RUSSIA

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1 District Heating

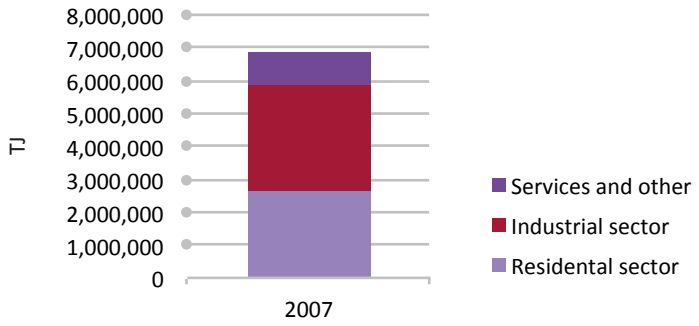
KEY FIGURES

	2009	2007	2005
Total installed District Heat capacity (in MWth)		541,028	
Trench length in km for transport and distribution network (one way)		173,100	177,200
Estimation of employment figures in the District Heating sector	2,3 million people[1]		
Number of District Heating utilities		17,183	21,368[2]
Number of District Heating systems		~50,000	~50,000[3]

DISTRICT HEATING SALES TO CUSTOMERS (IN TJ)

	2007
Residential sector	2,639,365
Industrial sector	3,211,343
Services and other	1,040,585
TOTAL	**6,891,293**

District Heating sales to customers (in TJ)



AVERAGE DISTRICT HEATING PRICE IN EUR/GJ

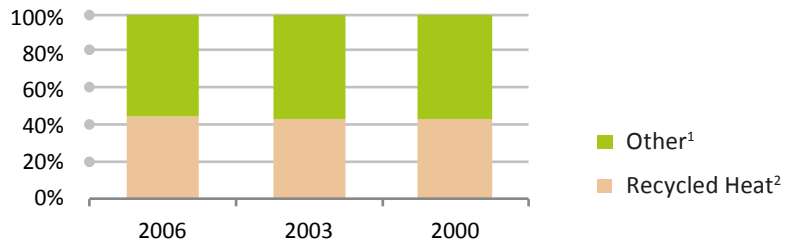
	2007
EUR/GJ (excl. VAT)	~4.48[4]

[1] Also including employers who are working in the field of water, gas and electricity supplying
[2] Data of year 2000
[3] Data of year 2000
[4] Average price for residential sector

ENERGY SUPPLY COMPOSITION FOR DISTRICT HEAT GENERATED

	2006		2003		2000	
Source	**In TJ**	**In %**	**In TJ**	**In %**	**In TJ**	**In %**
In cogeneration	**2,687,925.6**	**39**	**2,658,618**	**38.4**	**2,721,001**	**39.2**
Coal and Coal products; natural gas; oil and petroleum products; peat	2,674,109.2	38.8	2,643,964.2	38.2	2,706,766.2	39
Nuclear	13.816	0.2	14,653.8	0.2	14,235.1	0.2
Industrial surplus heat	337,456.1	4.9	309,823.2	4.5	280.934	4
Boilers (with fuel: coal and coal products; natural gas; oil and petroleum products; peat)	3,781,936.4	55	3,876,139.4	56	3,863,997.7	55.6
Electricity boilers	26,376.8	0.4	28,470.2	0.4	38,099.9	0.55
Others	52.335	0.7	53,172.4	0.7	44,798.7	0.65
TOTAL	**6,886,030**	**100**	**6,926,223.2**	**100**	**6,948,832**	**100**

Energy supply composition of generated District Heat



The two different categories are defined as follows:

1. "Other" - covers heat-only boilers, electricity and one-third of the heat originating from heat pumps.
2. "Recycled heat" - includes surplus heat from electricity production (CHP), waste-to-energy plants, and industrial processes independently from the fuel used for the primary process. Two-thirds of the energy delivered by heat pumps are also considered as recycled heat.

Over the last years a clear tendency towards an increase of natural gas in District Heating can be observed, while the share of coal, oil and petroleum products decreases. There is a strategy lead by Gazprom to increase use of gas in the regions. Practically no statistics are available on the use of renewable energies. Some experts suggest that the share of renewables is somewhere in between 0 and 1.5%.

SUMMARY OF THE NATIONAL DISTRICT HEATING MARKET

Practically all sectors of the economy show a tendency towards decentralisation of heat supply. In the industry sector the share of centralised heating decreased from 35% in 2000 to 31% in 2006. The share decreased by 2% in the residential sector, while the largest decrease in the share of centralised heating occurred in the services sector with 6%. Decentralisation reduced the length of the pipeline network by 4%. Heat generated by individual boilers has increased from 13.5% in 1990 to 20% in 2006. The reliability of the network improved five fold between 2001 and 2006 and the frequency of distribution failures are within 0.5 – 0.1 failures/km/year.

Energy conversion efficiency of boilers has decreased from 80% in 2000 to 78% in 2006.

43 billion roubles (more than € 1 billion) were invested in the District Heating systems in 2006. About €230 million were spent on efficiency measures and €70 million on the renewal of the pipe network (while requiring around € 5.5 billion).

NATIONAL LEGISLATIVE FRAMEWORK HAVING AN IMPACT ON DISTRICT HEATING

The Russian legislation having an impact on heat supply is based on the Heat Supply Act of 27 July 2010 (№ 190-FZ). The Act establishes the basis for heat production, transportation and consumption, and differentiates the areas of regulatory competence between central and local authorities. According to the Act, the Russian Ministry of Regional Development and the Russian Energy Ministry had been defined as authorised federal bodies of executive power implementing state policy in the heat supply sphere.

Since 2010, a number of additions to the Act have been made. The most considerable additions are those prohibiting connection to centralised open heat supply systems (of hot water supply) - since 2013 - and those which provide closing of centralised open heat supply systems (of hot water supply) - since 2022.

EXISTING DRIVING FORCES AND/OR OPPORTUNITIES THAT FAVOUR AN EXPANSION OF DISTRICT HEATING

Only new national legislation (Heat law) is supporting District Heating development.

EXISTING BARRIERS TO THE EXPANSION OF DISTRICT HEATING

The main problems for District Heating are:

- Lack of quality data on the factual state of District Heating systems;
- No rise in heat demands coupled with economic growth;
- Lack of municipal planning strategies for heating;
- Over-centralisation of many systems;
- High energy losses in heating networks;
- Lack of qualified personnel, mainly in smaller towns;
- Outdated equipment and low levels of automatisation.

SHOWCASE DISTRICT HEATING SCHEME IN THE RUSSIAN FEDERATION

Today the District Heating company “Mytischinskaya teploset”[5], JSC (created in 1969), which is situated in Moscow region, includes 41 operating boiler houses with a total capacity of 2.9 TJ/h and 215 km of District Heating pipelines. About 2,000 buildings are connected to the central heating system and about 6,280 TJ/year of heat energy are generated. Besides, 200 M m³ of natural gas, 1300 tons of diesel fuel, 40 M kWh of energy and 1.2 M m³ of water are consumed for heat supply.

District Heating company “Mytischinskaya teploset”, JSC was one the first companies in Russia, which started implementation of such programs as energy saving, reconstruction of heat supply networks and boiler house equipment, introduction of automated management control systems, remote control of equipment operation and condition of heat pipelines, technology and commercial estimation of power resources. The result was a substantial reduction (three times) of generated heat energy loss, increase of heat supply quality, lack of emergencies and opening of streets.

During six years of reconstruction, 130 km of pipelines were replaced with new preinsulated controllable pipes.

An individual automated heat supply station is one of the main elements of modern heat supply systems. It provides adjustment of the buildings heat supply according to the outside conditions. Individual heat supply stations are remotely controlled and operated from the operating department of the enterprise.

CHP IN ELECTRICITY GENERATION

The share of electricity generated by combined heat and power plants in the heating mode decreased from 34% in the late 1980s to 28% in 2011.

Burnout of fuel in combined heat and power plants in comparison with 1992 is ~ 37 mln.tut. per year.

The number of small utility boiler houses increased by ~ 20% from 2000 to 2011.

The number of boiler houses that burn natural gas has increased by more than 1.5 times.

[5] http://www.m-teploset.ru/

2 Climate conditions

NUMBER OF HEATING DEGREE DAYS

The Russian Federation is spread over a vast land surface with a variety of climatic zones. This diversity makes it difficult to provide a representative average assessment of the country's heating needs. In southern regions heating is required for 22 to 25 weeks per year, while in the north this can run up to 40 to 45 weeks or more (some municipalities reach 3,000 degree days per year, others more than 12,000). However, a major part of the country's regions cope with very cold conditions and a heating season of 9 to 10 months. In these areas heat can truly be regarded as a crucial societal commodity.

DESCRIPTION OF THE CLIMATIC CONDITIONS

Predictions made by the Moscow Power Engineering Institute on the impact of global warming in Russia, provide a diverse picture. By 2050, the warming may range from 1°C to 5°C. The impact will most certainly be a decrease in heating degree days. Global warming may pose a hazard for infrastructure in the permafrost zones due to shifts in the soil.

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It is necessary to stress that there is no data available about District Heating and Cooling in the official statistic issue "Russian statistical year-survey"[6]. The most correct data about Russian District Heating systems were presented in 2006 and 2007 year in different literature sources. There are no District Cooling systems in Russia today (except local examples) that is why they are not mentioned.

Actually, the most data about Russia, which were presented above, were the same as in "District Heating and Cooling Country by Country Survey – 2009", but with additional interesting facts about the development of the Russian District Heating sector.

This chapter is mainly based on data of the following publication "Analysis on the main tendencies in heat supply systems in the Russian Federation" (in Russian), I. A. Bashmakov (Executive Director of the Centre for Energy Efficiency – www.cenef.ru), 2008 (study conducted on request of the Energy Forecasting Agency – www.e-apbe.ru) and on data of publication "Current situation with District Heating in Russia" (in Russian), A.S. Nekrasov, Y.V. Sinyak, S.A. Voronina, V.V. Semikashev (http://www.ecfor.ru/index.php?pid=epub), 2011.

[6] http://www.gks.ru/wps/wcm/connect/rosstat/rosstatsite.eng/