOR UKRAINE	INTERNATIONAL EXPERIENCE
<p>Improve a standardized reporting system for all DH companies to transparently report comprehensive information on tariffs to the regulator for approval.</p> <p>To the extent possible, make data publicly available and accessible.</p>	<p>In most countries, there is a standardized system or format for DH companies to report tariff information to the regulator. In Denmark, companies by law must report their costs through an electronic reporting system; they use a standardized heat tariff calculation spreadsheet to report their budgets. In Lithuania, information about regulator tariff decisions, and in some cases records of negotiations, appeals, and public consultations, is often publicly available online.</p>

6. Link policy and regulatory elements so tariffs support investments and system innovation.

RECOMMENDATIONS FOR UKRAINE	INTERNATIONAL EXPERIENCE
Investments in the DH sector should be based on the city's heat supply development schemes, which should ensure efficient use of funds and prioritize investments in the long-term development of DH systems. Investment programs should be long-term with adjustments possible.	In most countries, tariff setting takes into account planned investments under municipal heat development plans. While governments may provide targeted incentives, such as for environmentally friendly technologies, these incentives are small compared to revenue and do not occur regularly.

7. Ensure that each CHP facility maintains a consistent approach for cost allocation.

RECOMMENDATIONS FOR UKRAINE	INTERNATIONAL EXPERIENCE
Establish a clear set of rules for allocating costs at CHPs between power and heat and ensure that heat tariffs adequately cover the heating share of CHP production costs. At the same time, allow for flexibility to adjust to different circumstances; if DH costs become high due to unfair cost-splitting, then DH companies will suffer.	In Poland, CHPs can use the benchmarking method to calculate heat tariffs, although there are no strict rules for splitting the costs between heat and power, and companies must document and stick with their chosen methodology. Lithuania has a methodology for determining which portion of the expenses are included in heat tariffs. Denmark has different rules depending on whether the DH company owns the CHP plant, which typically distinguishes whether the CHP plant is operated to optimize for heat or power.

8. Promote clear communication with consumers and DH companies.

RECOMMENDATIONS FOR UKRAINE	INTERNATIONAL EXPERIENCE
Define clear deadlines for submitting tariff applications and approving investment programs. Have a simple, clear mechanism for informing customers about tariff changes. Implement communication programs with customers and stakeholders to convey the benefits of investing in improvements in DH systems.	Countries generally have standard timelines and procedures for communicating tariff decisions. For example, in Poland, final heat tariffs are published in the newspapers and on URE's website. In Lithuania, there is a monthly deadline for announcing short-term tariff adjustments.

In Ukraine, a barrier to clear and effective tariff regulation is the existence of two parallel sets of regulatory requirements. Efficient regulation could be achieved by introducing a single system of rules and procedures for licensing and tariff setting, with a clear division of regulatory responsibilities between levels of government. The consolidated regulatory rules should be developed by the institution with the greatest capacity and regulatory experience based on data and evidence. The rules should be developed and approved at the central level, while the implementation of the rules could be carried out by different institutions. Among the case studies of European countries considered here, there are varied practices for which institutions approve or set heat tariffs, but all follow a single set of regulations for tariffs set at the central level.

In most Ukrainian cities, DH tariffs do not fully cover the operating and capital expenses of DH companies, which makes it difficult for DH companies to invest in improvements to DH systems and

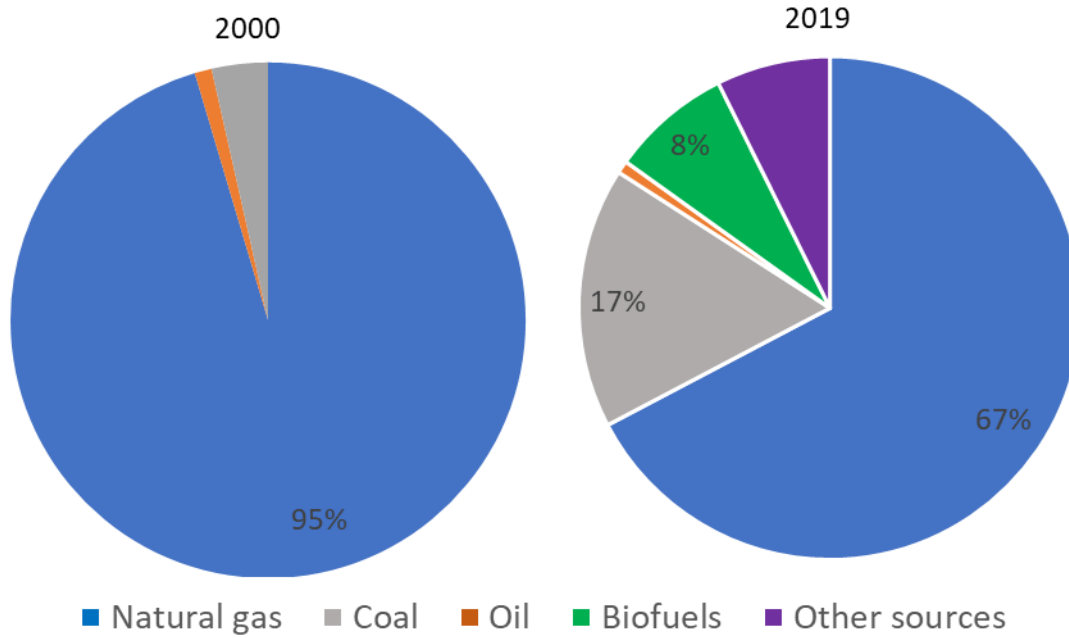
results in inefficiencies. Tariffs should be reformed to cover all economically justified costs and provide incentives for investments in system improvements. European experience offers some examples in this area. In all countries considered in the case studies, allowable costs to be covered in the tariff include costs of producing and distributing heat, as well as fixed costs such as system modernization, depreciation of assets, and repairs. In Denmark, incentive tariffs reward highly efficient systems. Investments in the DH sector should also be based on the city's heat supply development schemes, which should ensure the efficient use of funds and prioritize investments in the long-term development of DH systems. For example, in Lithuania, long-term tariffs are set and approved based on a company's long-term investment plan, which is closely reviewed by the national regulator.

Tariffs should also be able to adjust with changing fuel costs. This could be addressed in several ways, such as considering the price of energy as a separate component of the tariff, a one-time recalculation for consumers at the end of the heating period, or automatic adjustment of tariffs to reflect changing energy prices. The European countries considered here have various methods to reflect actual energy prices in heat tariffs. For example, in Poland DH companies can apply to the regulator to adjust tariffs. In Lithuania, DH companies can adjust tariffs monthly to reflect fuel price changes without approval from the regulator, although the costs are scrutinized later to ensure that the adjustments still follow the methodology. In Czechia, tariffs are recalculated at the end of the year to reflect actual costs and heat sold, and customers either pay or are returned the balance. European experience shows that there are different approaches to ensuring that heat tariffs are cost-reflective and can adjust when needed. This is important to maintain the financial stability of the heating sector, while transparency on tariff adjustments and oversight from the regulatory body are also essential for ensuring reasonable tariffs.

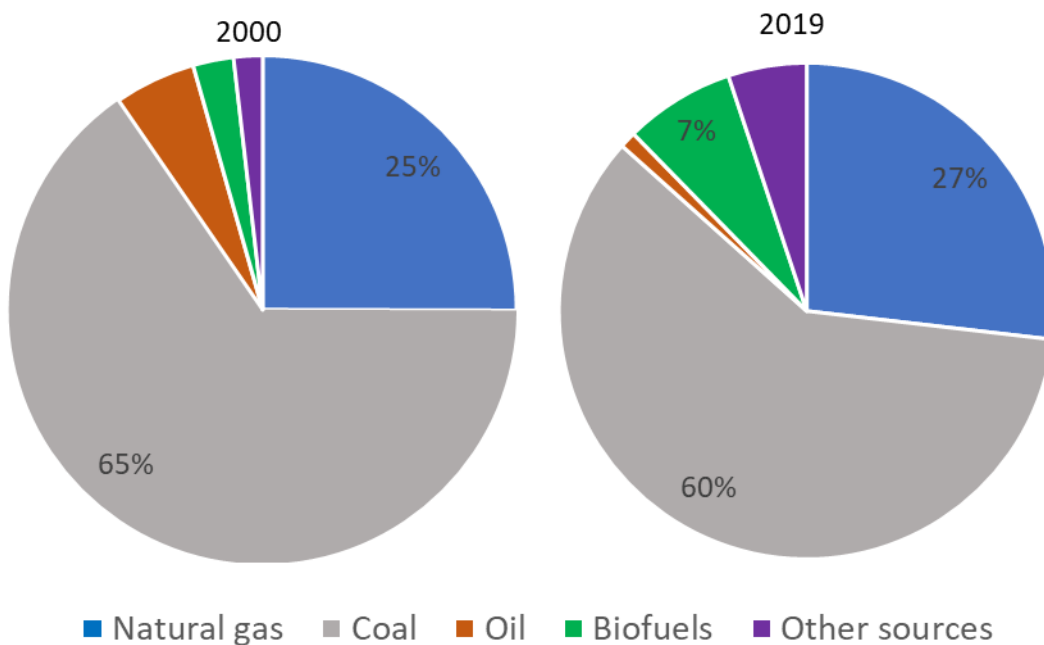
Tariff and regulatory reform make up key elements of a comprehensive reform program for the DH system in Ukraine. Creating a transparent regulatory system with consistent rules is important for stabilizing the DH sector, while allowing full coverage of costs in heat tariffs is crucial to improve its economic sustainability. In addition, it opens the door to more comprehensive modernization to improve service quality, implement climate mitigation policies, and overcome the vicious cycle of problems in the DH system.

ANNEX I. HEAT GENERATION BY SOURCE IN SELECTED COUNTRIES

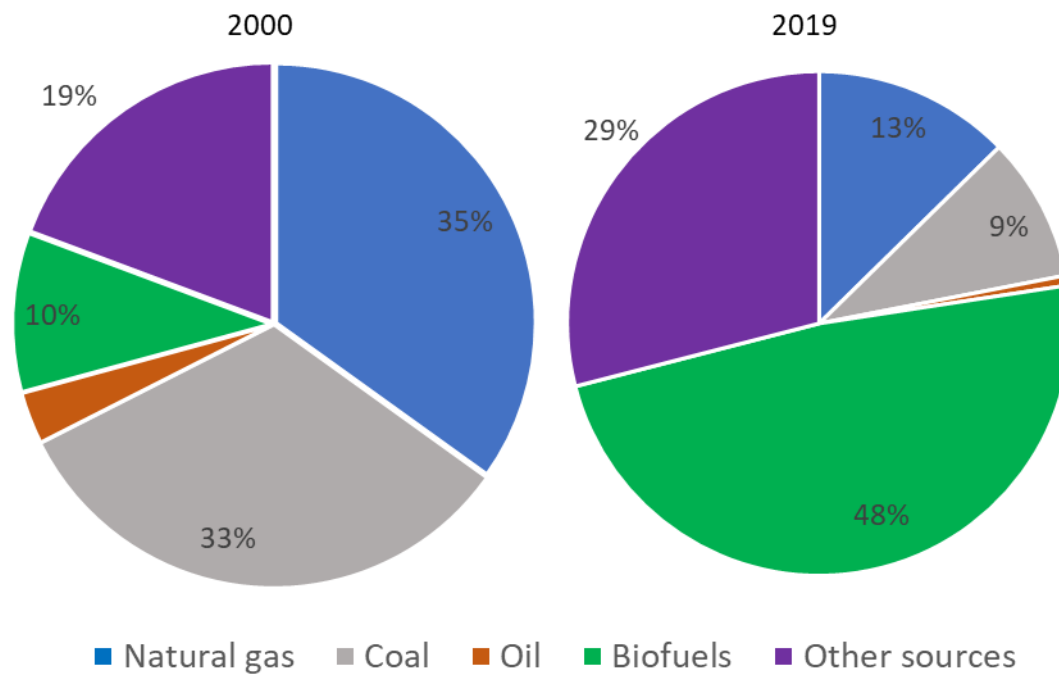
Ukraine



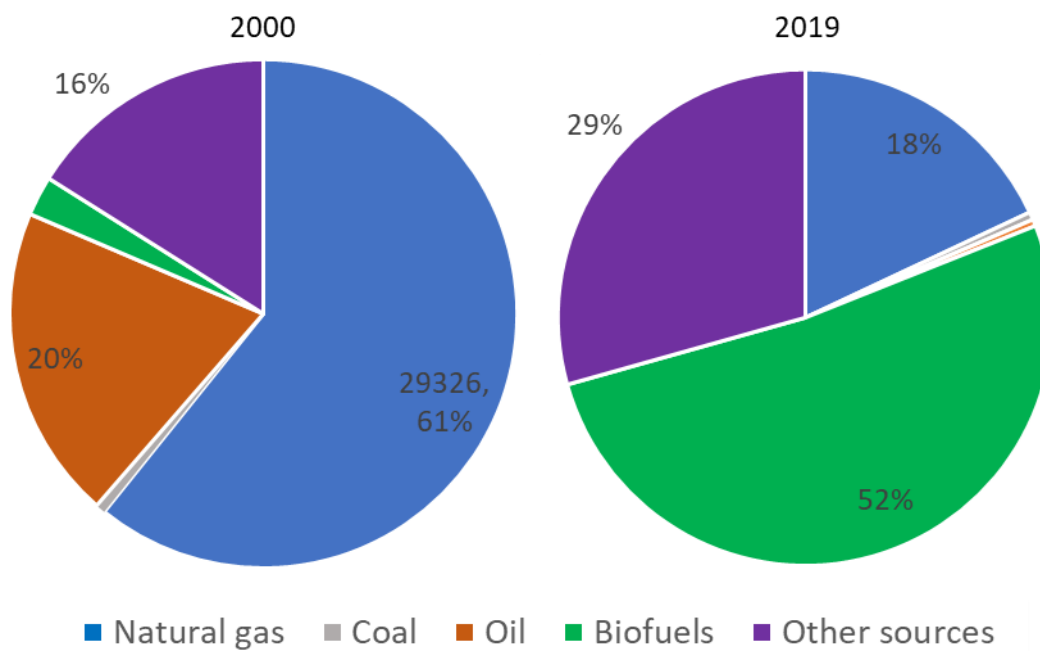
Czechia



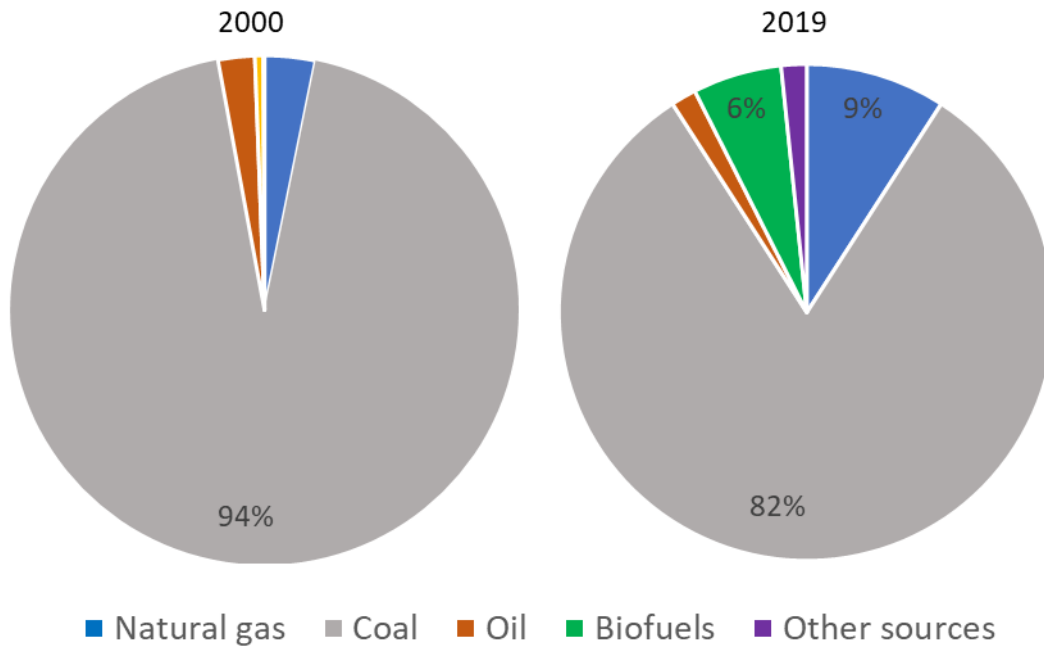
Denmark



Lithuania



Poland



Source: International Energy Agency, 2019. Available at <https://www.iea.org/data-and-statistics?country=UKRAINE&fuel=Electricity%20and%20heat&indicator=HeatGenByFuel> .

ANNEX 2. KEY LAWS AND BYLAWS FOR DH SECTOR IN UKRAINE

