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# Playing Hot and Cold: How Can Russian Heat Policy Find Its Way Toward Energy Efficiency?

V Roshchanka
M Evans

October 2012

Pacific Northwest NATIONAL LABORATORY

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# Executive Summary

The Russian district heating market has a large energy-saving potential, and, therefore, need for investments. The scale of needed investments is significant and reflects decades of underinvestment: about 70 percent of the district heating infrastructure needs replacement or maintenance, as is estimated by the Russian government. Securing the necessary financing will require involving the private industry and creating favorable conditions for private investors. In addition, for private parties to invest in district heating facilities across Russia, and not only in pockets of already successful enterprises, regulators have to develop a comprehensive policy that incorporates cost-reflective tariffs, metering, incentives for efficiency, and social support for the neediest consumers (rather than subsidies for all).

Russia's new legislation on district heating provides a strong basis for improvements in the sector. But many challenges remain to be addressed, especially when it comes to the practicalities of implementing the law.

The biggest challenge for Russia's district heating policy has been the fact that tariff revenue does not cover the full costs of district heating. This has made it hard to modernize or even maintain district heating systems, which has led to growing inefficiency and service disruptions. This financial situation has also made it difficult to attract private investment and management. While tariffs that do not fully reflect costs are a major reason for revenue shortfalls, non-payments, or poor enforcement of payment discipline, is also a contributing factor. Both low tariffs and non-payments also reduce incentives for consumers to save.

The second major challenge is the lack of accurate information on actual consumption, losses, and volume supplied. Introducing metering can help address this; the new law requires metering, and municipalities and district heating companies are working to implement it. Regulators, however, should ensure that metered data are incorporated into billing and planning. When norms and estimates are used, as has been customary in Russia, they often do not reflect the actual situation and fail to send the right signals to consumers and suppliers about their behavior and ability to improve efficiency of consuming or supplying heat. In situations when loss norms are lower than actual losses and metering is absent, losses tend to be passed to consumers and never addressed.

The legislation takes courageous steps in addressing these two basic challenges; this is particularly important as other policy improvements hinge upon success in these areas. In parallel with more completely addressing these challenges, regulators can also continue improving the policy framework for district heating in several ways:

- Ensuring that suppliers have the opportunity to cover their costs through tariffs and can build in necessary replacement costs and investments. Social needs can be better addressed through social support and energy efficiency programs, not broad subsidies.
- Incentivizing efficiency through tariff structures that encourage efficiency and investment, and moving away from cost-plus tariffs. Developing supporting regulation for benchmarking tariffs, for example, may be an effective option, along with broader implementation of other new tariff types that move away from inefficient cost-plus pricing.
- Considering consumer interests by ensuring that the heat service provided is of the highest quality and lowest cost, and least-cost investments are made.

- Separating regulation and ownership/management.
- Ensuring transparency in the regulatory process.
- Balancing supply and demand. This can be done by first improving demand-side efficiency and removing false incentives created by subsidies to more accurately assess demand. Sequentially, supply plans and investment programs need to be created to meet that demand cost-effectively.

Finally, regulators should not forget that district heating policy is closely linked to other sectors of energy, economic performance, and social policy. Thus, district heating policy should be examined in the broader context. Based on the experience in Eastern Europe, the success of district heating reforms relies largely on coordination and sequencing with other policies. For example, Romania experienced a much more difficult transition because of poor coordination between natural gas and district heating tariff reforms than, say, the Czech Republic.

# Acronyms and Abbreviations

| | |
|---|---|
| CENEf | Center for Energy Efficiency |
| CHP | combined heat and power |
| ECE | Economic Commission for Europe |
| Gcal | gigacalories |
| IEA | International Energy Agency |
| Mtoe | million tonnes of oil equivalent |
| MW | megawatts |
| PPP | public-private partnership |
| RUB | Russian ruble |
| TGC | territorial generation companies |
| USD | U.S. dollar |

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# 1.0 The State of District Heating in Russia

The heat sector represents a large segment of Russia's energy demand, accounting for one third of the country's fossil fuel consumption. Improving the sector's efficiency is fundamental to achieving Russia's energy efficiency goals, set by the Russian Federal State Program on Energy Savings and Increasing Energy Efficiency to 2020 (Government of the Russian Federation 2010).

Traditionally, Russia used large Soviet-design central stations that would heat large districts, pushing hot water through many kilometers of distribution pipes. While this inefficient model is being phased out through heat reforms and more modular designs, the district heating sector still has significant energy savings potential and opportunity to reduce costs and improve quality.

Heat policy also has strong economic and social implications since the heating period in Russia lasts up to 10 months, and about 73 percent of the Russian population—92 percent in urban areas and 20 percent in rural areas—depend on Russia's district heating sector, the largest in the world (Korppo and Korobova 2012).

A major challenge of the sector has been artificially low heat tariffs that reduce investment and incentives for efficiency. Heat subsidies have been a large drain on the federal budget historically, and the inefficiency of the sector has been a weight on Russian economic competitiveness. Energy wasted reduces Russia's potential energy export revenue as well. The social challenges of increasing tariffs have been a factor in the inefficiency of the sector. The Russian government recognizes that subsidies and artificially low prices may not help the population if the inefficiency they encourage leads to higher cost. Moreover, as elsewhere, low energy tariffs tend to benefit wealthier segments of the population most because their consumption is highest.

However, largely because of this challenge, the heat sector presents a significant opportunity for energy efficiency (IEA 2011). Whereas the final heat consumption of Russia is estimated at 114 million tonnes of oil equivalent (Mtoe) (2008 data, IEA 2010), the overall energy saving capacity of the heat supply systems in Russia is equal to 31.2 Mtoe (International Finance Corporation and World Bank 2008), or about 12 percent of the global heat consumption (259 Mtoe in 2008 data, IEA 2010). District heating can be an affordable, environmentally friendly heat source when properly managed. In Western Europe, this has proven to be the case because the heating systems use a large share of cogeneration[1] and waste heat, and distribution losses are low (IEA 2004).

## 1.1 Heat Production

In Russia's centralized heating systems, about 55 percent of the heat supply is produced by heat-only boiler plants and 44 percent is produced by cogeneration (see Figure 1.1) (Nekrasov et al. 2011). The number of heat-only boilers has been increasing, which is likely to negatively affect the energy efficiency of the sector.

[1] This paper uses the term cogeneration instead of combined heat and power (CHP); the terms are synonymous.

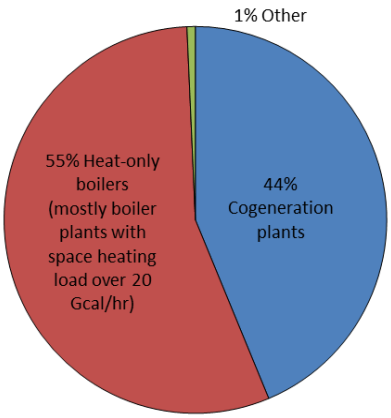


**Figure 1.1**. **Heat Production by Production Type in Russia, 2006** (based on data from Nekrasov et al. 2011)

Fuel sources for heat production are fairly diverse; however, natural gas takes the lead (about 66 percent of all sources). Coal and coal products come in second at 21 percent (see Figure 1.2).

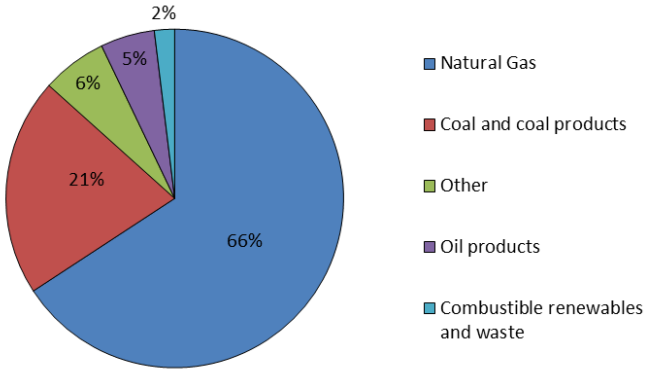


**Figure 1.2**. **Heat Production by Fuel Source in Russia, 2008** (IEA 2010)

## 1.2 Heat Consumption

In Russia, 46 percent of heat sold is consumed by the residential sector, 36 percent is consumed by the industrial sector, 16 percent is consumed by the commercial and public sectors, and 2 percent is consumed by agriculture and forestry (see Figure 1.3) (IEA 2010). Among residential and commercial consumers, most of the heat is consumed in the form of space heating (70 percent), with hot water accounting for the remaining 30 percent (Nekrasov et al. 2011).

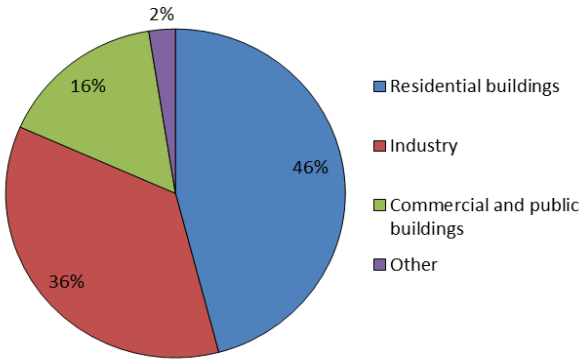


**Figure 1.3. Consumption of Heat Supply by Sector in Russia, 2008** (IEA 2010)

District heating consumption has been declining overall since 1990. Thus, between 1993 and 2007, total final consumption decreased by 54 percent among the industrial consumers, while combined consumption of residential, commercial, and public consumers fell by 33 percent over the same time period (Korppo and Korobova 2012). This trend can be attributed to several factors including industry moving toward onsite boilers that supply industrial needs only[2]; improved building efficiency; and users being driven away by low-quality services. For instance, the International Energy Agency (IEA) reported that in Chelyabinsk more than 660 megawatts (MW) of heat load was disconnected from the district heating system between 1992 and 2002. Industrial customers installed their own boilers, while better-off residential consumers opted for decentralized heating systems (IEA 2011). Such situations usually exacerbate the condition of district heating systems, as heat suppliers are left with fewer and poorer customers, and are unable to recover their costs and bring in investment funds for needed maintenance and modernization.

## 1.3 Losses

The district heating systems in Russia have inefficiency and high losses in production and distribution. This can be largely attributed to the aging infrastructure, but also to limitations of the heat policy and market structure. IEA's *World Energy Outlook 2011* reported that 80 percent of Russian boilers are over 30 years old (20 percent are over 50 years old), and over half of the 200,000-kilometer network of pipelines are past their technical life expectancy. The combination of these factors contributes to increasing inefficiency, losses, and a growing number of accidents.

Given the state of the infrastructure, both production facilities and heat supply networks present a large energy savings potential. The average heat boiler efficiency is reported at 73 percent (ECE 2010a), with some studies citing an average efficiency of 33 percent for older coal plants and 36 percent for older gas-fired plants (Korppo and Korobova 2012). For comparison, production efficiency in district heating systems in Western Europe is estimated to be 85 to 95 percent (IEA 2004).

[2] In the past, industrial enterprises would purchase a larger share of their heat, or they would own the heat-supply plants outright as part of their social support for workers. Selling such dual-purpose heat plants to the local governments made sense for the industrial companies from a cost perspective. However, when industry disconnects from the network, the excess network capacity can lead to growing inefficiency, an indication of the complexity of the district heating market transitions.

Similarly, distribution network losses in Russia are cited as around 20 percent in the latest Energy Strategy of Russia (Ministry of Energy of the Russian Federation 2010). However, higher losses have been reported by various studies (Bashmakov et al. 2008; Nekrasov et al. 2011). Typical losses in Western Europe are about 5 to 10 percent (IEA 2004).

Failures in the distribution systems, caused by worn pipelines, are also commonplace. During the 2009-2010 heating season, 36 large failures and 18,000 small failures occurred across the country. The number of small failures increased by 27 percent compared to the heating season in 2006-2007 (Nekrasov et al. 2011). This demonstrates that failures in the heat distribution networks are likely to be growing with the age of the infrastructure.

Overall, a key challenge in Russia's heat sector is to upgrade and refurbish up to 70 percent of the district heating system. Twenty-five percent of the supply network is in such critical condition that major blowouts may occur (IEA 2009). Although it is very challenging to replace infrastructure at such a scale, the Russian government has recognized that addressing district heating policy is a top priority to the country's energy efficiency, development, and economic competitiveness. Policy changes can make district heating more competitive, which in turn will bring investment.

## 1.4 Metering

Heat consumption from centralized supply systems has only begun to be metered. In residential buildings, installing meters is challenging because of the technical features of buildings, many of which were built before 1971 (Korppo and Korobova 2012). The vertical–stand pipe circuit, typical in such buildings, does not allow flat-specific meter installations. Building-level heat metering combined with apartment-level heat allocators[3] appears to be the most practical for existing buildings. Thus, meters are usually installed where distribution network meets user facilities, such as houses or apartment buildings. According to the Ministry of Energy, 29% of buildings have heat meters (with a larger share in government buildings); however, unofficial estimates at times indicate lower numbers (Ministry of Energy 2012). For example, estimates by the Russian Center for Energy Efficiency (CENEf) several years ago found that only 10 percent of residential buildings had meters. The difference may partially reflect the push to install meters in recent years, and significant regional differences in metering rates. Nonetheless, the Law on Energy Efficiency No. 261 of November 2009 and its regulations require residents to install meters, and metering is likely to further increase in the future (see Appendix A).

To summarize, the energy savings potential in the district heating stems in part from a number of technical issues, such as aging infrastructure, inefficient heat-only boilers, excessive centralization, high distribution losses, and lack of metering. This paper, however, will focus on policy challenges, and how they can be addressed to make district heating sector more energy- and cost-efficient.

[3] Heat allocators are simple, relatively inexpensive devices. They are not as accurate as heat meters, but can allow for equitable allocation of heat costs within a building when total building consumption is metered.

# 2.0 Making Policy for District Heating

The Russian government classifies and regulates district heating as a natural monopoly. To a large extent, this reflects the difficulty of transporting heat cost-effectively over large distances, meaning that district heating is inherently a local product. Despite this fact, some countries have been successful in creating market conditions that are balanced and open and promoting competition between district heating and other types of space heating. Regardless of whether policy-makers choose to regulate or create market conditions, the goal is usually to create a self-sufficient system that is efficient, effective, and fair. If done properly, regulation can be quite effective in achieving this goal (IEA 2004). Some of the most comprehensive guidelines for effective district heating regulation are offered by the IEA and include the following recommendations (IEA 2004):

- Tariffs must cover full costs.
- Regulation should provide strong incentives for improving efficiency in supply, distribution, and end use.
- Investment decisions need to consider the interests of consumers, so that all investments are least-cost and supply is secure.
- Regulation and the regulators should be independent from ownership and management.
- The regulatory process should be transparent and understandable.
- Subsidies should be eliminated, and high collection rates should be ensured. Social protection programs should target low-income households.

Recently, Russia took an important step in creating a comprehensive policy on district heating, known as Federal Law of Russian Federation No. 190-FZ "On Heat Supply." The law sets out the principles of government regulation of heat and hot water, describes the basic authorities of the federal and regional government agencies, outlines principles and methods of heat tariff regulation, and regulates the reliability of heat supply through various requirements, such as heat supply plans. In addition to the Law on Heat Supply, many other regulations specify the law. Appendix A lists the most relevant legislation that defines heat policy and establishes tariff regulations and market structure. Several other laws also have an impact on heat policy and implementation, including the Budget Code, the Labor Code, and the Tax Code, which have not been examined here.

Measured against IEA's principles, Russia's new legislative framework sets up a good foundation for improving the country's district heating system. Implementing this framework will be key in translating vision to action. The remainder of this section provides more detail on the basic guidelines, based on IEA recommendations and international experience, that might be helpful in developing and implementing Russia's heat policy reform.

## 2.1 Covering All Costs

An important aspect of designing effective regulation for district heating is to ensure that tariffs fully cover expenses, including replacement costs and return on investment. In Russia today, social considerations have much weight in calculating tariffs, and economic considerations of running a district heating facility can almost become secondary. This is one of the factors that contribute to losses for both

district heating companies and government budgets, resulting in lack of funding for upgrades and replacement. Ensuring that tariffs cover replacement costs and a return on investment will help attract investment for refurbishing and upgrading systems, a critical priority in Russia. This practice is likely to increase prices for consumers, which can be politically sensitive; but many countries have found that the best approach to meeting both investment and social needs associated with such tariff-setting is to set up need-based social support rather than blanket subsidies. Notably, many district heating facilities in Russia where heat tariffs allow operators to cover costs have found investors; while those with lower tariffs are struggling.

Cross-subsidizing, when different consumers (residential, commercial, or industrial) are charged different rates even though they consume heat from the same supplier, is still fairly common in Russia. It is not sustainable over the long term, as it sends wrong incentives to different groups of customers and drives industrial consumers away. The new legislation attempts to eliminate cross-subsidies, but it has not been realized in many regions because of the sensitivity of charging full cost to residential customers. This can be quite challenging if tariffs are locked into certain limits, and there is no funding for upgrades that improve efficiency.

Tariff limits also prevent district heating companies from covering their costs. In Russia, the Federal Tariff Service limits tariff growth. In 2012, tariffs were allowed to rise by a maximum of 6 percent between July and September and up to another 6 percent, depending on the region, between September and December. At the same time, prices on natural gas have been growing consistently and are expected to increase sharply in the future (EurActiv.com 2012). In combination with inflation of around 6 percent in 2012 (Rose 2012), the cost of supplying heat is likely to have grown faster than increases allowed by the centrally set limits. Moreover, the underlying tariffs did not cover costs previously, and rectifying this requires growth at a pace faster than inflation for some period. Thus, many suppliers are still struggling to cover their costs. For instance, in Chelyabinsk Region, an estimated 20 percent of boilers use lower tariffs than were submitted as "economically justifiable." The main reasons for the lower tariffs are the social policy of the local government that established that residents' incomes are too low to accommodate increases, poor operational conditions of the heat-supplying facilities, and historically low tariffs which cannot catch up with actual costs because of tariff limits. To sum up, adjusting tariffs to allow them to catch up with the cost of supplying heat can help revitalize the district heating sector and improve efficiency. The Russian legislation has already introduced an idea of forgoing tariff limits in certain cases, when investment programs are being implemented. However, without more specific regulations or plans, this concept is unlikely to be implemented. Planning is also important to link rising tariffs to improvements in service quality.

Finally, non-payment remains an issue for heat suppliers in Russia. For instance, as of October 2011 in Smolensk, about 13.5 percent of residents (approximately 40,000 households) did not pay their heating bill, owing city heat suppliers about 507 million RUB (16 million USD) (SmolNews.Ru 2011). Because district heating is seen as an essential social service, district heating companies have not been allowed to disconnect customers and have no easy way to enforce payment without going to court. The new heat law does allow heat suppliers to "limit" the supply of heat and hot water to non-paying customers, after a written notification (Russian Federation 2010). However, implementation has been slow as the necessary procedural regulations are still being worked out.

Implementing the above measures will likely increase prices for consumers. Currently, some of the expenses for supplying heat are covered by federal, regional, or local budgets. According to CENEf, heat suppliers received $1.8 billion USD in subsidies in 2010 (Bashmakov 2012). At the same time, the Russian law also provides discounts to certain segments of the population, as well as monetary subsidies. For instance, a family with three or more children can receive a 30-percent discount on their utility bills, and families with disabled children receive a 50-percent discount on their utility bills. In total, CENEf

estimated that in 2010 the government spent about $800 million USD helping households pay utility bills, the largest portion of which is heating. This amount represents a significant decrease from the $2 billion figure of the previous year (Bashmakov 2012).

As discussed, keeping tariffs below cost as a measure to protect low-income customers increases consumption and discourages consumer savings. A better policy might be to make direct payments to those who need social support, letting them choose how to allocate this funding, and giving them an opportunity to save on utilities. An energy efficiency program for low-income customers can also help reduce their bills. Examples of such programs include the U.S. Weatherization Assistance Program and the Canadian Energy Savings Assistance Program.[4] Another way to protect consumers is to ensure that billing is based on actual consumption, rather than estimates that allow suppliers pass on losses.

## 2.2 Providing Incentives for Efficiency

Well-designed policies can incentivize heat suppliers, network operators, and end users to save costs and energy. Establishing clearly defined responsibilities among the parties involved helps toward this end. One improvement the new legislation has offered is defining the contractual relationship between heat suppliers and consumers. This introduced clarity in that heat-generating enterprises are responsible for providing heat of sufficient quality and contracting network operators to distribute the heat. At the same time, heat suppliers have the right to disconnect customers that consume heat without entering into a contract. Defining the supplier-customer relationship is the first step towards ensuring that incentives are in the right place for the parties to act in a rational, cost-saving way.

Implementation of this relationship, however, is hindered by the lack of metering. Installation of meters is ongoing, and at a minimum, meters should be installed at heat substations or at the building-level. Metering will improve access to information for consumers and suppliers and provide better knowledge about heat consumption and losses, which will help allocate responsibility for dealing with the losses. Once they are aware of actual consumption rather than estimates based on norms that might not reflect actual situations, both consumers and heat suppliers can take action to reduce their losses and costs.

Another important aspect of incentivizing efficiency is the tariff structure. The Russian Law on Heat Supply provides for three types of tariffs (Russian Federation 2010):

- Cost-plus, based on reimbursing suppliers for the cost of running heat systems with a fixed percentage of profit built in, which operators must use to pay for upgrades (capital depreciation and maintenance are not fully covered in the allowable tariff-basis costs).
- Return on investment, which allows operating expenses and longer-term (3-5 years) investments to be included in the rate basis. Payback and return on invested capital within a specified period are also included.
- Tariff indexation, similar to a price cap, when prices are set to cover the costs of the preceding year multiplied by an index set by the central government that reflects change in specific conditions, such as rising fuel cost or deviation of the fuel cost from the expected.

[4] The IEA has recently issued a report on evaluating energy efficiency programs to address energy poverty that compares several European and North American programs. It is available at: https://www.iea.org/publications/freepublications/publication/low_income_energy_efficiency.pdf.

A fourth tariff type, benchmarking, was recently introduced in the law. It allows prices to be compared to peer suppliers of heat, and in theory, should promote efficiency. However, the supporting regulation has not been developed for this tariff to be effectively used. Table 2.2 below compares the advantages and disadvantages of each tariff type.

**Table 2.2. Comparison of Tariff Setting Methodologies**

| Methodology | Pluses | Minuses | Notes on Russian Policy |
|---|---|---|---|
| **Cost-plus** | Clear and logical calculation method | Encourages inefficiency and high cost (to increase profit); asymmetry in availability of cost data to regulators | In Russia, cost-plus tariffs do not usually include adequate funds for investment and maintenance, a significant problem |
| **Return on investment** | Encourages investment and private sector involvement by guaranteeing a rate of return on investment | Does not have particularly strong incentives to improve efficiency or lower cost | This tariff type does not seem to be in frequent use yet |
| **Tariff indexation** | Provides strong incentive for efficiency and cost savings; public advantage of a tariff that is more or less capped | For systems that have seen significant underinvestment, price caps may not allow enough tariff funding for modernization and unexpected equipment failures | Chelyabinsk Region has attracted private investment for several boiler modernization projects with this tariff structure, though the local government has subsidized distribution system improvements in most of these cases; stronger regulatory clarity and support would allow more widespread use of this tariff |
| **Benchmarking** | Provides strong incentive for efficiency improvements and cost savings through market comparison; can help address asymmetry in cost data between district heating company and regulator | Requires significant data on comparable district heating systems and careful thought to adjust for differences in conditions | Russia has not yet developed regulations to support this type of tariff-setting, although it is allowed by law |

At present, Russian regulators predominantly use cost-plus for calculating heat tariffs. Costs and losses are often submitted based on norms, which exist to make sure that suppliers do not charge unreasonable costs. But with such tariff-setting methods, heat suppliers have no incentive to reduce costs, but rather to inflate them to increase their profit, which is often expressed as percentage of the total cost. Cost-plus also deters heat suppliers from making investments in energy efficiency, because any potential

savings would be curtailed in the following year's tariff. In absence of metering, network operators can also be left to ignore losses, as it is impossible to know how much heat loss occurs in production versus distribution, and how much is actually being consumed.

Thus, to encourage cost and energy efficiency, regulators could provide incentives to move away from cost-plus tariffs in favor of benchmarking, return on investments, or even a form of price-capping.

Tariff structures also affect end-users' motivation to save. If customers receive satisfactory service, know they are paying a reasonable price for what they consume, and feel a degree of control over their bills, they are more likely to pay their bills, consume rationally, and not seek alternative heat supply options. Similarly, consumers will be more motivated if their bills are based on their actual consumption, rather than estimates, fixed fees, or norms of consumption. Among the positive developments in Russia is the new legislation that requires consumer bills to be more transparent and detailed. However, regulators should also ensure that metered data are regularly used to bill consumers. In some instances, meters have been used only on an annual basis to adjust estimates, a practice that is not likely to provide consumers with incentives.

## 2.3 Considering Consumers

Ensuring reliability of heat supply and protecting consumers from high prices are very important to policy-makers in Russia. Russian law places significant emphasis on reliability of supply through heat supply plans, standards for reliability, and regular government monitoring of preparedness for the heating season. Over the longer term, however, refurbishing and upgrading the district heating system will become increasingly important, and policy-makers should see promoting these activities as a way to consider consumers' interest.

Generally speaking, the best way to consider consumers is to set up a framework that ensures that consumers receive the highest service at lowest cost. Policies that can achieve this are demand-side energy efficiency measures, tariff structures that incentivize and empower consumers and heat suppliers to save, and in the longer term, investments to reduce costs to consumers. Since consumers are likely to pay for such upgrades through tariffs or fees, information on decisions on investments should be made available to them.

## 2.4 Separating Regulation and Ownership/Management

Because social policy is of such importance in Russia, it is very difficult for the regulators to separate themselves from political processes and focus on making the district heating sector efficient and self-sufficient in financial terms. This separation can be achieved when regulators are removed from owning and operating district heating facilities. For instance, with independent ownership or management, regulators will be less tempted to ignore the economics of running a district heating facility and set tariffs based on short-term political interests. In Russia, this situation is reasonably balanced, since regulators at the regional level approve tariffs based on submissions by district heating suppliers. However, as discussed above, tariff setting is still largely based on social considerations.

## 2.5 Ensuring Transparency in the Regulatory Process

It is easier to dissociate the heating sector from political processes when the regulatory processes are more transparent. For instance, tariff approvals, investment plans, and heat supply plans should be determined based on sound technical and economic considerations in order to maximize the benefits and minimize the total cost to consumers. Opening these processes for public review will help ensure that these decisions are based on merit and devoid of political interests. Requiring transparent information can also make better information available to regulators, enabling them make better decisions. At present, anecdotal evidence suggests that decisions on upgrades to district heating are not transparent in Russia. The requirement of the new legislation to post some of this information online is a step in the right direction, and its enforcement should be stressed.

Politically, it can be very difficult to separate the social pressure for low tariffs from the need for adequate revenue to sustain district heating where it is cost-effective. The countries that have succeeded with this have typically set up independent regulators at the national or regional level. Examples include Poland, the Czech Republic, Estonia, and Lithuania[5]. Russia also now has established regulation at the regional level.

## 2.6 Competition on the Heat Market

Competition in heat markets is very different from competition in electricity or other grid based energy services. The main reason is that heat cannot usually be transported over large distances cost-effectively as, say, electricity can be. This means that competition in heat markets rarely relies primarily on direct competition between different district heating suppliers for customers. Rather, where there is competition on heat markets, it is more often between different types of energy for heating (district heating competing with natural gas, fuel oil, geothermal heat pumps, etc.). Vibrant competition between energy types does exist in a few heat markets (notably Sweden and Finland), and in those markets, district heating tariffs are not regulated (IEA 2004). Regulation in those countries, instead, focuses on ensuring that there are no anti-competitive or anti-monopoly actions on the market. Full and balanced competition for electricity, natural gas, and other energy sources is essential to make this work in an efficient and fair manner. Countries that have introduced competition between district heating and other heating fuels, like natural gas, when there are market imbalances have experienced significant problems.

Competition should also not be introduced before the playing field is level, and policy is coordinated across all energy sectors. The strong interdependence between gas, electricity, coal, and heat sectors means that changes in one sector will lead to imbalances and disruptions in another. For instance, increasing district heating prices while domestic natural gas prices are still low will send the wrong signals across the market and encourage consumers to make the wrong capital investments. This can turn into financial difficulties for district heating companies and ultimately consumers, if gas prices rise to international levels (as they have been generally trending). Several Central European countries experienced significant problems because of such imbalances. Romania is the starkest example of this, where the imbalances led customers to disconnect en masse; that in turn ultimately made many systems unsustainable, leaving the poorest with no heat because they could not afford individual boilers. Other countries like Lithuania that have also experienced major challenges before instituting reforms found that

[5] *Coming in from the Cold* by the IEA (2004) provides additional information on this subject and these examples.

as customers disconnected, system efficiency dropped, and costs per customer grew significantly. Lithuania ultimately decided to limit disconnections in urban heating zones, much as Denmark does. While such an approach may not lead to the lowest costs, based on Danish experience, it can help optimize for efficiency. It can also provide stability for district heating systems during the transition toward completely balanced markets.

The Russian Law on Heat Supply and the Russian Energy Strategy to 2030 envision greater competition in the district heating sector, particularly competition between wholesale suppliers of heat. It is economically wise to require least-cost heat supply, and ensure that low-cost heat providers, such as industry waste heat sources, be allowed to sell their heat to the district heating company when that is technically feasible. However, no district heating system in the world has introduced full wholesale competition with liberalized prices because of the inherent technical challenges.

Russian policymakers may want to consider the examples of other countries in deciding how to move toward competition. Liberalizing prices does seem feasible when there are truly competitive energy markets as Sweden and Finland have found. This may take time to achieve in Russia, however, and in the interim, ensuring fair tariff setting with built-in incentives for investment and efficiency is a good option. Sequencing district heating reforms is also important to ensure that the market adapts over time, without abrupt price increases or changes in demand patterns. For example, ensuring balanced market conditions before introducing competition (or encouraging easy disconnections) can reduce sharp drops in district heating demand because of price distortions.

## 2.7 Balancing Supply and Demand

The large scale of the district heating system and declining demand since the 1990s led to overcapacity, which increased the costs of running district heating facilities. Systems that operate at partial capacity have higher fixed costs and have difficulty in reducing their operating expenses. Thus, it is crucial to make realistic projections of future demand and ensure that supply is least-cost. Metering is an essential first step, but it cannot be overstated that assessing demand is a challenging task in Russia because consumption was based on distorted incentives and subsidized prices. In addition, demand-side energy efficiency measures, including transmission and distribution, should be implemented before investments in new capacity are considered. Energy planning should follow to ensure that investments are optimal and cost the least. Regulators should make sure that the boundaries of district heating supply are rational and provide the least-cost means of offering space heat.

Among significant improvements introduced by the new heat law is the requirement for local governments to develop and publicly post heat supply plans as well as investment programs. It appears that most cities in Russia have not developed such plans since the 1980s. The subsequent, recently passed regulation specifies that the plans need to include a description of the current state of the district heating network and prognosis for loads and balances, fuel sources, investment plans for the next 15 years, and electronic models of district heating systems. Development of such plans can build a foundation for better assessment of supply and demand, ensure more comprehensive investments in district heating, and create conditions for improving energy efficiency of the district heating sector, especially in combination with energy efficiency incentives and investment programs.

However, to be useful, demand projections should be carefully researched, rather than solely based on territorial development plans, and consider the effects of subsidies and improvements in demand-side energy efficiency. When demand is assessed accurately, it is easier to ensure that supply investments are least-cost and do not contribute to overcapacity. Additional considerations should be given to municipalities' and district heating companies' capacity to carry out this task effectively.

# 3.0 Attracting Financing for District Heating

Because Russia is in need of upgrading and replacing 70 percent of its district heating facilities and network, attracting private investors is very important. Early experience with privatization in district heating was not positive, and many privatized companies, unable to sustain profit, declared bankruptcy and handed district heating facilities back to municipalities. More recently, however, private ownership and public-private partnerships (PPPs) have become fairly common and accepted.

Overall, it is difficult to assess the proportion of private ownership in district heating as the category of "private" is not homogenous. Private sector participation varies from region to region, but usually it declines along the supply chain from generation to distribution (IEA 2009). In addition to the government directly owning the heat supply systems, the market is represented by a variety of government-owned companies, PPPs, and entirely private companies.

Currently, three major types of players set up the basic structure of the district heating sector. They are (1) subsidiaries of large energy companies, such as Gazprom, State Company Sintez, Kvadry, LukOil, IES-Holding, and Fortum; (2) formerly municipally owned district heating facilities, some of which have leased out or sold their district heating systems to private investors; and (3) local industrial enterprises that have traditionally provided heat from their facilities (Stupin 2012; Korppo and Korobova 2012).

Subsidiaries of large energy companies typically own large-scale cogeneration systems, and sometimes distribution lines that supply heat to large cities. For example, Gazprom Energy is a specialized subsidiary of Gazprom that generates and transmits heat, transmits electricity, and provides water and wastewater services. Gazprom Energy supplies heat in five regions of Russia through 40 facilities with a total capacity of 1,500 MW and 600 kilometers of heat distribution networks. In 2010, the company sold 1.8 million Gcal of heat worth 2.7 billion RUB (89 million USD) (Gazpromenergo.ru 2012). These large cogeneration-based systems are also united geographically into 14 territorial generation companies (TGCs) that are present in most of the Russian regions (RAO UESR 2012). More than 40 percent of heat is produced by 500 cogeneration plants (IEA 2011).

Municipalities traditionally owned and managed municipal boilers and local distribution networks and covered segments of the population not covered by TGCs. While municipal enterprises are still in control of most of the district heating facilities, many have been transferred or leased to private operators (Bashmakov et al. 2008). Municipal distribution networks also buy "waste" heat from large cogeneration plants, although because costs are not adequately aligned and heat prices are so much below cost, incentives for that are not as big, which is a source of huge inefficiency.

Finally, local industrial enterprises may still own heat supply in many industrial towns even though providing heat service is not profitable for them (Korppo and Korobova 2012). Not surprisingly, this category of owners tends to have many operational issues.

Regulators can facilitate investment by creating policies that attract private players to district heating facilities, especially those that have higher investment needs. One of the basic requirements for that is setting operational tariff policy that allows investors to recover costs, as discussed above. Additionally, the legislative framework and subsequent regulations have to be set up to allow for the participation of private industry. Good legislation should offer a mechanism for balancing various risks, such as

guaranteeing return on investment for private parties and successful project implementation for government.

In international practice, the most common forms of leveraging private financing in the energy sector are through:

- Management agreements;
- Leasing;
- Concession agreements; and
- Privatization.

Table 3.1 shows the ways in which the risks and responsibilities are distributed in these public-private agreements:

**Table 3.1**. **Distribution of Risks and Responsibilities in Various Forms of Public-Private Agreements** (based on DENA 2007).

| | **Facility Management and Operation** | **Payment for Services** | **Investment** | **Ownership** |
|---|---|---|---|---|
| **Management Agreements** | Private | Government | Government | Government |
| **Leasing** | Private | Private | Government | Government |
| **Concession Agreements** | Private | Private | Private | Government |
| **Privatization** | Private | Private | Private | Private |

A **management agreement** is when a company takes on the responsibility not only for upgrading the facility but also for managing it and conducting sales. In this case, revenue comes not only from energy saving measures, but also from sales. Although management agreements do not necessarily bring large-scale financing, they can solve the issue of poor management and ensure that regulation of district heating and its operation are separate. We have not encountered any examples of management agreements in Russia.

**Leasing** was one of the earliest forms of PPPs in Russia and is, therefore, more established and popular than the other forms. Under the leasing option, a private party takes on operation, management, and implementation of upgrades in a facility. In Russia, this mechanism works the following way: the lessor accepts rent payments from the lessee and reinvests them into upgrading the facility, which lessee is contracted to implement. The main risk under this model is that budget decisions are made on an annual basis, and upgrades are limited to the size of the lease payments. On the other hand, the lessee does not have to wait to make a profit, which reduces the risk of the investment.

**Concession agreements** differ from the previous form of PPP, since they put the responsibility for investment onto a private party. Upgrades are usually detailed in the longer-term concession agreement. The private entity has more risks, but also has control over upgrades. Concession agreements are more flexible for investors, allow returns over a longer period of time, and do not depend on government

financing. Russia has recently updated its model concession agreement, and although the law has not yet been fully tested in practice, observers in Russia predict that this model is likely to be the more popular choice (Danko and Suchkova 2009).

Under **privatization**, government cannot usually influence the private companies' investment and management decisions, but it still has some control over private companies through tariff regulation, energy planning, standards, and norms. Private companies bring financing for district heating but seek returns through selling heat services. Thus, it is important to set up conditions that allow sound operation of district heating facilities and cost recovery.

One concern among private investors is the current tariff policy in Russia, which is being set annually and in accordance with limits. Investors are at high risk of not being able to recover their costs. One solution that was found in Chelyabinsk Region is creating long-term tariff agreements. Tariff agreements are one of the regulatory options under the federal heat law, though Chelyabinsk was the first region in Russia to experiment with it in multiple projects.[6] Tariff agreements guarantee a certain tariff level for a period of up to five years (with indexation for changing fuel prices), adding predictability and reducing risks for investors. The agreements also contain a description and cost of necessary upgrade measures and the necessary terms for their cost-recovery. In Chelyabinsk, tariff agreements have been used primarily to finance the replacement of highly inefficient boilers, typically where there are opportunities to switch from coal to lower-price gas, in other words, where the return on investment was particularly high. Such tariff agreements could be applicable in other parts of Russia, offering a practical solution to reducing risks and attracting investment. However, because of the short term of these agreements, any unplanned changes in conditions, such as abnormally warm winters, or other steep drops in demand, may harm the economics of the investments. In short, these are new agreements in Russia, so not all the risks have been explored. Other countries, such as the Baltic States, also have experience with such agreements (often called concession agreements). The contract periods may be up to 25 years there, which can allow for deeper modernization.

In addition to PPPs, government can attract financing through bonds, budget financing and guarantees, loans from financial institutions, and international financing. One of the common issues for securing such financing is offering collateral. Municipalities, unlike private parties, cannot pledge their assets to financiers. In some cases, however, governments were able to provide budget guarantees to investors. Even though it locks up government budgets, from the investors' perspective risks are reduced. This is very important, since nonpayment and indebtedness are rather common issues in Russia.

[6] Evans et al. 2012 provides an example of a Chelyabinsk tariff agreement as an appendix.

# 4.0 The Larger Context for Heat Policy

Because district heating is such an important sector of the economy that is linked to Russia's energy intensity, economic performance, and quality of life, district heating should be integrated into other policy frameworks and the national policy agenda. One such framework is the Energy Strategy of Russia, with electricity and social policies being other important policies.

## 4.1 The Energy Strategy of Russia

In 2009, the Russian Government issued the Energy Strategy of Russia to 2030. The strategy touches on many issues relevant to the transformation of the district heating sector. For example, the primary goal of the strategy is to decrease Russia's energy intensity. The government envisions supporting this objective by ensuring that consumers have an interest in saving energy and improving energy efficiency. The government also wants to create competitive and fair energy markets with stable and affordable prices, and to promote research and development encouraging innovation in the energy sector and production of efficient equipment and technologies. The document further states that development of domestic energy markets should occur by creating transparent procedures under the law, promoting private sector participation in the energy sector, eliminating cross-subsidies, and gradually liberalizing domestic markets for the main types of energy (including natural gas, electricity, and heat). In the Energy Strategy, Russian policy-makers clearly envision competitive, efficient, and technologically advanced energy systems, where participants have incentives to save energy.

The new Russian heat law resonates with this vision, although its implementation lags behind, partially because of the lack of supporting regulations but also because the implementation strategy has not been synchronized with the laws. For instance, more can be done in Russia to attract private sector investment in the district heating sector, such as through privatization, leasing, and concession agreements, because investments are necessary to replace the aging infrastructure.

The Energy Strategy also places significant emphasis on energy efficiency in all aspects of district heating—production, distribution, and consumption—and lists a number of measures that need to be taken to improve energy efficiency. For example, among the goals stated are: moving away from heat-only boilers in favor of cogeneration, increasing industrial efficiency, developing distributed heat generation systems, reducing heat losses in transportation systems, and installing accounting and quality control equipment. The strategy estimates that implementation of these activities will result in reduction of heat losses by half from 19 percent to 8 to 10 percent by 2030. Some of these activities, like installation of meters and controls, are being carried out. But for the most part, unless specific provisions are introduced to encourage these developments, this goal is likely to be unaccomplished.

## 4.2 District Heating and Electricity

District heating is linked to electricity systems through cogeneration plants, which were installed in Russia on a broad scale and generate about a third of the electricity in the country (Druzhinin 2012). Thus, the two sectors are closely linked.

In much of Russia today, electricity producers compete to supply power based on price. While the transition to power-sector competition has taken time, there are important implications for the heat sector. Cogenerators have incentives to allocate a large share of their costs to the heat that they supply. The same fuel, after all, is used to produce both heat and power. Regulators often try to limit this, and effectively set heat prices below cost. Low heat prices reduce the incentive to cogenerate and sell heat. Coordinating policy on heat and electricity can be very useful in addressing such issues. Higher heat tariffs that can cover all costs, while not incentivizing high costs, may also improve efficiency of both the heat and power sectors.

## 4.3 Social Policy

Because district heating is such an essential commodity in Russia's cold climate, it is closely linked to social welfare. Policy makers recognize that families depend on district heating, and they feel a commitment to protect certain segments of the population. At the same time, keeping tariffs low for all as a welfare policy for a few can send the wrong signals. A better policy would be to ensure that heat suppliers could cover their costs, while vulnerable groups of residents receive need-based support. Energy efficiency programs can also help low-income customers reduce their heating bills.

# 5.0 Conclusions and Recommendations

District heating is closely linked with other sectors of the economy, and thus requires a concerted effort to ensure that policies are coordinated across sectors. Success of district heating reforms depends on sequencing of related policies. In addition, strategic partnerships with the private sector are key because of the need for substantial investment to cover the replacement or upgrades of about 70 percent of district heating assets in Russia.

The new Russian legislation on district heating has made significant progress in ensuring a strong legal basis for modernization of the district heating sector. However, achieving this modernization requires significant efforts and coordination on implementation. Some of the key practical steps needed to ensure the success of district heating reform include:

- Installing meters and control devices to better account for demand, consumption, and losses;
- Ensuring a high level of payment discipline from consumers;
- Establishing tariffs and conditions that allow for full cost recovery;
- Eliminating cross-subsidization, direct payments to heat suppliers, and discounts for consumers in favor of social support for vulnerable consumer groups; and
- Ensuring that regulators set tariffs transparently and independent of political processes.

Russia has already made a significant effort to install meters. However, further emphasis is needed to ensure that all customers have meters and pay for heat based on actual consumption. Meters will also help district heating companies quantify the losses within their systems and better estimate future demand as a result. This will also help ensure that customers' interests are better considered.

District heating regulation can be further improved if the tariff structure incentivizes efficient behavior of both consumers and suppliers. To achieve this, regulators should move away from cost-plus regulation in favor of other tariff types, such as indexing or benchmarking. Finally, to make more effective investments, a better estimate of demand trends needs to be conducted. This can be helped by recently mandated heat supply plans and regional investment programs, but consideration should be given to sequencing with demand-side efficiency policies and removal of subsidies.

In sum, the Russian government has begun the important process of district heating reform and taking many critical steps such as adopting new legislation and regulation. The challenge with district heating reform elsewhere has often been in implementation; this paper seeks to provide ideas for consideration on strengthening implementation through the comprehensive district heating reforms that Russia has begun.

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# Appendix A

# Relevant Laws of the Russian Federation Affecting the Heat Sector

# Appendix A

# Relevant Laws of the Russian Federation Affecting the Heat Sector

The most relevant laws and regulations of the Russian Federation affecting the heat sector regulation, pricing, and market structure are listed in Table A.1.

**Table A.1. Relevant Laws of the Russian Federation Affecting the Heat Sector**

| Name of the Legislation | Date Adopted and Amended | Implications for the Heat Sector |
|---|---|---|
| Federal Law of the Russian Federation No. 190-FZ "On Heat Supply" | July 27, 2010 (last amendment on December 7, 2011 by Federal Law No. 417) | ● Sets out the principles of government regulation of thermal energy and heat-medium and the authority of government agencies, authorities of the subjects of the Russian Federation and local self-government bodies in heat regulation.<br>● Outlines the principles of heat tariff regulation by Federal and regional authorities, types of tariffs, methods of tariff regulation, and government oversight.<br>● Describes four methods that can be used to set tariffs:<br>- Cost-plus method;<br>- Return on investment method;<br>- Tariff indexation method;<br>- Benchmarking.<br>● Lays down legal grounds for economic relations of producing organizations, distribution network organizations, and consumers of thermal energy and heat-medium; establishes that thermal energy and heat-medium supply are to be regulated on contractual basis between consumers and supplying organization as well as between supplying organizations and distribution networks.<br>● Regulates reliability of heat supply.<br>● Sets out requirements for self-regulating organizations in heat supply. |
| Government Order No. 2485-p "On affirmation of a plan for priority activities related to implementing provisions of the Federal Law 'On Heat Supply'" | December 30, 2010 | Sets schedule for developing and amending regulations in 2011 regarding division of authorities among Federal agencies, organization of heat supply, repairs and phase out of heat supply systems, instituting investment systems, pricing of heat services, heat system reliability, heat supply contracting, heat accounting, technical loss standards for heat systems, tariff regulation, dispute resolution, etc. |

**Table A.1**. (continued)

| Name of the Legislation | Date Adopted and Amended | Implications for the Heat Sector |
|---|---|---|
| Decree of Government of the Russian Federation No. 97 "On approval of the typical rule on the executive agencies of the subjects of the Russian Federation regulating state tariffs" | February 21, 2011 | Establishes goals and authority of the executive agencies of the subjects of the Russian Federation. The goals of the executive agencies are outlined as establishing tariffs, maintaining a balance of economic interests of heat consumers and suppliers, preventing establishment of discount tariffs at the expense of other users, creating stimuli for increasing energy efficiency of systems and implementing energy saving technologies.<br><br>Executive agencies will set tariffs on heat (within federally-established limits), on heat-medium, and services of heat transfer and heat-medium transfer, as well as fees for maintaining a heat reserve, in absence of heat consumption, and connecting to district heating network. The agencies can also decide to abolish tariffs on heat, in accordance with the law "On Heat Supply".<br><br>Executive agencies are financed out of the budget of subjects of the Russian Federation. |
| Decree of Government of the Russian Federation No. 583 "On the procedure for resolving disputes between agencies regulating heat tariffs and organizations conducting regulated heat supply activities in relation to choosing the method of tariff regulation" | July 20, 2011 | Establishes rules on resolving disputes between heat suppliers and executive agencies of the subjects of the Russian Federation or self-government bodies of settlements and municipal districts (if they are authorized to deal with heat tariffs) regarding the choice of tariff type for regulating heat price. The decree requires Federal Tariff Service to respond to filed statements of dispute within 30 days.[1] |

[1] Note: This regulation has not yet entered into force.

**Table A.1**. (continued)

| Name of the Legislation | Date Adopted and Amended | Implications for the Heat Sector |
|---|---|---|
| Decree of Government of the Russian Federation No. 154 "On requirements towards heat supply plans, procedure for their development and approval" | February 22, 2011 | To supply heat and heat-medium reliably, at an economic cost, and with minimal impact on the environment and to stimulate development of district heating and implementation of energy-saving technologies, settlements and municipal districts are required to have a plan for heat supply. Such plans should be developed by local self-governance bodies of settlements and municipal districts, authorized executive agencies of the subjects of the Russian Federation, or legal persons (or jointly with legal persons) based on territory development plans, for a period of at least 15 years. Heat supply plans, and preparation documents for them, are required to be posted on official websites, and public hearings should be held. Cities with over 500,000 residents are also required to submit such plans to Federal authorities. Plans are to be yearly updated.<br><br>Heat supply plans should include, among other things:<br>●Electronic model of the district heating system (not to be posted online);<br>● Analysis of the current state of the district heating system (including structure, heat sources, network, demand load, balances, tariffs, accident information, losses, etc.);<br>● Prognosis for urban/territory development, heat and heat-medium demand, fuel sources, balances, options for meeting demand;<br>● Investment plans;<br>● Justification of system reliability, etc. |
| Decree of Government of the Russian Federation No. 222 "On introducing modifications to the Decree of the Government of Russian Federation No. 748 dated December 5, 2006" | March 29, 2011 | This regulation presents the latest model concession agreement for utility service infrastructure, including district heating. |

**Table A.1**. (continued)

| Name of the Legislation | Date Adopted and Amended | Implications for the Heat Sector |
|---|---|---|
| Federal Law No. 261-FZ "On Saving Energy and Increasing Energy Efficiency, and on Amendments to Certain Legislative Acts of the Russian Federation" | November 23, 2009 | ● Objects connected to district heating and consuming more than 0.2 GCal/hr need to install metering devices in places of connection or in places of connection to intermediate devices for distribution. Public facilities and non-residential facilities should install meters by January 1, 2011, and residential buildings should install building-level heat meters by January 1, 2012. Newly built multi-apartment buildings and newly renovated multi-apartment buildings, if feasible, should have individual meters as well. Heat suppliers are responsible for offering installation and maintenance of meters at an agreed upon cost.<br>● New construction of heat supply facilities can be only approved if the self-governance agency can justify that energy efficiency measures, including use of electric stations for heat, are infeasible or not cost-effective.<br>● Heat suppliers and organizations spending more than 10 million RUB must undergo energy auditing.<br>● Public facilities must reduce their energy consumption, including heat, in comparison with 2009 by 15% with no less than 3%/year.<br>● Municipal authorities are allowed to enter into EPCs. |
| Decree of Government of the Russian Federation No. 294 "On approving procedure for payment for heat energy and natural gas" | April 4, 2000 (last amended on December 17, 2010 by No. 1045) | Regulates payment for heat services:<br>● 35% of estimated heat cost should be paid by the 18$^{th}$ of the month in which heat is consumed;<br>● 50% of estimated cost should be paid by the end of the month;<br>● factual consumption should be paid for by the 10$^{th}$ of the following month. Overpayment amount is counted towards the balance of the following month<br><br>Public facilities and a number of other bodies are excluded from this law. |
| Decree of Government of the Russian Federation No. 307 "On procedure for connecting to district heating supply and on introducing modifications to some law acts of the Government of the Russian Federation" | April 16, 2012 | In case of new construction, increase in heat demand, or major facility renovation, users have to enter into heat supply contract. This regulation specified the rules on choosing the supplier, contract structure, implementation specifics, etc. |

**Table A.1**. (continued)

| Name of the Legislation | Date Adopted and Amended | Implications for the Heat Sector |
|---|---|---|
| Decree the Government of the Russian Federation No. 109 "On Pricing Policy for Electrical and Heat Energy in the Russian Federation" | February 26, 2004 (last amended on December 29, 2011 by No. 1178) | Establishes that heat and heat distribution are to be regulated, and their accounting should be done separately.<br><br>The law states that regulated entity can choose one of the three methods of tariff regulation:<br>● Cost-plus method;<br>● Return on investment method;<br>● Tariff indexation method.<br><br>Methodology is described for using each method. Executive agencies of the subjects of the Russian Federation must establish tariffs within Federally-established limits. (Note: this decree is in the process of being amended to incorporate changes introduced by Law No. 190). |
| Decree of Government of the Russian Federation No. 306 "On approval of rules for establishing and defining norms of consumption on communal services" | May 23, 2006 (last amended on March 28, 2012 by No. 258) | Provides rules on the technical specifications that should be considered by the executive bodies of the subjects of the Russian Federation in establishing norms of communal service consumption for residential buildings. Such norms for heat include heat energy expenditure required to maintain residences at a temperature required by comfort standards (expressed in GCal/month/$m^2$). |
| Order of the Ministry of Energy of the Russian Federation No. 323 "On management of work by the Ministry of Energy of the Russian Federation on approval of norms for fuel rate for released energy from combined heat and power stations and boilers" | December 30, 2008 | Establishes rules on how Ministry of Energy calculates norms of maximum allowable fuel use (in kg of coal-equivalent) for producing 1 GCal of heat. |
| Order of the Ministry of Energy of the Russian Federation No. 325 "On management of work by the Ministry of Energy of the Russian Federation on approval of norms for technical losses in transmitting heat energy" | December 30, 2008 (last amended on February 1, 2010 by No. 36) | Establishes rules on how Ministry of Energy calculates norms for expenditures in heat distribution for heat-medium transfer and associated losses and energy expenditures; heat and heat-medium losses in networks during distribution; and electricity expenditures during heat distribution. |

**Table A.1**. (continued)

| Name of the Legislation | Date Adopted and Amended | Implications for the Heat Sector |
|---|---|---|
| Order of the Federal Tariff Service of the Russian Federation No. 20-э/2 "On approving Methodological Instructions for calculating regulated tariffs and prices on electric (heat) energy at retail (consumer) market" (Registered at the Ministry of Justice 10/20/2004 No. 6076) | August 6, 2004 (last amended on December 26, 2011 by No. 823-э) | This regulation provides detailed methodologies on how tariffs should be structured and calculated. (Mostly describes the cost-plus method). |
| Order of the Federal Tariff Service of the Russian Federation No. 130-э "On approving regulation on revision of cases related to establishing tariffs and (or) their limits for electric (heat) energy (capacity) and services, offered at wholesale and retail markets of electric (heat) energy (capacity)" | April 8, 2005 (last amended on December 26, 2011 by No. 824-э) | Outlines procedures for FTS for considering cases related to establishing tariffs on heat and electricity, submitted by tariff regulating agencies. The order lists forms that must be submitted by such agencies. |
| Order of the Federal Tariff Service of the Russian Federation No. 242-э/7 "On establishing tariff limits on heat energy, supplied by heat supplying organizations to consumers, on average in accordance with subjects of the Russian Federation for the year of 2012" | October 6, 2011 | Establishes maximum tariff limits for the year of 2012 at the level of subjects of the Russian Federation. Provides the maximum percentage tariffs can grow on average in each subject of the Russian Federation. Tariffs cannot increase between January 1 and June 30, 2012, can increase by 106% between July 1 and August 31, 2012 for all subjects, and can increase for the period of September 1 and December 31, 2012 by 101% to 105.6% depending on the subject. |

Sources: Rosteplo.ru 2012 and Consultant.ru 2012.

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