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Modernizing the Russian District Heating Sector: Financing Energy Efficiency and Renewable Energy Investments under the New Federal Heat Law

ANATOLE BOUTE*

I. INTRODUCTION

Due to its high energy intensity and inefficiency,[1] the Russian economy presents enormous potential for cost-effective energy savings and greenhouse gas emission reductions.[2] Moreover, Russia presents considerable opportunities for the deployment of renewable energy sources.[3] Realizing this potential is not only an essential task for the economic modernization and diversification of Russia as an industrial

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1. ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD), OECD ECONOMIC SURVEYS: RUSSIAN FEDERATION 12, 17 (2011).

2. *Id.*; *see also* INT'L FIN. CORP. & THE WORLD BANK, ENERGY EFFICIENCY IN RUSSIA: UNTAPPED RESERVES 27 (2008), *available at* http://www.ifc.org/ifcext/rsefp.nsf/AttachmentsByTitle/FINAL_EE_report_Engl.pdf/$FILE/Final_EE_report_engl.pdf [hereinafter UNTAPPED RESERVES].

3. INT'L FIN. CORP., RENEWABLE ENERGY POLICY IN RUSSIA: WAKING THE GREEN GIANT 5-6 (2011), *available at* http://www1.ifc.org/wps/wcm/connect/region_ext_content/regions/europe+middle+east+and+north+africa/ifc+in+europe+and+central+asia/publications/renewable+energy+policy+in+russia+-+waking+the+green+giant [hereinafter RENEWABLE ENERGY POLICY IN RUSSIA].

nation,[4] it is also of great strategic importance for the international community and Russia's energy partners, in particular the European Union. With Russia being the fourth largest emitter of greenhouse gases, improving the efficiency of its energy system is indispensable to avoid offsetting international climate change mitigation efforts through unreasonably large energy waste.[5] Generating energy savings in Russia also increases the availability of Russian energy sources for export.[6]

The heating sector consumes around one-third of Russia's primary energy.[7] It is responsible for much energy waste due to the use of obsolete equipment.[8] In accordance with the International Energy Agency, it is thus "a critical sector from an energy saving and environmental perspective."[9] Modernizing this sector is essential to combat climate change, improve

4. Rasporiazhenie Pravitel'stva RF Kontseptsiia dolgosrochnogo sotsial'no-ekonomicheskogo razvitiia Rossiiskoi Federatsii na period do 2020 goda [Conception for the Long-Term Social and Economic Development of the Russian Federation for the Period Until 2020] ch. V, at 6, SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2008, No. 47, Item 5489.

5. Andreas Goldthau, *Improving Russian Energy Efficiency: Next Steps*, 46 RUSS. ANALYTICAL DIG. 9, 11 (2008).

6. *See* GÉRARD CÉSAR ET AL., RUSSIE: PUISSANCE OU INTERDÉPENDENCE ÉNERGÉTIQUE? (Sénat Français, 2009), *available at* www.senat.fr/rap/r09-182/r09-1820.html; *see also* THEMATIC GROUP ON ENERGY EFFICIENCY OF THE EU–RUSSIAN ENERGY DIALOGUE, TERMS OF REFERENCE, app. 2, (Sept. 27, 2007), *available at* http://ec.europa.eu/energy/international/bilateral_cooperation/russia/doc/groups/efficiency/2007_energy_efficiency_terms_of_reference_en.pdf; *see also* INTERNATIONAL ENERGY AGENCY, OPTIMISING RUSSIAN NATURAL GAS: REFORM AND CLIMATE POLICY 16 (2006), *available at* http://www.iea.org/textbase/nppdf/free/2006/russiangas2006.pdf (discussing the economic benefit that energy efficiency measures – including renewable energy – represents for Russia in terms of increased export potential of fossil fuels). *See also* Rasporiazhenie Pravitel'stva RF Ob utverzhdenii gosudarstvennoi programmy 'Energosberezhenie i povyshenie energeticheskoi effektivnosti na period do 2020 goda [Federal Program on Energy Efficiency for the Period until 2020], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2011, No. 4, Item 622.

7. INT'L ENERGY AGENCY, WORLD ENERGY OUTLOOK 274 (2011) [hereinafter WORLD ENERGY OUTLOOK].

8. *Id*.

9. *Id*.

international energy security and reorient the Russian economy towards more sustainable and innovative patterns.

Russia has the largest and oldest district heating system in the world – i.e., centralized heat production and distribution through heat networks, in contrast to heating with decentralized (individual) boilers.[10] Moreover, the Russian electricity and heating sector is characterized by a high rate of combined heat and power (CHP) installations.[11] In theory, centralized heat supply, in combination with heat production by CHP plants, if well maintained and managed, can be one of the most efficient ways of organizing the energy system.[12] CHP plants recover the heat – a by-product of electricity generation – that is largely wasted with conventional electricity production techniques. District heating systems supply this heat to industrial and household consumers and are therefore (in theory) a more energy efficient alternative to individual heat boilers. In Russia, however, heat production installations operate at a level of energy efficiency well below international averages.[13] Given the obsolescence of the Russian district heating infrastructure, a considerable amount of energy can be saved through relatively accessible technologies and cost-effective energy saving practices.[14] The Russian district heating sector also presents great potential for the use of renewable energy sources, particularly biomass and geothermal energy.[15]

10. INT'L ENERGY AGENCY, CHP/DH COUNTRY PROFILE: RUSSIA 4 (2009), *available at* http://www.iea.org/g8/chp/profiles/russia.pdf [hereinafter CHP/DH COUNTRY PROFILE].

11. *Id.*

12. INT'L ENERGY AGENCY, COMING IN FROM THE COLD: IMPROVING DISTRICT HEATING POLICY IN TRANSITION ECONOMIES 41 (2004), *available at* http://www.iea.org/textbase/nppdf/free/archives/cold.pdf [hereinafter COMING IN FROM THE COLD]; *see also* Scott Kelly & Michael Pollitt, *An Assessment of the Present and Future Opportunities for Combined Heat and Power with District Heating (CHP-DH) in the United Kingdom,* 38 ENERGY POL'Y 6936, 6938-39 (2010).

13. WORLD ENERGY OUTLOOK, *supra* note 7, at 274.

14. UNTAPPED RESERVES, *supra* note 2, at 56; JOANA CHIAVARI & MARC PALLEMAERTS, ENERGY AND CLIMATE CHANGE IN RUSSIA: NOTE FOR DG INTERNATIONAL POLICIES OF THE UNION POLICY DEPARTMENT ECONOMIC AND SCIENTIFIC POLICY 10 (2008), *available at* http://www.ieep.eu/assets/433/ecc_russia.pdf.

15. RENEWABLE ENERGY POLICY IN RUSSIA, *supra* note 3, at 18.

Realizing the energy saving potential of the Russian heating sector requires the creation of an adequate regulatory framework that is conducive to the transfer of capital and energy efficient technology. In particular, heat tariffs that stimulate – rather than disincentivize – energy savings are needed. Agreeing with international energy experts,[16] the Russian authorities recognize that the inadequacy of the existing tariff structure is one of the main obstacles to the modernization of the Russian heating infrastructure.[17] The traditional approach to tariff setting in Russia does not ensure the financial viability of energy efficiency investments. On the contrary, it encourages companies to increase their operating costs (such as fuel costs) and thus to consume more energy. To modernize the heating sector, investors need to rely on tariff methodologies and structures that enable them to recover the capital costs of their energy efficiency investments and to earn a reasonable return on capital. By the same token, investors in biomass-fueled heat installations need to rely on tariffs that enable them to recover their investment and their operating costs, in particular the cost of biomass.

Acknowledging the necessity of stimulating the efficiency of the heating sector, Russia adopted the Federal Law on Heat Supply on July 27, 2010.[18] This law builds upon other recent legislative action in the field of energy efficiency. On November 23, 2009, Russia adopted the Federal Law on Energy Savings and Energy Efficiency Improvements.[19] On March 26, 2003, it

16. UNTAPPED RESERVES, *supra* note 2, at 12; CHP/DH COUNTRY PROFILE, *supra* note 10, at 1.

17. Ukaz Prezidenta RF Ob osnovnykh polozheniiakh strukturnoi reformy v sferakh estestvennykh monopolii [The Edict on the Main Regulations Concerning Structural Reform in the Field of Natural Monopolies], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 1997, No. 18, Item 2132.

18. Federal'nyi Zakon RF O Teplosnabzhenii [The Federal Heat Law], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2010, No. 31, Item 4159.

19. Federal'nyi Zakon RF Ob energosberezhenii i o povyshenii energeticheskoi effektivnosti [The Federal Energy Efficiency Law], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2009, No. 48, Item 5711.

adopted the Federal Law on the Electric Power Industry[20] to improve the energy efficiency of the electricity sector by organizing it on a liberalized market basis.[21]

This article analyzes the new legislative basis that the 2010 Federal Heat Law – together with the Federal Energy Efficiency Law – creates for the regulation of tariffs in the heating sector. The central question of this legal analysis relates to the financial viability of energy efficiency and renewable energy investments in the heating sector. Does the new legislative basis for the regulation of heat tariffs in Russia provide investors with the possibility to recover the capital costs of their energy efficiency and renewable energy investments? Does the new law create an adequate tariff structure to tackle the pressing modernization challenge that is presented by the Russian heating system?

By answering these questions, this article aims to contribute to the legal and policy literature on the energy transition towards more sustainable and climate-friendly patterns. Despite its considerable social, economic and geopolitical importance, the issue of energy efficiency in transition economies, and in particular within Russia, remains largely unexplored in Western legal literature.[22] This issue has also received relatively limited attention from Russian legal scholars.[23] Moreover, with the

20. Federal'nyi Zakon RF Ob elektroenergetike [The Federal Electricity Law], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2003, No. 13, Item 1177.

21. Anatole Boute, The Modernisation of the Russian Electricity Production Sector – Regulatory Risks and Investment Protection (Jan. 31, 2011) (unpublished Ph.D thesis, University of Groningen) (on file with the author); INT'L ENERGY AGENCY, RUSSIAN ELECTRICITY REFORM: EMERGING CHALLENGES AND OPPORTUNITIES 63 (2005), *available at* http://www.iea.org/textbase/nppdf/free/archives/russianelec.pdf [hereinafter RUSSIAN ELECTRICITY REFORM].

22. *But see* Bertrand Malmendier, *New Russian Energy Efficiency Act* 29 J. ENERGY & NAT. RESOURCES L. 177 (2011). This piece is one of the few exceptions to this rule.

23. *See* SVETLANA V. MATIIASHCHUK, KOMMENTARII K FEDERAL'NOMU ZAKONU OT 23 NOIABRIA 2009 G. NO. 261-FZ "OB ENERGOSBEREZHENII I O POVYSHENII ENERGETICHESKOI EFFEKTIVNOSTI I O VNESENII IZMENENII V OTDEL'NYE ZAKONODATEL'NYE AKTY ROSSIISKOI FEDERATSII" (2010); V. Zarubina, *Pravovye Aspektye Energosberezheniia v Rossiia* IURISK 23 (2002); I. Ignat'eva, *Budet li Effektivnym Zakonodatel'stvo ob Energoeffektivnosti?* ENERGETIKA I PRAVO 2 (2010); O. Vaneev, *Polnomochiia Sub"ektov Rossiiskoi Federatsii v Sfere Energosberezheniia: Novye Vozmozhnosti*, ROSSIISKAIA IUSTITSIIA 7 (2011).

exception of recent Russian commentaries on the Federal Heat Law,[24] the regulation of district heating has only been incidentally touched upon in both Western and Russian legal literature.[25] This literature gap, with respect to Russian energy efficiency and district heating law, can be explained by the fact that Russia only recently started to reform its energy infrastructure towards more efficient patterns. In addition, the debate in Russian energy law literature has traditionally focused on contractual issues rather than on the regulation of financial incentives to stimulate investments.[26] The lack of legal analysis on district heating can be explained by scholars' focus on the electricity market. The electricity market liberalization process has raised important legal issues, which have taken attention away from the regulated segments of the energy supply industry.

The focus on sustainability issues in the electricity sector rather than in the district heating sector is also characteristic of Western environmental law and energy law literature. The lack of attention to the regulation of district heating in such literature can be explained by the fact that district heating remains relatively undeveloped in the European Union and the United States, particularly in comparison to Russia. States only recently started to advocate district heating as part of the solution to decarbonize energy supplies. Because of higher energy efficiency levels, district heating – together with CHP generation – is central to the most recent European energy efficiency initiatives.[27] By the same token, the use of renewable energy sources (e.g., biomass and geothermal energy) for heat production

24. SVETLANA V. MATIIASHCHUK, KOMMENTARII K FEDERAL'NOMU ZAKONU OT 27 IIULIA 2010 G. N 190-FZ 'O TEPLOSNABZHENII' (2011).

25. It has also benefitted from insufficient attention by political and social scientists. *See generally* Anna Korppoo & Nina Korobova, *Modernizing Residential Heating in Russia: End-use Practices, Legal Developments, and Future Prospects*, 42 ENERGY POL'Y 213 (2012).

26. *See* OLEG A GORODOV, DOGOVORY V SFERE ELEKTROENERGETIKI (2007); SERGEI A SVIRKOV, DOGOVORNYE OBIAZATEL'STVA V ELEKTROENERGETIKE (2006); Alla Varlamova, *O Nekotorykh Problemakh Dogovornykh Otnoshenii na Rynke Elektroenergii*, KHOZIAISTVO I PRAVO (2006).

27. *European Commission Proposal for a Directive on Energy Efficiency and Repealing Directives 2004/8/EC and 2006/32/EC,* at 5, COM (2011) 370 final (June 22, 2011).

has gained importance in recent years.[28] Legal issues regarding the development of these techniques are thus likely to become increasingly relevant in the context of the current debate on the transition toward more sustainable and climate-friendly energy patterns. In this context, a legal analysis of the Russian heating sector is of special relevance. Russia has accumulated much experience in the development and organization of district heating. The Russian experience can provide valuable lessons for the creation of an adequate regulatory framework for district heating and CHP in other countries.

The structure of the argument in this article proceeds as follows. Part II outlines the current state and structure of the Russian district heating sector. This section uses the Russian example to introduce the reader to the basic function and organization of district heating and CHP technologies. Part III highlights investment challenges facing the Russian heating sector by focusing on the necessity for improvement in energy efficiency and the need to exploit the potential for renewable energy sources, in particular biomass and geothermal energy. I therefore review official policy documents that outline the principles underlying the future development of Russian heating infrastructure. Part IV examines the new tariff structure under the Federal Heat Law and the Federal Energy Efficiency Law. I take the perspective of an investor in energy efficiency and renewable energy projects in the Russian heating sector, and ask whether the new tariff structure provides sufficient guarantees to recover the capital costs associated with these projects. Part V analyzes the specific case of CHP installations, in particular the issue of cost allocation between the heat and electricity output of these installations. I examine how the allocation of costs between electricity and heat revenues influences the competitiveness and

28. Council Directive 2009/28/EC on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives, 2001/77/EC and 2003/30/EC, art. 16, para. 11, 2009, O.J. (L 140), 16-62; Ralph Sims et al., *Integration of Renewable Energy into Present and Future Energy Systems, in* IPCC SPECIAL REPORT ON RENEWABLE ENERGY SOURCES AND CLIMATE CHANGE MITIGATION 641 (Ottmar Edenhofer et al. eds., 2011); Veit Bürger, *Policies to Support Renewable Energies in the Heat Market,* 36 ENERGY POL'Y 3150 (2008).

financial viability of high efficiency CHP installations. Part VI concludes.

II. THE CURRENT STATE AND STRUCTURE OF THE RUSSIAN DISTRICT HEATING SECTOR

A. From Centralization to "Boilerization"

In 2010, Russia produced approximately two billion gigacalories of heat. Seventy percent of the heat produced (or 1.35 billion gigacalories) was centrally produced and supplied through district heating networks.[29] This magnitude can better be understood by comparison with heat production in other countries.[30] Heat sales in the district heating network in Finland – which has relatively similar climatic conditions to central and northwestern Russia – amounted to about twenty-seven million gigacalories in 2009.[31] In the United States, an estimated eighty-eight million gigacalories of heat were sold to consumers in the same year.[32]

Centralized heat production in Russia consists of CHP plants, thermal electricity production plants with heat as a byproduct,[33] and large boilers (with a capacity exceeding twenty gigacalories per hour) that supply heat to the local network (i.e., heat supply pipes).[34] Decentralized heat production installations

29. AGENTSTVO PO PROGNOZIROVANIIU BALANSOV V ELEKTROENERGETIKE (APBE), STSENARNYE USLOVIIA RAZVITIA ELEKTROENERGETIKI NA PERIOD DO 2030 GODA 46 (2011), *available at* http://www.e-apbe.ru/5years/detail.php?ID=40223.

30. It must be noted that comparisons of the size of the Russian district heating sector with other countries must be considered carefully given the specific climatic conditions in Russia and the specific industrial basis and size of the Russian economy.

31. This is roughly equivalent to 116,000 terajoules. EUROHEAT & POWER, DISTRICT HEATING AND COOLING COUNTRY BY COUNTRY: 2011 SURVEY 124 (2011).

32. This is roughly equivalent to 365,000 terajoules. *Id.* at 400.

33. On the difficulty in delimitating the notions of thermal power plants and CHP installations and the confusion created by different approaches in official statistics, see SIMON PIRANI, ELUSIVE POTENTIAL: NATURAL GAS CONSUMPTION IN THE CIS AND THE QUEST FOR EFFICIENCY 33, 42 (2011), *available at* http://www.oxfordenergy.org/wpcms/wp-content/uploads/2011/07/NG-531.pdf.

34. ENERGY COMMITTEE OF THE STATE DUMA, EXPLANATORY NOTE TO THE PROJECT OF FEDERAL LAW ON HEAT SUPPLY NO. 177427-5, at 1 (Mar. 23, 2009),

are generally smaller boilers (under twenty gigacalories) and other autonomous heat sources. CHP installations account for approximately thirty-one percent of the heat production[35] and around one-third of the electricity production capacity in Russia.[36] CHP installations can function in heat extraction mode – i.e., when the CHP plants produce heat together with electricity – or in condensing mode – i.e., in the sole production of electricity. Heat extraction varies with time of year and demand by industrial consumers. In condensing mode, the energy efficiency of CHP plants is much lower than in heat extraction mode.

The large share of district heating and CHP in Russia is a legacy of the Soviet organization of the economy, which aimed to ensure a centralized supply of heat and electricity to the major cities and industrial centers.[37] The heat network was designed to supply heat to residential, commercial and industrial consumers. The heat supplied to buildings is used for hot water and space heating. In addition, the industry uses steam for production purposes.

Since 1990, the share of centralized heat supply has decreased due to the difficult economic context of the post-Soviet transition.[38] In contrast to the electricity market, where demand increased considerably since 1998 following economic growth, the decreasing trend in the district heating sector continued between 2000 and 2008.[39] This continual decrease can be explained by the fact that reliability of supply concerns and tariff issues led consumers to switch from centralized heat supply to individual

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available at http://asozd2.duma.gov.ru/main.nsf/(Spravka)?OpenAgent&RN=177427-5.

35. *See* PIRANI, *supra* note 33, at 44; APBE, *supra* note 29, at 36; ENERGY COMMITTEE OF THE STATE DUMA, *supra* note 34, at 1.

36. INT'L ENERGY AGENCY, TOWARD A MORE EFFICIENCY AND INNOVATIVE ELECTRICITY SECTOR IN RUSSIA 8 (2012), *available at* http://www.iea.org/publications/insights/russian_electricity_reform.pdf; *see also* WORLD ENERGY OUTLOOK, *supra* note 7, at 269.

37. CHP occupied a leading place in the domestic economic structure of the Soviet Union. *See* Yuri A Zeigarnik, *Some Problems with the Development of Combined Generation of Electricity and Heat in Russia,* 31 ENERGY 2387-94 (2006); SVETLANA V. MATIIASHCHUK, RYNOK TEPLOVOI ENERGII: VOPROSY TEORII I PRAKTIKI 5-15 (2009); CHP/DH COUNTRY PROFILE, *supra* note 10, at 1.

38. APBE, *supra* note 29, at 36; PIRANI, *supra* note 33, at 37.

39. PIRANI, *supra* note 33, at 37.

boilers.[40] According to the IEA, heat supply from CHP installations dropped by more than thirty percent between 1990 and 2007.[41]

The Russian authorities consider this "boilerization" trend (i.e., the replacement of central heat supply by individual boilers) as a "chaotic" development that threatens the central heating system.[42] This trend has serious implications from an energy efficiency perspective.[43] The decrease in demand for centralized heat affects the profitability of CHP installations and large boilers, and prevents investments in the modernization of existing plants. This prolongs the operational lifetime of existing obsolete installations, and increases the energy, carbon intensity, and environmental impacts of the heating sector. Moreover, the decreasing trend in use of the centralized heating system contrasts with international efforts to stimulate district heating and CHP generation as solutions to decarbonizing energy supply.

B. Fuel Mix and Energy Efficiency

The fuel mix of the Russian centralized heating sector primarily consists of natural gas – 65.8 percent in 2008, followed by coal and peat – 20.9 percent, renewable energies such as biomass and geothermal – more than 5.5 percent, and oil products – 5.2 percent.[44] There are important regional differences in the Russian Federation. The share of natural gas in the European part of Russia is much larger than in Siberia and

40. CHP/DH COUNTRY PROFILE, *supra* note 10, at 4; WORLD ENERGY OUTLOOK, *supra* note 7, at 273; Gurgen Olkhovsky, *Upgrading Cogeneration Technologies at Russian Combined Heat and Power (CHP) Plants, in* WORLD ENERGY COUNCIL, REGULATING DISTRICT HEATING AND COGENERATION IN CENTRAL AND EASTERN EUROPE (2004), *available at* http://www.worldenergy.org/documents/dhchp.pdf.

41. CHP/DH COUNTRY PROFILE, *supra* note 10, at 4.

42. ENERGY COMMITTEE OF THE STATE DUMA, *supra* note 34, at 1.

43. Aleksander Bogdanov, *Kotel'nizatsiia Rossii – Beda Natsional'nogo Maschtaba*, ENERGORYNOK 50, 50-58 (2006).

44. The Federal Program on Energy Efficiency for the Period Until 2020, *supra* note 6, at app. 2; *see also* PIRANI, *supra* note 33, at 35; A. Nekrasov et al., *State-of-the-Art of Russia's Heat Supply Systems,* STUD. RUSS. ECON. DEV. 20, 24 (2011).

the Far East where coal is predominant.[45] This can be explained by the location of vast coal resources in the latter regions.[46] Geothermal energy is used in Kamchatka; biomass (e.g., wood waste and waste from the animal industry) is used in the Archangelsk region – characterized by a relatively large forestry industry[47] – and in Belgorod – characterized by a relatively large pork industry.

Due to the absence of investment in modernization of infrastructure, the large majority of the CHP plants and boilers in Russia are obsolete.[48] According to Russia's Energy Strategy 2030, between sixty-five and seventy percent of infrastructure is fully depreciated.[49] According to the World Bank, "[m]ost of Russia's boilers fall short of the best international energy intensities."[50] Moreover, network losses are considerable. They amount to between twenty and twenty-five percent of heat production, depending on the statistics.[51] In contrast, in Helsinki, Finland, network losses amount to six percent.[52]

The high energy and carbon intensity of the Russian heating sector offers considerable opportunities for cost efficient energy savings and greenhouse gas emission reductions. As noted above, modernizing this sector is thus a key issue from a climate change perspective. Given the high share of gas used by the heating sector, it is also of strategic importance for the European Union.

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45. CHP/DH COUNTRY PROFILE, *supra* note 10, at 4.

46. PIRANI, *supra* note 33, at 35.

47. On the potential for energy wood resources in the region, see Yuri Gerasimov & T. Karjalainen, *Energy Wood Resources in Northwest Russia*, 35 BIOMASS AND BIOENERGY 1655 (2011).

48. UNTAPPED RESERVES, *supra* note 2, at 54, 57; ALLIANCE TO SAVE ENERGY, URBAN HEATING IN RUSSIA: EXPERIENCE FROM THE TRANSITION AND FUTURE DIRECTIONS 13 (2006), *available at* http://www.ase.org/uploaded_files/munee/Russia_UH_Analysis.pdf; STEPHAN SOLZHENITSYN ET AL, PATHWAYS TO AN ENERGY AND CARBON EFFICIENT RUSSIA 418 (2009), *available at* http://www.mckinsey.it/idee/practice_news/pathways-to-an-energy-and-carbon-efficient-russia-summary-of-findings.view.

49. Rasporiazhenie Pravitel'stva RF Ob Energeticheskoi strategii Rossii na period do 2030 goda [The Russian Energy Strategy for the Period Until 2030, SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2009, No. 48, Item 5836.

50. UNTAPPED RESERVES, *supra* note 2, at 57.

51. *Id*. at 58; Nekrasov, *supra* note 44, at 26; PIRANI, *supra* note 33 at 44.

52. UNTAPPED RESERVES, *supra* note 2, at 58.

Improving the energy efficiency of the heating sector can free gas for exports.[53]

C. The Ownership Structure

Most CHP installations are controlled by Territorial Generation Companies ("TGKs"). The TGKs are regional electricity production companies that have been created based on the regional production assets of the former Russian unified energy system, the quasi-monopolist RAO UES. Before the privatization and liberalization of the electricity sector in 2003, RAO UES controlled the large federal production assets, as well as several regional energy supply companies called "AO-Energos." AO-Energos produced and supplied electricity and heat regionally by operating CHP installations. During the privatization of RAO UES, TGKs were formed with the production assets of the AO-Energos.[54] The TGKs were sold to private investors.[55]

TGKs generally control district heating networks. The TGKs are the largest heat producers in Russia. They account for about sixty-eight percent of heat production.[56] Other heat suppliers are the regional generation companies that remained independent to RAO UES (e.g., Irkutskenergo and Tatenergo, which operate in the Irkutsk region and in Tartarstan, respectively).[57]

The large thermal power plants, which generate heat as byproduct of electricity, are controlled by the Wholesale Generation Companies (referred to herein as "OGK," in

53. CHP/DH COUNTRY PROFILE, *supra* note 10, at 3; CÉSAR, *supra* note 6; THEMATIC GROUP ON ENERGY EFFICIENCY OF THE EU–RUSSIAN ENERGY DIALOGUE, *supra* note 6. The International Energy Agency estimates that energy efficiency improvements in Russia's district heating sector could save thirty to fifty billion cubic meters per year of natural gas. INT'L ENERGY AGENCY, DEVELOPMENT OF ENERGY EFFICIENCY INDICATORS IN RUSSIA 18 (2011), *available at* http://www.iea.org/papers/2011/Russia_En_Eff_Ind.pdf.

54. Alda Engoian, *Industrial and Institutional Restructuring of the Russian Electricity Sector: Status and Issues*, 34 ENERGY POL'Y 3233 (2006).

55. PRICEWATERHOUSECOOPERS, POWER DEALS 2007 ANNUAL REVIEW 13 (2007); PRICEWATERHOUSECOOPERS, POWER DEALS 2008 ANNUAL REVIEW 7 (2008).

56. PIRANI, *supra* note 33, at 43.

57. Petra Opitz, *The (Pseudo-) Liberalization of Russia's Power Sector: the Hidden Rationality of Transformation*, 28(3) ENERGY POL'Y 147, 150 (2000).

accordance with the Russian acronym). These companies were also created during the privatization of RAO UES. The OGKs are, along with the state-controlled nuclear operator Energoatom and the hydropower company RusHydro, the largest producers in the wholesale electricity market. The thermal OGKs were formed based on the large federal plants owned by RAO UES, as well as some regional generation assets that were controlled by the AO-Energos. The heat output of these thermal power plants is often a by-product of their main electricity production activity, and so their share in the heat market is marginal.

In contrast to the regional heat production infrastructure and large federal plants, the ownership structure of smaller boilers is more diversified. They are controlled by municipalities and by private companies.

The ownership structure of the district heating sector illustrates the close interrelation between the heat and electricity markets. TGKs, and to a lesser extent OGKs, are active in the electricity market and the heating market.[58] As will be seen below, the participation of CHP installations in both the electricity and heat markets has important financial consequences for the business case of these investments. Indeed, the electricity sector is largely organized on a liberalized market basis, whereas heat supply mainly remains regulated.

It is important to note that Russian law considers heat transport activities to be a natural monopoly.[59] District heating does not, however, qualify as being a "sector of strategic interest."[60] The stringent conditions of the Federal Law on

58. For information on the market power of these generation companies in the different regions, see FEDERAL'NAIA ANTIMONOPOL'NAIA SLUZHBA, OBZOR SOSTOIANIIA KONKURENTSII NA OPTOVOM RYNKE ELEKTRICHESKOI ENERGII I MOSHCHNOSTI 18-20, 30 (2009); Russell Pittman, *Restructuring the Russian Electricity Sector: Re-creating California?*, 35(3) ENERGY POL'Y 1872-83 (2007).

59. Federal'nyi Zakon RF O estestvennykh monopoliiakh [The Federal Law on Natural Monopolies] art. 4, para. 1, SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 1995, No. 34, Item 3426].

60. Federal'nyi Zakon RF O poriadke osushchestvleniia inostrannykh investitsii v khoziaistvennye obshchestva, imeiushchie strategicheskoe znachenie dlia obespecheniia oborony strany i bezopasnosti gosudarstva [The Federal Law on Foreign Investments in Strategic Sectors] art. 6, 36, SOBRANIE

Foreign Investments in Strategic Sectors thus do not apply to foreign investments in the district heating sector.

III. THE MODERNIZATION OF THE RUSSIAN HEATING SECTOR: INVESTMENT CHALLENGES

To understand the long-term vision of the Russian authorities for the development and modernization of the district heating infrastructure, it is necessary to examine the main legal and regulatory documents that govern the sector. An analysis of these strategic documents enables identification of the fundamental principles of Russian heat law. These principles illustrate how Russia intends to tackle the existing deficiencies and forthcoming challenges for heat supply.

A. Strategic Documents: Sources of Russian Heat Law

Among the official documents that outline the relevant strategic aspects for the long-term development of the Russian district heating sector, the main one is certainly the Federal Heat Law of July 27, 2010.[61] This law regulates heat production, distribution and supply to consumers. It also outlines the main principles of development for the Russian heating sector. Before the adoption of the Federal Heat Law, the heating sector was not regulated by one overarching legislative act. Rather, it fell within the scope of application of different legislative documents, such as the Federal Law of April 14, 1995 on the State Regulation of Tariffs for Electric and Thermal Energy.[62] By determining general principles for the organization of heat production and supply, the Federal Heat Law brings consistency to the regulation of this sector.

ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2008, No. 18, Item 1940.

61. The Federal Heat Law, *supra* note 18.

62. Federal'nyi Zakon RF O gosudarstvennom regulirovanii tarifov na elektricheskuiu i teplovuiu energiiu v Rossiiskoi Federatsii, [The Federal Electricity and Heat Tariff Law], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russia Federation Collection of Legislation] 1995, No. 16, Item 1316. This law has now been repealed.

Given the close interrelation between the heating and electricity sectors, the Federal Electricity Law of March 26, 2003 is also of key importance for the development of the heating sector in Russia.[63] The Federal Electricity Law establishes the legal foundations of the Russian electricity sector.[64] It determines the fundamental principles underlying the electricity sector's organization and its further development.

Given its high energy intensity and large potential for energy savings, the heating sector is of particular importance to Russian energy efficiency policy and law. The Federal Energy Efficiency Law of November 23, 2009 is therefore key to the modernization of the Russian heating sector.[65] In accordance with this law, the government of the Russian Federation and the regional authorities are required to develop energy efficiency programs. These programs outline how the federal and regional authorities plan to improve the energy efficiency of the Russian economy, including the heating sector. In addition, a long-term vision for the heating sector is outlined in Russia's Energy Strategy 2030.[66]

B. Perspectives of Development: Principles of Russian Heat Law

In accordance with Article 3 of the Federal Heat Law, the main principles that underlie the development of the heating infrastructure in Russia are: (1) securing an energy efficient and environmentally safe supply; (2) prioritizing deployment of CHP generation; (3) ensuring reliability of supply; and (4) stimulating the centralized development of the heating system. The Federal Heat Law also recognizes the importance of a planned, or central, command-and-control approach to the organization of the heating system.[67]

The Federal Electricity Law and the Federal Energy Efficiency Law endorse the principles of energy efficiency and an

63. The Federal Electricity Law, *supra* note 20.
64. *Id*. at arts. 1, 6.
65. The Federal Energy Efficiency Law, *supra* note 19.
66. The Russian Energy Strategy for the Period Until 2030, *supra* note 49.
67. The Federal Heat Law, *supra* note 18, art. 23, para. 8

environmentally safe energy supply.[68] Moreover, these laws recognize the principle of reliability of supply,[69] and of a planned approach to the organization of energy infrastructure.[70] As will be analyzed hereunder, CHP also benefits from a priority treatment under the Federal Electricity Law, in particular with regard to the selection of price bids on the day-ahead market and the dispatching of production installations.

Although the legal principles outlined in these Federal Laws are not directly enforceable, they are of fundamental importance for the organization of the Russian heating sector. This is due to the fact that the regulatory, executive and judicial authorities must take these principles into account when interpreting and applying these laws.[71] In accordance with Article 3, paragraph 2 of the Federal Heat Law, and Article 6, paragraph 2 of the Federal Electricity Law, public policy in the heating and electricity sectors shall aim at ensuring compliance with the general principles established by these Federal Laws. Accordingly, judicial authorities will refer to these principles to interpret the law in the context of claims of violations by the regulatory and executive authorities. Reference to these principles will prove to be particularly relevant in the context of tariff disputes, which is the main topic of the present piece.[72]

Most principles governing the development of the Russian heating sector are complementary and mutually reinforcing. To ensure synergy between the different principles of Russian heat law, the Federal Heat Law introduces the mechanism of "heat supply schemes": local authorities (municipalities) for districts under 500 inhabitants, and federal authorities for larger cities, are required to elaborate schemes (or plans) that outline the development of the heating system.[73] Heat supply schemes are

68. The Federal Electricity Law, *supra* note 20, art. 6; *see also* The Federal Energy Efficiency Law, *supra* note 19, art. 4.

69. The Federal Electricity Law, *supra* note 20, art. 6.

70. The Federal Energy Efficiency Law, *supra* note 19, art. 4; *see* also The Federal Electricity Law, *supra* note 20, art. 21, para. 2.

71. MATIIASHCHUK, *supra* note 24.

72. *See* Opredelenie Verkhovnogo Suda Rossiiskoi Federatsii No. 73-G12-1 (Feb. 22, 2012) [hereinafter *Decision of the Russian Supreme Court No. 73-G12-1*].

73. The Federal Heat Law, *supra* note 18, art. 2, § 20, art. 4, para. 2, art. 6.

first and foremost a reaction to the "chaotic" boilerization of the Russian heating system.[74] They aim at ensuring the coherent development of the Russian heating infrastructure and thus safeguard a centralized heat supply. Simultaneously, the heat supply schemes must ensure a reliable heat supply in an energy efficient way,[75] which includes stimulating the use and further deployment of CHP installations.[76] By integrating the principles of centralized heat supply development, reliability of supply, energy efficiency, and priority development of CHP, the heat supply schemes enable the implementation of Russian heat law to be streamlined.

Importantly, the heat supply schemes are part of the planned approach to the development of the heating sector and the planned approach to improved energy efficiency. Indeed, these schemes are closely related to the investment programs that the regulatory authorities approve for the different (regulated) heat companies. They also complement the energy efficiency programs that regional and federal authorities must develop in accordance with the Federal Energy Efficiency Law.[77] Russian experts have defended the view that the design and implementation of heat supply schemes is essential to improve the efficiency and coherent development of the heating sector.[78] International experience (e.g., in Denmark) illustrates the benefits of a planned approach to the organization of district heating.[79] In Russia, as further analyzed below, this planned approach is of essential importance to the financial viability of energy efficiency investments: authorities must adopt tariffs that reflect the investment and operating expenses that heat companies make in the implementation of energy efficiency programs.

The Federal Heat Law also adopts an integrated and streamlined approach to the promotion of energy efficiency.

74. ENERGY COMMITTEE OF THE STATE DUMA, *supra* note 34, at 3.

75. The Federal Heat Law, *supra* note 18, art. 2, § 20, art. 23, para. 2.

76. *Id*. at art. 23, paras. 2, 8.

77. The Federal Energy Efficiency Law, *supra* note 19, art. 14.

78. ALLIANCE TO SAVE ENERGY, *supra* note 48, at 37.

79. David Toke & Aikaterini Fragaki, *Do Liberalized Electricity Markets Help or Hinder CHP and District Heating? The Case of the UK*, 36 ENERGY POL'Y 1148, 1455 (2008).

Energy efficiency concerns are reflected in the other principles of Russian heating law. The priority development of CHP aims, for instance, to reduce primary energy consumption by maximizing the benefit of the joint production of heat and power. By the same token, energy efficiency improvements and the modernization of infrastructure will contribute to reliable heat supply. Energy efficiency is also a requirement of the heat supply schemes and is thus central to the principle of centralized development of the heating infrastructure. As introduced above, it is also an important aspect of the planned approach to the heating sector and is reflected in the investment programs of regulated heat companies.

It is important to note that under Russian law, renewable energy is part of the broader concept of energy efficiency.[80] Energy efficiency programs should consider measures to increase the share of renewable energy sources.[81] Policy and regulatory instruments to stimulate energy efficiency improvements (e.g., tariff methodologies that aim to ensure the financial viability of energy efficiency projects) thus cover renewable energy projects. An analysis of energy efficiency regulation is also relevant for renewable energy investments.

80. Rasporiazhenie Pravitel'stva RF Osnovnye napravleniia gosudarstvennoi politiki v sfere povysheniia energeticheskoi effektivnosti elektroenergetiki osnove ispol'zovaniia vozobnovliaemykh istochnikov energii na period do 2020 goda [The Main Directions for the State Policy to Improve the Energy Efficiency of the Electricity Sector on the Basis of the Use of Renewable Energy Sources for the Period up to 2020], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2009, No. 4, Item 515.

81. The Federal Energy Efficiency Law, *supra* note 19, art. 14, paras. 6, 7; Postanovlenie Pravitel'stva Rossiiskoi Federatsii O trebovaniiakh k regional'nym I munitsipal'nym programmam v oblasti energosberezheniia I povysheniia energeticheskoi effektivnosti, No. 1225, SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2010, No. 6, Item 645 (signed Dec. 31, 2009); Prikaz Ministerstva ekonomicheskogo razvitiia RF Ob utverzhdenii primernovo perechnia meropriiatii v oblasti energosberezheniia i povysheniia energeticheskoi effektivnosti, kotoryi mozhet byt' ispol'zovan v tseliakh razrabotki regional'hykh, munitsipal'nykh program v oblasti energosberezheniia I povysheniia energeticheskoi effektivnosti, No. 61, *Zhurnal rukovoditelia i glavnogo bukhgaltera ZHKKH,* No. 5, 2010 (signed Feb. 2010).

C. The Modernization Objectives

The Russian government aims to improve the energy efficiency of the Russian economy by 40 percent by 2020, as compared to 2007 energy consumption levels.[82] With respect to the heating sector, the World Bank and Russian energy experts estimate that Russia could cut energy consumption in the heat production sector by 8.4 percent, and that large energy savings can be achieved by developing CHP.[83] Russia's Energy Strategy 2030 aims to reduce network losses from 20 percent (according to some estimates 25 percent) in 2008 to 8-10 percent by 2030.[84] On the production side, Russia aims to improve energy efficiency by modernizing the existing capacity and making maximum use of CHP installations (i.e., by refurbishing individual boiler houses into CHP installations).[85] It also aims to develop heat production on the basis of renewable energy sources, particularly geothermal energy and biomass.[86] In contrast to the electricity sector,[87] Russia has not adopted strategic objectives for the development of renewable energy sources in the heating sector. Several Russian regions have, however, expressed their commitment to renewable energy and some are starting to support the use of biomass.[88]

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82. Conception for the Long-Term Social and Economic Development of the Russian Federation until 2020, *supra* note 4; The Russian Energy Strategy for the Period Until 2030, *supra* note 49, at 15-16; *see also* Aleksandra Novikova et al., *Russian Pledge vs. Business-as-usual – Implementing Energy Efficiency Policies Can Curb Carbon Emissions* 2 (The Finnish Institute of International Affairs, Working Paper No. 61, 2009), *available at* http://www.upi-fiia.fi.

83. UNTAPPED RESERVES, *supra* note 2, at 57; IGOR BASHMAKOV ET AL., RESOURCE OF ENERGY EFFICIENCY IN RUSSIA: SCALE, COSTS AND BENEFITS 46 (2008), *available at* http://www.cenef.ru/file/Energy percent20balances-final.pdf.

84. The Russian Energy Strategy for the Period Until 2030, *supra* note 49, at 73.

85. The Federal Program on Energy Efficiency for the Period Until 2020, *supra* note 6, at ch. 5; APBE, *supra* note 29, at 37.

86. The Russian Energy Strategy for the Period Until 2030, *supra* note 49, at 71.

87. The electricity sector target is 4.5 percent by 2020, according to the Main Directions for the State Policy to Improve the Energy Efficiency of the Electricity Sector on the Basis of the Use of Renewable Energy Sources for the Period up to 2020.

88. *See* RENEWABLE ENERGY POLICY IN RUSSIA, *supra* note 3, at 46; DUTCH EMBASSY IN MOSCOW, EN MASSE FOR RUSSIAN BIOMASS (2011), *available at* http://www.mvo.nl/Portals/0/duurzaamheid/biobrandstoffen/nieuws/2011/08/kansen

Russian energy efficiency improvement objectives (and associated energy savings) are ambitious. However, it is clear that without a proper regulatory framework that ensures the financial viability of energy efficiency and renewable investments, the modernization program of the Russian heating sector will largely remain declarative and aspirational. The next section examines the regulatory obstacles that jeopardize the business case of energy efficiency investments in Russia.

D. Tariff Obstacles to Financing the Modernization Program

The high energy intensity of the Russian heating sector is due to the lack of investment in modernization of this sector since the 1980s.[89] Russian and international experts have explained the reluctance of investors to commit capital and technology by referring to the inadequacy of heat tariffs.[90] Analysts have highlighted the methodology, level, cross-subsidization and duration of tariffs as the main obstacles to the financing of energy efficiency investments in the Russian heating sector. Before analyzing how the Federal Heat Law of 2010 aims to stimulate

percent 20biomassa percent20Rusland.pdf. For an overview of the potential for renewable energy of the different regions of the Russian Federation and initiatives to harness this potential, see MINISTRY FOR REGIONAL DEVELOPMENT OF THE RUSSIAN FEDERATION, OBZOR PRIMENIAEMYKH V SUB"EKTAKH POSSIISKOI FEDERATSII VOZOBNOVLIAEMYKH ISTOCHNIKOV ENERGII (2007).

89. In the 1980s and 1990s, investment in the Russian electricity and heating sector decreased substantially. The commissioning of new capacity and the pace of modernization of existing power plants slowed considerably. This started the aging process and increased energy inefficiency in the Russian energy production and transmission sector. *See* ELENA A. TELEGINA, BEZOPASNOST' ROSSII – PRAVOVYE, SOTSIAL'NO, EKONOMICHESKIE I NAUCHNO TEKHNICHESKIE ASPEKTY ENERGETICHESKAIA BEZOPASNOST' – PROBLEMY FUNKTSIONIROVANIIA I RAZVITIIA ELEKTROENERGETIKI 76 (2001); I. V. MOZHINA & N. P. KOZHEMIAKO, FORMIROVANIE STRATEGII ENERGOSBEREZHENIIA NA PREDPRIIATIIAKH ELEKTROENERGETICHESKOI OTRASLI PROMYSHLENNOSTI 5 (2005); Kevin McCann, *Soviet Energy – Crisis or Collapse?*, ENERGY POL'Y 364, 365 (May 1991). In 1983, the Communist Party adopted a program designed to develop and improve the energy efficiency of the electricity and heating sector until the year 2000. However, due to the collapse of the Soviet Union in 1990, this program was not implemented. EVGENII V. KUDRIASHOV, ADMINISTRATIVNO-PRAVOVOE REGULIROVANIE V SFERE ELEKTROENERGETIKI ROSSIISKOI FEDERATSII 24 (2005).

90. UNTAPPED RESOURCES, *supra* note 2, at 12; WORLD ENERGY OUTLOOK, *supra* note 10, at 1.

the financing of this modernization program, it is important to briefly examine these tariff barriers.

Firstly, although the regulatory framework governing tariff setting in Russia allowed for different tariff methodologies (including the "return on investment" methodology), in practice heat tariffs were primarily based on the "cost-plus" methodology,[91] i.e., remuneration of costs plus a standard profit.[92] This cost-plus approach to tariffs does not stimulate companies to reduce their energy consumption and to supply heat in a more efficient way.[93] On the contrary, it creates an incentive to produce more energy, because the income of heat suppliers is based on the cost and the amount of heat sold to consumers.[94] According to the World Bank:

> The cost-plus tariff methodology used in Russia discourages heating suppliers from investing in any measures that save operating and maintenance costs (which include energy costs). With the cost-plus method used currently in Russia, the greater the cost base, the greater the profit margin earned by heat suppliers. As such, the producers' goal of maximizing profit contradicts with the objective of improving their efficiency.[95]

91. The limited use of the return on investment methodology can be explained by the fact that, in accordance with the applicable tariff principles, the Federal Service for Tariffs had to explicitly authorize the transition from the cost-plus methodology to the return on investment methodology for every installation. *See* Postanovlenie Pravitel'stva RF O tsenoobrazovanii v otnoshenii elektricheskoi i teplovoi energii v Rossiiskoi Federatsii [The Decree on the Regulation of Electricity and Heat Prices], Item 15, SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2004, No. 9, Item 791.

92. INT'L ENERGY AGENCY, RUSSIAN ENERGY PRICES, TAXES AND COSTS 10, 18 (1994) [hereinafter RUSSIAN ENERGY PRICES, TAXES AND COSTS]; F. Veselov, *Novaia tsenovaia politika v rossiiskoi elektroenergetike*, 7 ENERGORYNOK, (2007), *available at* http://www.e-m.ru.

93. *See, e.g.*, Diana Poputoaia & Stefan Bouzarovski, *Regulating District Heating in Romania: Legislative Challenges and Energy Efficiency Barriers*, 38 ENERGY POL'Y 3820, 3827 (2010); *see also* COMING IN FROM THE COLD, *supra* note 12, at 111.

94. The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91, art. 16.

95. UNTAPPED RESOURCES, *supra* note 2, at 101.

In the same vein, the Edict of the President of the Russian Federation of April 28, 1997 on the Main Principles underlying the Structural Reform of Natural Monopolies recognized that:

> [T]he reduction in effectiveness of the investment process is largely the result of the existing framework for . . . financing that provides for the creation of financial resources by including the investment component in the tariffs for electricity and heat. The possibility of receiving considerable investment resources by their "mandatory" inclusion into the tariffs for end consumers liberates the joint stock electricity companies from the need to look for potential investors, and reduces the need to search for efficient projects. Moreover, the financing of electricity through regulated tariffs transfers the entire investment risk on electricity consumers, reduces their own investment possibilities to modernize production, which is not conducive to energy savings.[96]

Secondly, heat tariffs, together with the price of primary energy fuels, are subject to intense political pressure and kept at a low level,[97] far below international prices.[98] In many regions of the Russian Federation, low tariffs prevented producers from fully recovering their costs.[99] Historically, low energy tariffs in Russia are seen as a mechanism to hold back inflation[100] and compensate for the high energy intensity of the production

96. Ukaz Prezidenta RF Ob osnovnykh polozheniiakh strukturnoi reformy v sferakh estestvennykh monopolii [the Edict on the Main Regulations concerning the Structural Reform in the Field of Natural Monopolies] art. 1, para. 6 SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 1997, No. 18, Item 2132 (translation by author).

97. THE WORLD BANK, LIGHTS OUT? THE OUTLOOK FOR ENERGY IN EASTERN EUROPE AND CENTRAL ASIA 101 (2010).

98. CHP/DH COUNTRY PROFILE, *supra* note 10, at 1; IEA, *supra* note 87, at 9.

99. FEDERAL'NAJA ANTIMONOPOL'NAJA SLUZHBA, REZUL'TATY MONITORINGA RYNKA TEPLOSNABZHENIJA (2007), *available at* http://www.rosteplo.ru/Tech_stat/stat_shablon.php?id=2124; *see also* DEUTSCHE ENERGIE-AGENTUR GMBH, ERMITTLUNG VON ENERGIEEFFIZIENZPOTENZIALEN IN RUSSISCHEN NAH- UND FERNWÄRMENETZEN 15 (2010), *available at* http://www.dena.de/fileadmin/user_upload/Projekte/Energiesysteme/Dokumente/Kurzbericht_Ermittlung_von_Energieeffizienzpotenzialen.pdf; Korppoo & Korobova, *supra* note 25, at 216.

100. RUSSIAN ENERGY PRICES, TAXES AND COSTS, *supra* note 91, at 9.

process.[101] However, maintaining tariffs at a level too low to cover operating costs prevents additional investment, and jeopardizes energy efficiency improvements in the sector.[102] According to the International Energy Agency, prices have been largely based on social and political considerations, negatively affecting investments in production capacity.[103]

Cross-subsidization aims to protect the population from energy price increases.[104] With cross-subsidies, households benefit from preferential energy tariffs, while some industrial consumers pay more for their electricity and heat.[105] Cross-subsidization thus protects the population from significant increases in energy prices by placing the burden on the industrial sector. Pricing does not reflect real costs and therefore disincentivizes energy savings.[106] As will be seen below, cross-subsidization also takes place between the electricity and heat output of CHP installations: by adopting higher heat prices, the authorities favor the competitive position of CHP installations on the electricity market at the expense of heat consumers.[107] Subsidizing electricity prices with higher heat prices stimulates the boilerization of the Russian heating system.[108]

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101. *See* ANATOLII I. KUZOVKIN, REFORMIROVANIE ELEKTROENERGETIKI I ENERGETICHESKAIA BEZOPASNOST 105 (2006).

102. *See* Veselov, *supra* note 92; MAIIA M. KHAIT, VLIIANIE RESTRUKTURIZATSII KRUPNYKH PREDPRIIATII NA OTRASLEVOI RYNOK (NA PRIMERE ELEKTROENERGETIKI) 24 (2006); *see also* William Tompson, *Restructuring Russia's Electricity Sector – Towards Effective Competition or Faux Liberalization?* 6-7 (OECD Economics Dept., Working Paper No. 403, 2004) (considering that "the electricity sector has been subsidizing the rest of the economy by running down its capital base").

103. RUSSIAN ELECTRICITY REFORM, *supra* note 21, at 27; INT'L ENERGY AGENCY, WORLD ENERGY OUTLOOK 2010, 599 (2010).

104. VITALII E. SPIRIDONOV, INVESTITSIONNYI FAKTOR RAZVITIIA ELEKTROENERGETIKI ROSSII V PROTSESSE EE REFORMIROVANIIA 8 (2007); VESELOV, *supra* note 92; KUZOVKIN, *supra* note 101, at 6, 137; Franz Hubert, *Reform of Russian Power Industry – Which Lessons from Abroad?* SOC. SCI. RES. NETWORK 6 (2002).

105. For a definition and explanation of cross-subsidization in Russia, see, e.g., KUZOVKIN, *supra* note 101, at 100. *See also* KONSTANTIN B. VAKULEVICH, OSOBENNOSTI EKONOMICHESKOGO RAZVITIIA ELEKTROENERGETIKI V ROSSII 15 (2005).

106. Korppoo & Korobova, *supra* note 25, at 216.

107. COMING IN FROM THE COLD, *supra* note 12, at 119.

108. Bogdanov, *supra* note 43, at 58.

Low tariff levels, along with the use of the cross-subsidization mechanism, illustrate the crucial social meaning of affordable energy in Russia.[109] This legacy of the Soviet system constitutes a major hurdle to the realization of energy savings and the modernization of the Russian heating sector. Investors in energy efficiency improvement measures need to recover the capital costs of their investments. In the short term, this may exercise upward pressure on energy prices and may therefore be opposed for short-term social and political purposes.[110]

An additional barrier to energy efficiency improvements in the Russian heating system is the short-term nature of tariffs.[111] By adopting tariffs on a yearly basis, the system does not provide the necessary visibility and financial predictability that investors require.[112]

IV. TARIFFS AND THE REFORM OF THE RUSSIAN HEATING SECTOR

In order to attract investment in the modernization of the heating sector, the 2010 Federal Heat Law introduces important changes to tariff methodology, level, and duration. It establishes new tariff principles, including the support of energy efficiency improvements, and addresses the issue of cross-subsidization. Before examining energy efficiency issues in relation to heat tariffs, this part briefly introduces the main regulatory structure that governs tariff setting in the Russian heating sector.

109. *See* Christian von Hirschhausen & Petra Opitz, *Power Utility Re-Regulation in East European and CIS Transformation Countries (1990-1999): An Institutional Interpretation* 8 (DIW Berlin German Institute for Economic Research, Discussion Paper No. 246, 2001); Christian von Hirschhausen & Thomas Wälde, *The End of Transition: An Institutional Interpretation of Energy Sector Reform in Eastern Europe and the CIS,* 11(1) MOCT-MOST, 91-108 (2001).

110. Robert P. Anex, *Restructuring and Privatizing Electricity Industries in the Commonwealth of Independent States,* 30 ENERGY POL'Y 397, 407 (2002).

111. D. Matsepuro, *Mekhanizmy vozvrata investitsii v kommunal'nom komplekse*, 8 PRAVO I EKONOMIKA (2006), *available at* http://www.consultant.ru.

112. *Id*.

A. The Regulatory Framework for Heat Tariffs in Russia

The 2010 Federal Heat Law creates the legislative basis for the determination of heat tariffs in Russia.[113] Its tariff regime replaces the Federal Law of April 14, 1995 on the State Regulation of Tariffs for Electric and Thermal Energy[114] that applied until the end of 2010.[115] From the first of January 2011, regulated prices for electricity were replaced by liberalized (i.e., free market) prices. Since 2003, the Russian electricity market has gradually opened to competition, and the end of 2010 marks the final stage of this transition.[116] The completion of liberalization reform in the electricity market is one of the main reasons underlying the need to adopt a new tariff structure for the heating sector. The electricity and heat markets are closely interrelated, as is illustrated by the large share of CHP installations. The 1995 Federal Electricity and Heat Tariff Law provided the legal basis for tariffs in both the electricity and heat sector. There was a need to create a new legal basis for heat tariffs following the liberalization of the electricity market and the subsequent inapplicability of the 1995 Federal Electricity and Heat Tariff Law. The Federal Heat Law is thus the "logical continuation" of the electricity market reform.[117]

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113. MATIIASHCHUK, *supra* note 24, at 2.

114. The Federal Electricity and Heat Tariff Law, *supra* note 62.

115. On the expiration of the 1995 Federal Electricity and Heat Tariff Law, see *Decision of the Russian Supreme Court No. 73-G12-1*, *supra* note 72; Postanovlenie Presidiuma Vysshego Arbitrazhnogo Suda Rossiiskoi Federatsii No. 11009/10 (Jan. 18, 2011) [hereinafter *Decision of the Supreme Arbitrazh Court No. 11009/10*]. On the transition regime, see The Federal Heat Law, *supra* note 18, arts. 29-30.

116. A transitional regulation was established by Federal'nyi Zakon RF Ob osobennostiakh funktsionirovaniia elektroenergetiki v perekhodnyi period i o vnesenii izmenenii v nekotorye zakonodatel'nye akty Rossiiskoi Federatsii i priznanii utrativshimi silu nekotorykh zakonodatel'nykh aktov Rossiiskoi Federatsii v sviazi s priniatiem Federal'nogo zakona 'Ob elektroenergetike' [The Federal Law on the Regulation of the Electric Power Industry during the Transition Period, SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2003, No. 13, Item 1178.

117. ENERGY COMMITTEE OF THE STATE DUMA, *supra* note 34, at 1. On the link between the link between the electricity and heat reform, see S. Shevtsov, *Nekotorye zamechaniia po proektam Federal'novo zakona 'O teplosnabzhenii'*, Vestnik Federal'novo arbitrazhnovo suda Severo-Kavkazskovo okruga 3 (2008).

In accordance with the 1995 Federal Electricity and Heat Tariff Law, the government of the Russian Federation adopted a Decree on the Regulation of Electricity and Heat Prices on February 26, 2004.[118] This decree, last modified on June 6, 2011, establishes the Fundamental Principles for the Formation of Electricity and Heat Prices as well as the Rules for the State Regulation of Electricity and Heat Tariffs. The Fundamental Principles regulate the methodology and structure of heat tariffs. The Rules for the State Regulation of Tariffs govern the procedural aspects of tariff-setting in the heating sector. In accordance with the Federal Heat Law,[119] the government of the Russian Federation must approve new Fundamental Principles and Rules for the Regulation of Heat Tariffs. Draft Principles and Rules have been published.[120] However, without their official enactment, the Fundamental Principles and Rules for the Regulation of Tariffs adopted under the 1995 Federal Electricity and Heat Tariff Law remain applicable. This article examines both the existing[121] and draft Principles and Rules for the Regulation of Heat Tariffs.

The tariff regime of the Federal Heat Law and of the Government Decree on the Regulation of Electricity and Heat Prices, together with the tariff provisions of the Federal Energy Efficiency Law, governs the activities of the tariff authorities in the Russian heating sector. The Federal Service for Tariffs (FST) is the highest tariff authority in the Russian Federation.[122] The

118. The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91, Item 791. It must be noted that since the beginning of 2012 this Decree solely applies to the regulation of heat tariffs. Electricity retail tariffs are now regulated under Postanovlenie Pravitel'stva RF O tsenoobrazovanii v oblasti reguliruemykh tsen (tarifov) v elektroenergetike [The Decree on the Regulation of Electricity Prices], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2012, No. 4, Item 504.

119. The Federal Heat Law, *supra* note 18, art. 4, para. 1, § 6.

120. Proekt postanovleniia Pravitel'stva Rossiiskoi Federatsii "Ob osnovykh tsenoobrazovaniia v sfere teplosnabzhenia," Proekt postanovleniia Pravitel'stva Rossiiskoi Federatsii "O pravilakh regulirovaniia tsen (tarifov) v sfere teplosnabzheniia" [hereinafter *Draft Principles and Rules for the Regulation of Heat Tariffs*].

121. The existing principles are soon to be replaced.

122. Rasporiazhenie Pravitel'stva RF Ob utverzhdenii polozheniia o Federal'noi Sluzhbe po Tarifam [The Decree of the Federal Service for Tariffs],

FST implemented the Government Decree on the Regulation of Electricity and Heat Prices with its Order on the Approval of the Methodological Instructions for the Calculation of Regulated Heat Tariffs of August 6, 2004. The FST will have to amend these Methodological Tariff Instructions in accordance with the Federal Heat Law and the new Decree of the Government of the Russian Federation on the Regulation of Heat Tariffs.

Regional tariff authorities adopt heat tariffs within the framework of the Methodological Instructions for the Calculation of Regulated Heat Tariffs developed by the FST.[123] The administrative functioning of the regional tariff authorities is partly regulated by the Decree of the Government of the Russian Federation on the Regulation of the Regional Tariff Authorities.[124]

Item 1, SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2004, No. 29, Item 3049.

123. It is important to note that the Federal Law No. 210 of December 30, 2004 on the Principles for Regulation of Tariffs for Communal Organizations does not apply to the heating sector. Federal'nyi Zakon RF Ob osnovakh regulirovaniia tarifov organizatsii kommunal'nogo kompleksam, SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2010 No. 31, Item 4179; *see also* Federal'nyi Zakon RF O vnesenii izmenenii v nekotorye zakonodatel'nye akty Rossiiskoi Federatsii v sviazi s priniatiem Federal'nogo Zakona 'O teplosnabzhenii,' SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2010, No. 31, Item 4160); *Decision of the Russian Supreme Court No. 73-G12-1*, *supra* note 72. On the distinction between the supply of warm water – a communal service within the meaning of the Federal Law on Tariffs for Communal Organizations – and heat, see Postanovlenie Federal'nogo Arbitrazhnogo Suda Vostochno-Sibirskogo Okruga No. F02-2611/11 (July 11, 2011) [hereinafter *Decision of the Federal Arbitrazh Court of the East-Siberian District No. F02-2611/11*]; Postanovlenie Chetyrnadtsatogo Arbitrazhnogo Apelliatsionnogo Suda No. 14AP-8263/11 [hereinafter *Decision of the Fourteenth Arbitrazh Appeal Court No. 14AP-8263/11*].

124. Postanovlenie Pravitel'stva RF Ob utverzhdenii tipovogo polozheniia ob organe ispolnitel'noi vlasti Sub"ektka Rossiiskoi Federatsii v oblasti gosudarstvennogo regulirovaniia tarifov [The Decree of the Government of the Russian Federation on the Regulation of Regional Tariff Authority], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2011, No. 10, Item 1379.

B. Principles of Tariff Regulation

The principles of tariff regulation under the Federal Heat Law provide for a very delicate balance between consumer and investor rights. On the one hand, the regulation of tariffs must guarantee the affordability of heat for consumers.[125] On the other hand, tariff regulations must create the necessary conditions to promote energy efficiency investments, and attract adequate financial resources to ensure the reliable functioning of the heating system.[126] Depending on the timeline chosen (short- or long-term), these principles can either be in contradiction or mutually reinforcing. In the short term, the affordability of heat prices for consumers can clash with investor demands to recover the higher capital costs of their energy efficiency investments. Necessary price increases for energy efficiency investments could, in the short term, affect consumers' interests. This potential short-term contradiction between consumer and investor concerns is particularly acute in Russia where investors require a short return on investment periods given the risky business environment and regulatory instability.[127] However, in the long term, energy efficiency investments exert downward pressure on consumer prices because they reduce energy consumption.[128] Energy savings lower the costs for primary energy fuels in the heat production process and thus contribute to the long-term affordability of heat prices.[129] Conversely, low tariffs that aim to

125. The Federal Heat Law, *supra* note 18, art. 7.

126. *Id*.

127. The Global Competitiveness Report 2009–2010 of the World Economic Forum ranks Russia 119th of 133 analyzed countries regarding the protection of property rights, 96th regarding the favoritism in decisions made by government officials, and 116th regarding judicial independence. Moreover, Russia is ranked 109th of 133 on the efficiency of the legal framework in settling disputes, and 111th on the efficiency of the legal framework in challenging regulations. *See* WORLD ECONOMIC FORUM, GLOBAL COMPETITIVENESS REPORT 2009–2010 27, 268 (2009), *available at* http://www.weforum.org; *see also* EUROPEAN COMMISSION DIRECTORATE-GENERAL FOR ECONOMIC AND FINANCIAL AFFAIRS, ECFIN COUNTRY FOCUS – FOREIGN INVESTMENT IN RUSSIA (2008), *available at* http://ec.europa.eu/economy_finance/publications/publication10969_en.pdf.

128. COWI AS AND MUNICIPAL DEVELOPMENT INSTITUTE, AFFORDABLE HEATING UKRAINE – FINAL STRATEGY REPORT iii, 16 (2009), *available at* http://www.esmap.org/esmap/sites/esmap.org/files/ 813200925402_Affordable_Heating.pdf.

129. *Id.; see also* COMING IN FROM THE COLD, *supra* note 12, at 18, 46.

protect consumers in the short term will prevent energy efficiency improvements, increase energy consumption, and thus lead to higher prices in the long term.

Article 7 of the Federal Heat Law recognizes long-term tariffs as a mechanism to achieve the delicate balance between the affordability of prices for consumers and the necessity of ensuring a reasonable return on investments for heat producers and suppliers.[130] Long-term tariffs will ensure the stability of the consumer–producer relation and will contribute to improved investment conditions in the heating sector.[131] In addition, the Federal Heat Law, together with the Federal Electricity Law,[132] recognizes energy efficiency as a fundamental principle of tariff regulation.[133]

Importantly, the Federal Heat Law also provides that tariffs must ensure the "economically well-founded nature" of the costs of heat production, distribution, and supply. The principle of the economically well-founded nature of costs is a cornerstone of Russian tariff regulation.[134] It reflects the balance between the

130. The Federal Heat Law, *supra* note 18, art. 7, para. 1, § 5.

131. *Id.*

132. It must be noted that most principles of tariff regulation in The Federal Heat Law are also recognized in The Federal Electricity Law for the regulated segment of the electricity industry. In accordance with The Federal Electricity Law, the main principles governing electricity prices are the balance of economic interests amongst suppliers and consumers, the affordability of electricity for consumers (including the protection of consumers against unjustified price increases), the economically well-founded nature of prices and the stability of investment conditions. Moreover, the Federal Electricity Law recognizes the need to create the necessary conditions to attract investments in the development of the electricity infrastructure and to ensure economic incentives for the implementation of more efficient technologies. The Federal Electricity Law, *supra* note 20, arts. 6, 20, art. 29, para. 2. These principles can thus be recognized as general principles of Russian (downstream) energy law.

133. The former Federal Law on the State Regulation of Electricity and Heat Tariffs provided that the regulation of tariffs shall aim to "create economic incentives ensuring the use of energy-saving technologies in production processes." On energy efficiency as one of central principles of Russian electricity law, see Petr G. Lakhno, *Printsipy Energeticheskogo Zakonodatel'stva*, ENERGETIKA I PRAVO 150, 172 (2008).

134. I. A. LEONT'EV, KOMMENTARII K FEDERAL'NOMU ZAKONU OT 14 APRELIA 1995 GODA NO. 41-FZ "O GOSUDARSTVENNOM REGULIROVANII TARIFOV NA ELEKTRICHESKUIU I TEPLOVUIU ENERGIIU V ROSSIISKOI FEDERATSII" 15 (2007).

interests of producers (investors) and consumers.[135] Following this principle, investors in energy efficiency and renewable energy projects in the heating sector will have to demonstrate that their investment and operating costs are justified.[136] As such, in the long term, energy efficiency improvements to heat infrastructure will result in lower energy consumption, and therefore will be in the interest of consumers. To enable the modernization of the heating sector, the tariff authorities will thus have to take this long-term benefit to consumer welfare into account when making delicate decisions on the "economic well-founded" nature of heat tariffs.[137]

The "economic well-founded" nature of biomass projects is a more delicate issue. The transformation of wood, waste, and other biodegradable products into biomass for energy production and the supply of this resource to heat generation plants require non-negligible expenses. Biomass is dependent on a supply chain that can, depending on local conditions, be costly to organize. On the other hand, switching from fossil fuel to biomass shields consumers in the long-term from the volatility of primary energy prices. Importantly, the Federal Arbitrazh Court of the Northwest District recently recognized that the additional costs related to the transformation and supply of biomass for CHP production were, *in casu*, "economically well-founded."[138] The

135. IU. ZAKHAROV, PRAVOVYE ASPEKTY REFORMIROVANIIA ELEKTROENERGETIKI 155 (2005).

136. Tariff authorities assess the economically well-founded nature of costs on the basis of accounting reports, statistical date and independent expert evaluations. For recent examples, see Postanovlenie Federal'nogo Arbitrazhnogo Suda Ural'skogo Okruga No. F09-1088/12 (Mar. 15, 2012) [hereinafter *Decision of the Federal Arbitrazh Court of the Ural District No. F09-1088/12*]; Postanovlenie Federal'nogo Arbitrazhnogo Suda Povolzhskogo Okruga No. F06-8306/11 (Oct. 11, 2011) [hereinafter *Decision of the Federal Arbitrazh Court of the Povolzhski District No. F06-8306/11*]; Postanovlenie Federal'nogo Arbitrazhnogo Suda Severo-Kavkazskogo Okruga No. F08-5405/11 (Sept. 26, 2011) [hereinafter *Decision of the Federal Arbitrazh Court of the North-Caucasian District No. F08-5405/11*].

137. The tariff authorities must take the principles of Russian heat law into account when setting the methodologies and determining the level and duration of the heat tariffs. *See Decision of the Russian Supreme Court No. 73-G12-1*, *supra* note 72.

138. Postanovlenie Federal'nogo Arbitrazhnogo Suda Severo-Zapadnogo Okruga No. F07-8429/11 (Oct. 31, 2011) [hereinafter *Decision of the Federal*

Court came to this conclusion by highlighting the absence of proof that using biomass would increase the price of primary energy fuel for electricity and heat production.

C. Tariff Methodologies

Article 9 of the Federal Heat Law recognizes four methodologies for the determination of heat tariffs: economically well-founded costs, indexation of tariffs, guarantee of return on investment, and the comparative approach.

The methodology of economically well-founded costs is the cost-plus approach to tariff setting. In accordance with this methodology, heat tariffs cover operating expenses (e.g., fuel costs) and, to a certain extent, the repayment of capital during the regulatory period.[139] The negative impact of the cost-plus tariff approach to energy efficiency has been highlighted above: it stimulates energy consumption and does not provide long-term financial visibility. With the reform of the Russian heating sector and the recent energy efficiency initiatives, Russia intends to phase out the existing "cost-plus" approach. In accordance with Item 13 of the Draft Principles for the Regulation of Heat Tariffs,[140] the cost-plus methodology cannot be used after January 1, 2013.

The indexation, comparative, and return on investment methodologies are supposed to improve the financial predictability of investments in the modernization of the heating sector.[141] They are considered long-term tariff methodologies.[142]

The indexation methodology adopts a cost-based approach. In contrast to the traditional cost-plus methodology, it integrates

Arbitrazh Court of the Northwest District No. F07-8429/11]; Reshenie Arbitrazhnogo Suda Vologodskoi Oblasti No. A13-13-1398/2011 (July 12, 2011) [hereinafter *Decision of the Arbitrazh Court of the Vologda District No. A13-13-1398/2011*].

139. The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91, at Items 18, 19.

140. *Draft Principles and Rules for the Regulation of Heat Tariffs*, *supra* note 120.

141. Matsepuro, *supra* note 111, at 7.

142. *Draft Principles and Rules for the Regulation of Heat Tariffs*, *supra* note 120, at Item 12.

efficiency coefficients for operating costs.[143] Energy efficiency considerations are thus central to this approach, at least in theory. The indexation methodology also provides for regulated return on invested capital.[144] It therefore combines elements of the cost-based methodology with the return on investment methodology.

The comparative approach provides for the determination of tariffs based on the cost structure of benchmark installations.[145] In accordance with the heat reform plans,[146] it will apply to small heat installations, in particular to plants with an installed capacity under ten gigacalories per hour.[147] Calculating tariffs in relation to benchmark installations can provide adequate incentives to trigger energy efficiency investments.[148] The challenge will be to determine adequate benchmark installations. Given the obsolete state of the Russian heating sector, choosing existing boilers as benchmarks would not stimulate modernization in the sector. On the other hand, imposing state-of-the-art benchmarks based on the best available techniques could jeopardize the financial viability of most heating companies. Alternative benchmarks are needed to enable heating companies to adapt their business case to more efficient standards during a transition period. This could consist of gradually decreasing cost coefficients to eventually achieve ambitious energy efficiency benchmarks – i.e., high efficiency installations with low operating costs. Biomass installations are characterized by relatively high operating costs but are nevertheless considered to be high efficiency installations. To ensure the financial viability of these investments, the cost characteristics of biomass should be

143. *Id*. at Item 60.

144. *Id*. at Item 58.

145. *Id*. at Item 64.

146. The comparative approach is a new tariff methodology. It was not included in Decree No. 109 on the Regulation of Electricity and Heat Prices before the adoption of The Federal Heat Law. The latter only refers to the methodologies of economically well-founded nature of costs, return on investment and indexation of tariffs.

147. *Draft Principles and Rules for the Regulation of Heat Tariffs*, *supra* note 120, at Item 14.

148. COMING IN FROM THE COLD, *supra* note 12, at 115.

recognized by adopting specific benchmarks for these installations.

The return on investment methodology fixes the tariffs so as to recover operating costs, investment costs,[149] and earn a certain profit on the invested capital.[150] In a comparable way to the indexation methodology, operating costs are bound to efficiency coefficients.[151] The return on investment methodology is particularly appropriate for energy efficiency projects,[152] including heat production from geothermal energy. Energy efficiency investments are characterized by high investment costs but lower operating costs in the medium- and long-term. Given the high initial capital intensity of energy efficiency projects, it is essential from an investor's perspective to have guarantees on the compensation of investment costs and the return on invested capital. The return on investment methodology, to a large extent, provides such guarantees. In this respect, it is important to note that the Federal Energy Efficiency Law explicitly refers to the return on investment methodology as a method to stimulate energy efficiency improvements.[153] However, recent tariff proposals considerably limit the application of the return on investment methodology. Firstly, the application of this tariff methodology is limited to CHP installations or large heat boilers (boilers with an installed capacity equal or above ten gigacalories).[154] Secondly, it is limited to companies that can

149. Investment costs are, as will be analysed below, determined on the basis of the investment programs that the regulatory authorities adopt for the concerned heat companies. The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91, at Item 32.

150. The tariff authorities fix the return on invested capital based on specific rules that the FST adopts in co-operation with the Ministry of Energy. The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91, at Item 35; *Draft Principles and Rules for the Regulation of Heat Tariffs*, *supra* note 120, at Item 53.

151. The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91, at Item 48.

152. Korppoo & Korobova, *supra* note 25, at 218 (providing that the investment methodology (Regulatory Asset Base – RAB) "if successful, could be a step towards facilitating desperately-needed modernization investments in the sector").

153. The Federal Energy Efficiency Law, *supra* note 19, at art. 25, para. 6.

154. *Draft Principles and Rules for the Regulation of Heat Tariffs*, *supra* note 120, at Item 15.

demonstrate their financial viability.[155] Thirdly, this methodology will only apply if, at the moment of tariff setting, heat tariff increases have not exceeded the official price forecasts of the federal government's social and economic plan.[156] The latter requirement protects consumers from price increases. It constitutes a potential and important limit to the implementation of ambitious modernization plans in the heating sector. Indeed, as introduced above, although the modernization of the heating infrastructure will reduce operating costs, it represents higher capital investments and will therefore have a certain impact on heat prices in the short term.

Besides the methodology choice, heat tariffs differ depending on their structure. Heat tariffs can have a single or double rate.[157] Single rate (one-tier) tariffs compensate producers for both operating and investment costs through "all inclusive" payments per gigacalorie of heat supplied. Double rate (two-tier) tariffs, by contrast, contain a component for the heat output and a distinct component for the installed capacity of heat installations. Producers' revenues through the output-based rate vary in function of the amount of heat produced. Revenues through the capacity-based rate depend on the ability of the heat plant to meet the heat consumption load of the system (i.e., the readiness of the heat installation to produce heat and supply it to consumers).[158] Double rate tariffs thus have a variable charge (output) and a fixed charge (capacity). In theory, the output component compensates for the operating costs, whereas the capacity component aims to recover investment costs.[159] Double rate tariffs provide important financial guarantees to energy efficiency investments in the heating sector. The possibility of recovering the investment costs of energy efficiency projects in a specific tariff component increases the financial predictability for

155. *Id.*

156. *Id.*

157. The Federal Heat Law, *supra* note 18, at art. 11, para. 1; The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91, at Item 58.

158. The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91, at Item 58, paras. 1, 61.

159. On the capacity component of energy tariffs, see ZAKHAROV, *supra* note 135, at 154; A. Repina, *Pravovaia Priroda Generiruiushchei Moshchnosti,* 4 ZAKONODATEL'STVO 14 (2008).

investors. With double rate tariffs, a large share of the revenues is decoupled from the amount of heat produced. This reduces the incentive to increase energy production in order to recover costs. From a consumption perspective, however, basing a large share of heat tariffs on fixed investment costs reduces the incentive for consumers to save energy.[160]

It can be concluded that the reform of the heating sector provides for tariff methodologies – in particular the benchmarking and the return on investment methodologies – that are well-adapted to the specific cost characteristics of most energy efficiency and renewable energy investments in the heating sector. In contrast to the traditional cost-plus approach, the focus on investment costs facilitates the recovery of high capital expenses in energy efficiency projects. However, as analyzed above, the return on investment approach is limited to very specific cases. More importantly, even if the regional tariff authorities opt for the return on investment approach,[161] the financial viability of energy efficiency projects will eventually depend on what investment costs are eligible for recovery. Indeed, Russian tariff law strictly regulates the type and amount of costs that investors can recoup through tariffs. The next section analyzes whether the higher capital costs of energy efficiency projects can legitimately be integrated into the regulated tariffs. Can regional authorities determine what investment costs they will compensate, and thus what energy efficiency projects they will support? Can the federal authorities

160. COMING IN FROM THE COLD, *supra* note 12, at 116.

161. It must be noted that, in accordance with The Federal Heat Law, *supra* note 18, art. 9, para. 2, the competent regional tariff authority determines what methodology and tariff structure it will apply for each installation by taking into account the methodology proposal made by the operator of the concerned installation. The Federal Service for Tariffs resolves disputes on the choice of methodology between the operator of the regulated heat installation and the regional tariff authority. *See* Postanovlenie Pravitel'stva RF O poriadke rassmotreniia raznoglasii, voznikaiushchikh mezhdu organami regulirovaniia tsen (tarifov) v sfere teplosnabzheniia i organizatsiiami, osushchestvliaiushchimi reguliruemye vidy deiatel'nosti v sfere teplosnabzheniia, v sviazi s vyborom metoda regulirovaniia tsen (tarifov) [The Decree on the Resolution of Disputes on the Choice of Tariff Methodologies], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2011, No. 30, Item 4640.

restrict regional energy efficiency and renewable energy policy choices by imposing strict requirements on the type and amount of investment costs that can be recovered through tariffs?

D. Investment Programs and Tariffs

Investment programs are an essential mechanism to determine heat tariffs that ensure the financial viability of energy efficiency and renewable energy investments. Following the enactment of the Federal Heat Law, regional authorities determined investment programs for the heat companies that operate within their regions.[162] These programs outline the measures (e.g., financial incentives) that heat companies need to implement in order to modernize and develop their infrastructure.[163] The Federal Energy Efficiency Law provides that these programs must contain energy efficiency requirements.[164] Importantly, in accordance with both the Federal Energy Efficiency Law and the Federal Heat Law, tariffs should reflect the costs made to implement investment programs.[165] Including energy efficiency and renewable energy measures in the investment programs of heat companies will thus facilitate the recovery of the investment costs related to the implementation of these energy efficiency and renewable energy measures.[166]

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162. The Federal Heat Law, *supra* note 18, art. 5, para. 5.

163. *Id*. at art. 2, para. 10.

164. The Federal Energy Efficiency Law, *supra* note 19, art. 25, para. 5; Postanovlenie Pravitel'stva RF O poriadke ustanovleniia trebovanii k programmam v oblasti energosberezheniia I povysheniia energeticheskoi effektivnosti organizatsii, osushchestvliaiushchikh reguliruemye vidy deiatel'nosti, art. 2, para. 3, SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2010, No. 21, Item 2606; *see also* The Federal Heat Law, *supra* note 18, art. 2, para. 10.

165. The Federal Heat Law, *supra* note 18, art. 10, para. 8; The Federal Energy Efficiency Law, *supra* note 19, art. 25, para. 7. Regional tariff authorities determine what investment costs can be included in the tariffs on the basis of the investment programs of these companies. The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91, at Item 32.

166. Investors can also crystallize their rights and obligations regarding investments in the modernization of heat production installations by signing concession agreements with the regional authorities. *See* Federal'nyi Zakon RF O kontsessionnykh soglasheniiakh [The Federal Law on Concession

E. Federal Control on Regional Tariff Levels

Having examined the new tariff principles and methodologies under the Federal Heat Law, it is important to analyze the margin of maneuver for regional authorities in the regulation of tariffs. To what extent are the regional tariff authorities bound by limits of tariff levels imposed at the federal level by the FST? The question of regional tariff autonomy in Russia is of particular importance from an energy efficiency perspective. Regions in the Russian Federation are directly confronted with the challenges of ensuring reliability of heat supply and securing primary energy fuels for heat production. They are directly facing the social and economic consequences of primary energy fuel scarcity and local environmental pollution. Energy efficiency measures improve the reliability of heat supply and reduce the dependency on primary energy fuels for regions that do not produce energy and are dependent on energy imports from other regions in the Russian Federation. Improvements in energy efficiency also reduce the environmental impact of the heating sector, in particular local air pollution. Regional economies thus directly benefit from reductions in the energy intensity of the heating sector.[167]

Agreements], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2005, No. 30, Item 3126. The Federal Law on Concession Agreements aims to attract investments in the modernization of the Russian economy, including the heat supply infrastructure. *Id.* at arts. 3, 4, para. 1.10). By entering into a concession agreement, the investor takes the obligation to construct – or modernize – and operate specific property that is owned by the Russian government. Concession agreements can regulate the main tariff parameters in accordance to which investments will be remunerated. *Id.* at art. 10, para. 2.2; *id.* at art. 20. Importantly, The Federal Law on Concession Agreements includes a stabilization clause: regulatory changes that to a significant extent deprive investors of the rights that existed at the moment of concluding the concession agreement entitles these investors to renegotiate the conditions of the agreement. *Id.* at art. 20. Moreover, if tariff authorities contradict the agreed long-term tariff parameters, the investors concerned have the right to unilaterally request modifications of the concession agreement in order to restore the economic equilibrium that existed at the moment of investment (i.e., at the moment of the conclusion of the concession agreement). *Id.* at art. 20, para. 4.

167. It must, however, be noted that the implementation of energy efficiency measures by the regional authorities could have negative consequences for the future allocation of natural gas to their region. Traditionally, regions negotiate on a yearly basis with the main gas supplier (Gazprom) for the amount of gas that will be supplied to them. Gas is usually allocated based on consumption in

Although there are large differences between the regions, they often have strong incentive to act in a manner that will stimulate energy efficiency improvements or promote renewable energy sources,[168] even if this might lead to a negative short-term impact on energy prices. In contrast, at the federal level, short-term price increases are a very sensitive issue and a serious obstacle to the implementation of energy efficiency and renewable energy initiatives. The federal authorities have demonstrated their readiness to exercise stringent control on energy prices, as has been recently illustrated by the measures taken by the government of the Russian Federation to postpone price increases until after the presidential elections of March 2012.[169] For this reason, the repartition of tariff competences between the federal

the previous years. Energy savings at the regional level could thus reduce the amount of gas to which the regions that implemented these savings were initially entitled based on the grandfathering approach. By reducing the share of energy expenditure in the regional budget, energy savings could also affect the redistribution of fiscal resources between the regions. Regional energy efficiency measures could therefore be opposed for fiscal reasons.

168. *See, e.g.*, the actions taken by the Region of Belgorod: Rasporiazhenie pravitel'stva belgorodskoi oblasti "ob utverzhdenii vremennykh pravil rascheta ekonomicheski obosnovannogo reguliruemogo eko-tarifa na elektricheskuiu energiiu (moshhnost'), proizvedennuiu na ob'ektakh elektroenergetiki, ispol'zuiushchikh vozobnovliaemye istochniki energii", *available at* http://docs.pravo.ru/document/view/13504087/?mode=full; Postanovlenie Pravitel'stva Belgorodskoi oblasti "Ob utverzhdenii poriadka predostavleniia subsidii iz oblastnogo biudzheta na vozmeshchenie chaste zatrat na uplatu protsentov po kreditam, poluchennym v rossiiskikh kreditnykh organizatsiiakh iuridicheskimi litsami nezavisimo ot ikh organizatsionno-pravovykh form na realizatsiiu kontseptsii razvitiia bioenergetiki i biotekhnologii v belgorodskoi oblasti na 2009-2011 gody", *available at* http://docs.pravo.ru/document/view/13504087/?mode=full. *See also, e.g.,* the actions taken by the Dagestan Republic: Postanovlenie Respublikanskoi sluzhby po tarifam Respubliki Dagestan "ob ustanovlenii tarifov na teplovuiu energiiu v geotermal'noi vode, dobyvaenuiu OOO 'Geoekoprom' i realizuemuiu potrebiteliam g. Makhachkaly s 01.01.2012 po 30.06.2012", *available at* http://www.regionz.ru/index.php?ds=1448047.

169. *Putin zamorazhivaet tarify monopolii do serediny 2012*, LAWTEK (Sept. 13, 2011), http://lawtek.ru/news/pravo/78791.html. In Article 9 of the Decree of the Government of the Russian Federation No. 1172 of December 27, 2010, the government limited the growth in end-user prices to fifteen percent in 2011. *See* Postanovlenie Pravitel'stva RF Ob utverzhdenii pravil optovogo rynka elektricheskoi energii i moshchnosti i o vnesenii izmenenii v nekotorye akty Pravitel'stva Rossiiskoi Federatsii po voprosam organizatsii funktsionirovaniia optovogo rynka elektricheskoi energii i moshchnosti [The Wholesale Market Rules], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2011, No. 14, Item 1916.

and regional levels is a key issue for the modernization of the heating sector. It determines the margin for maneuver that regional authorities will have in pursuing ambitious regional energy efficiency and renewable energy initiatives in this sector.

The Federal Heat Law entrusts regional tariff authorities with the task of determining the tariffs for heat supply.[170] However, the margin of maneuver given to regional tariff authorities is seriously limited by the requirement that regional tariffs must remain within limits determined by the FST.[171] The FST must adopt minimum and maximum heat prices per region,[172] and fix limits for the heat produced by CHP installations with an installed capacity of twenty-five megawatts or more.[173] In addition, the autonomy of regional tariff authorities is limited by the fact that, as seen above, the FST adopts methodological instructions that govern the calculation of heat tariffs. The FST also acts as an appeal authority where there are disputes between regional authorities, suppliers, and consumers.[174]

Despite these limitations, regional authorities have the possibility to pursue ambitious energy efficiency and renewable energy policies in the heating sector and adopt tariffs that stimulate energy savings. The Government Decree on the

170. The Federal Heat Law, *supra* note 18, art. 7, para. 3; *see also* Decree of the Government of the Russian Federation on the Regulation of Regional Tariff Authorities, *supra* note 124. Regional authorities may decide to delegate this tariff setting competence to local authorities, with the exception of tariffs for the heat output of CHP installations. The Federal Heat Law, *supra* note 18, art. 7, para. 6.

171. The Federal Heat Law, *supra* note 18, art. 7, para. 2; The Decree of the Federal Service for Tariffs, *supra* note 122, arts. 5.3.1.10, 5.3.1.11.

172. *See* Prikaz Federal'noi Sluzhby po Tarifam "Ob ustanovlenii predel'nykh maksimal'nykh urovnei tarifov na teplovuiu energiiu, postavliaemuiu teplosnabzhaiushchimi organizatsiiami potrebiteliam, v srednem po sub"ektam rossiiskoi federatsii na 2012 god" *Rossiiskaia gazeta* [Russian Journal] 2011 No. 231.

173. The Federal Heat Law, *supra* note 18, art. 10, para. 5; *see also* Prikaz Federal'noi Sluzhby po Tarifam "O predel'nykh urovniakh tarifov na teplovuiu energiju, proizvodimuiu elektrostantsiiami, osushhestvliaiushchimi proizvodstvo v rezhime kombinirovannoi vyrabotki elektricheskoi i teplovoi energii, na 2012 god" *Rossiiskaia gazeta* [Russian Journal] 2011 No. 231.

174. The Federal Heat Law, *supra* note 18, art. 7, para. 9; The Decree on the Resolution of Disputes on the Choice of Tariff Methodologies, *supra* note 161.

Regulation of Regional Tariff Authorities explicitly provides that one of the main tasks of regional tariff authorities is to create economic incentives to stimulate energy efficiency improvements in the heating sector.[175] Further, it is the regional authorities[176] that determine the investment programs of heat companies.[177] As seen above, investment programs must include energy efficiency requirements.[178] In accordance with the Federal Heat Law and the Federal Energy Efficiency Law, heat tariffs must reflect the costs that are approved in the investment programs, including energy efficiency and renewable energy projects. The regional authorities can thus require heat companies to implement ambitious energy efficiency improvement measures and guarantee the financial viability of these measures by adopting appropriate tariffs. As the investment costs of these energy efficiency measures are included in the investment programs of the concerned companies, they must be considered eligible costs that can be recovered through the regulated tariffs. Even more, Article 25, paragraph 7 of the Federal Energy Efficiency Law provides that the costs related to mandatory energy efficiency improvements (including energy efficiency projects in investment programs) must be taken into account for the determination of tariffs.

While it is true that ambitious regional energy efficiency policies could lead to regional tariffs that exceed the tariff limits set by the FST, it is essential to note that the Federal Heat Law provides an exception to the principle that regional tariffs must remain within the federal limits. Article 10, paragraph 8 of the Federal Heat Law provides that regional tariff authorities can exceed the FST tariff limits if higher prices are necessary to recover the costs that heat companies expend to implement their investment obligations. Regional authorities can decide to exceed the federal tariff limits without requesting the authorization of the FST. This exception to the dominant control of energy prices

175. The Decree of the Government of the Russian Federation on the Regulation of Regional Tariff Authority, *supra* note 124, at Item 3.

176. In particular, this applies to the regional executive authorities, i.e., regional governments, not the regional tariff authorities.

177. The Federal Heat Law, *supra* note 18, art. 5, para. 5.

178. *Id*. at art. 5, para. 5.

by the FST is paramount for regional energy efficiency initiatives in the heating sector. On the basis of the Federal Heat Law (read in connection with the Federal Energy Efficiency Law), regions can pursue ambitious heating infrastructure modernization programs without being prevented by the price control agenda of the federal authorities. To escape the federal price limits, regions must integrate energy efficiency measures with the investment programs of the regional heat companies, and adopt tariffs that ensure the recovery of these investments.

Regions could also make use of this tariff autonomy to support renewable installations. As mentioned above, Russian law includes renewable energy under the general concept of energy efficiency, and the Federal Energy Efficiency Law requires regional authorities to include the support of renewable energy in their regional energy efficiency programs.[179] The investment costs of biomass and geothermal installations could thus be included in the investment programs of the affected heat companies. Regional tariffs could also recover the operating costs, in particular the cost of biomass used in renewable heat installations.[180] In accordance with Article 5, paragraph 2 of the Federal Heat Law, regions are charged with the task of determining standard fuel costs per unit of heat produced.[181] More generally, Article 25, paragraph 7 of the Federal Energy Efficiency Law provides that the costs related to regional energy efficiency obligations (including renewable energy sources and biomass) should be taken into account in determining tariffs.

In theory, the FST tariff limits cannot prevent the implementation of regional heat policies, reflected in the

179. *See* Rasporiazhenie Pravitel'stva Rossiiskoi Federatsii "Ob osnovnykh napravleniiakh gosudarstvennoi politiki v sfere povysheniia energeticheskoi effektivnosti elektroenergetiki na osnove ispol'zovaniia vozobnovliaemykh istochnikov energii na period do 2020 goda" SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2009, No. 4, Item 515; Federal Energy Efficiency Law, *supra* note 19, art. 14, para. 6, § 7.

180. *Decision of the Federal Arbitrazh Court of the Northwest District No. F07-8429/11*, *supra* note 138; *Decision of the Arbitrazh Court of the Vologda District No. A13-13-1398/2011*, *supra* note 138.

181. It must be noted that the federal authorities determine standard fuel costs for CHP installations with an installed capacity above twenty-five megawatts.

investment programs and long-term tariffs for specific heat installations. Russian tariff law clearly indicates that regional heat and energy efficiency policies – including in principle renewable energy policies – must be respected. The regions in the Russian Federation thus have the possibility to pursue ambitious policies in regard to the modernization of the heating sector, including by promotion of renewable energy sources for heat production.

F. Duration

As introduced above, the Federal Heat Law aims to stabilize the investment climate in the heating sector. Tariffs must apply for periods of at least one year,[182] but one-year periods are too short to recover the capital costs of energy efficiency investments.[183] The Federal Heat Law therefore introduces long-term tariffs for heat investments. Within the meaning of the Federal Heat Law, long-term tariffs apply for longer than one year.[184] In particular, the Federal Heat Law provides that long-term tariffs apply when the authorities opt for the method of return on invested capital.[185] In this case, investors can count on the approved tariffs for periods of at least five years.[186] The Federal Energy Efficiency Law also requires the tariff authorities to adopt long-term tariffs for energy efficiency investments.[187] The Federal Energy Efficiency Law specifically refers to the method of return on invested capital for energy efficiency

182. The Federal Heat Law, *supra* note 18, art. 10, para. 2.

183. According to the IFC, companies require payback periods of approximately three years for energy efficiency investments in Russia. *See* INT'L FIN. CORP., ENERGY EFFICIENCY A NEW RESOURCE FOR SUSTAINABLE GROWTH 31 (2010), *available at* http://www1.ifc.org/wps/wcm/connect/a2abc18048177850a1f6ef484bb223d8/PublicationECARegionalEEsurvey2010en.pdf?MOD=AJPERES. *See also* WORLD ENERGY OUTLOOK, *supra* note 7, at 68 (providing the typical lifetime of heat production installations).

184. The Federal Heat Law, *supra* note 18, art. 10, para. 3.

185. *Id.* at art. 10, para. 4. In accordance with The Federal Heat Law, art. 10, para. 3, long-term tariffs also apply when heat companies conclude long-term contracts with consumers.

186. *Id.*

187. The Federal Energy Efficiency Law, *supra* note 19, art. 25, para. 6; The Federal Heat Law, *supra* note 18, art. 10, para. 12 (considering energy efficiency indicators as parameters for the long-term regulation of tariffs).

investments.[188] Reading the Federal Heat Law in connection with the Federal Energy Efficiency Law, it can be argued that energy efficiency investments in the heating sector can benefit from regulated tariffs for five-year periods.

The distribution of competences between the regional and the federal tariff authorities might, however, represent a risk for investors that rely on long-term heat tariffs. As introduced above, regional tariff authorities are bound by the minimum and maximum tariff limits adopted by the FST. The FST adopts these limits on a yearly basis.[189] Long-term tariffs might not necessarily be compatible with these yearly limits. The Federal Heat Law aims to minimize the potential clash between long-term heat tariffs and the yearly tariff limits adopted by the FST in three ways. Firstly, it entitles the FST to adopt tariff limits for a long-term period.[190] Secondly, the law requires the FST to take into account long-term regional tariffs when fixing the tariff limits for each region of the Russian Federation.[191] Although this provision only requires the FST to "take into account"[192] the long-term tariffs adopted by the regional authorities, it nevertheless provides a strong signal that existing decisions must be respected. This interpretation of the Federal Heat Law is supported by the aforementioned principle of Russian energy law, according to which adequate incentives – including regulatory stability – must be created to attract investments in the development and modernization of the heating sector. Thirdly, as introduced above, regional tariffs can legitimately exceed the FST limits if higher tariffs are necessary to implement the investment programs that the regulatory authorities adopt for the affected heat companies.[193]

188. The Federal Energy Efficiency Law, *supra* note 19, art. 25, para. 6.

189. The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91 (including the Rules for the State Regulation of Electricity and Heat Tariffs).

190. The Federal Heat Law, *supra* note 18, art. 10, para. 5.

191. This requirement has also been integrated in *Draft Principles and Rules for the Regulation of Heat Tariffs*, *supra* note 120, at Item 3, para. 4.

192. In Russian, "*uchityvat*."

193. *The Federal Heat Law*, *supra* note 18, art. 10, para. 8.

G. Impact of Energy Savings on Tariffs

Energy efficiency improvements reduce the amount of primary energy used to produce the same output, and thus decrease the variable costs of heat production. Depending on the tariff methodology, energy savings could affect the cost basis of the tariffs, and possibly trigger downwards tariff revisions. Such revisions can dissuade investors from realizing energy efficiency improvement measures, in particular when tariffs do not provide for the recovery of the higher capital costs of these investments.[194] In contrast, investors have a financial incentive to save energy if they can benefit from the difference between the reduced variable costs and the existing tariffs, and use this difference to recover their investments.[195] In Russia, what guarantees do investors have that the authorities will not change tariffs to reflect the lower variable costs resulting from energy efficiency improvements? For how long can investors benefit from relatively higher tariffs (in relation to their new variable costs) to recover the capital invested in energy savings?

In addition to provisions on the long term regulation of tariffs, the Federal Energy Efficiency Law recognizes the need to guarantee to investors that they will financially benefit from energy savings. Entities that implement energy efficiency improvement measures can keep the financial benefits that result from these investments.[196] The benefit of energy savings will remain for a period of at least five years following the regulatory period during which these investments were implemented.[197] Investors will thus receive the difference between their real costs – reduced following the implementation of energy efficiency measures – and the existing tariffs, calculated on the basis of their previous (higher) fuel costs. This clause clearly provides much-needed guarantees for energy efficiency investments. It can provide the business case for energy efficiency investments,

194. COMING IN FROM THE COLD, *supra* note 12, at 112.

195. *Id*.

196. The Federal Energy Efficiency Law, *supra* note 19, art. 25, para. 8.

197. *Id*.; *see also* The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91, at Item 35, para. 1 (the Rules for the State Regulation of Electricity and Heat Tariffs).

which rely on the financial benefits of reduced energy consumption.

It is, however, of limited relevance for energy efficiency investments that are part of the investment obligations of heat companies, or that are financed on the basis of the return on investment method.[198] Indeed, in accordance with Article 25, paragraph 8 of the Federal Energy Efficiency Law, companies can only benefit from the difference between existing tariffs and their reduced costs where the tariffs do not already cover the higher capital costs of energy efficiency investments.[199] This safeguard prevents energy companies from receiving a double dividend for the same capital investments. Simultaneously, it encourages companies to go beyond the energy efficiency requirements of their investment programs. In accordance with the Federal Energy Efficiency Law,[200] heat companies will maintain the financial benefit resulting from any energy savings beyond their investment requirements.

H. Towards the Liberalization of Heat Supply?

The liberalization of energy systems is often advocated as a mechanism to stimulate energy efficiency improvements.[201] In Russia, the idea that liberalization would improve efficiency of supply was one of the main reasons underlying the opening of the electricity market to competition.[202] According to the Conception for the Long-Term Social and Economic Development of the Russian Federation until 2020, the liberalization of energy markets creates economic incentives for the realization of energy

198. *Draft Principles and Rules for the Regulation of Heat Tariffs*, *supra* note 120, at Item 10.

199. *Id*.

200. *Id*.

201. NICHOLAS STERN, STERN REVIEW ON THE ECONOMICS OF CLIMATE CHANGE 493 (2007); UNTAPPED RESERVES, *supra* note 2, at 7, 11, 109; COMING IN FROM THE COLD, *supra* note 12, at 149.

202. Postanovlenie Pravitel'stva RF O reformirovanii elektroenergetiki Rossiiskoi Federatsii [The Decree on the Restructuring of the Electric Power Industry] SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2001, No. 29, Item 3032, Chapter I. For a recent confirmation of this policy, see The Russian Energy Strategy for the Period Until 2030, *supra* note 49.

savings.[203] In the same vein, Article 12 of the Federal Heat Law entitles regional authorities to abolish tariff regulation and organize heat supply on a competitive basis. In contrast to the electricity sector, the liberalization of the heating sector is subject to very stringent conditions. The organization of a specific heat supply system on a free market basis must take place following the initiative (or at least with the agreement) of the concerned heat company. Such decision can only be made in the absence of subsidies to heat companies in the heat system concerned. Moreover, the heat system can only be opened to competition if alternative fuels that can be used for heating purposes are available.[204] In addition, heating on the basis of these alternative energy sources must be affordable.

In the absence of full market opening, heat companies have the opportunity to conclude long-term heat supply agreements with consumers at unregulated prices.[205] Every producer has the right to supply consumers.[206] The Federal Heat Law thus, to a certain extent, introduces the principle of "third party access" to the heating sector. However, the Federal Heat Law also provides strict conditions: bilateral agreements at unregulated prices may only be concluded for newly built production installations, and they may not negatively affect heat prices for existing consumers.[207]

The Federal Heat Law thus falls short of reforming the heat market on a free market basis. Although regional authorities may in theory make the decision to liberalize their heat system, free market price formation will clearly remain the exception to regulated heat prices in Russia. This careful approach to the liberalization of heat supply is not surprising. Although competition has been advocated as a mechanism to stimulate

203. Conception for the Long-Term Social and Economic Development of the Russian Federation until 2020, *supra* note 4, ch. V, 6.

204. The Federal Heat Law, *supra* note 18, art. 12, para. 3. The International Energy Agency considers that "competition between heat sources is by far the most common type of competition for the district heating sector." COMING IN FROM THE COLD, *supra* note 12, at 126.

205. The Federal Heat Law, *supra* note 18, art. 15, para. 2.

206. *Id*.

207. *Id*. at art. 10, paras. 9-10.

energy efficiency in the heating sector,[208] the concentrated nature of heat production and supply constitutes a considerable obstacle to the introduction of free market principles in this sector. Guaranteeing non-discriminatory third party access to the heat network has been highlighted in the literature as an important challenge to the opening of the heating sector to competition.[209]

V. REGULATING CHP: THE HEAT AND ELECTRICITY OUTPUT

As introduced above, CHP generation is an energy efficient production process because it recovers the heat that is a by-product of electricity generation. For every input of fuel, CHP installations generate a double output of electricity and heat. The electricity and heat "commodities" are sold on their respective markets. In Russia, the heat commodity is sold at regulated tariffs. In contrast, the electricity commodity is, since January 2011, sold on the wholesale market at free market prices.[210] The sale of electricity in a liberalized market environment and heat in a regulated market environment creates difficulties for the calculation of heat tariffs.[211] A particularly sensitive issue is how investors in CHP installations will recover their investment and operating costs. What part of the investment and operating costs will they recover through heat tariffs and what part will they recover on the electricity market? The allocation of costs to the electricity and heat output of CHP installations raises issues of cross-subsidization of one commodity by the other.[212] Inadequate cost allocation rules can affect the competitiveness of CHP in relation to other heat sources, in particular individual boilers. This can impact on the

208. COMING IN FROM THE COLD, *supra* note 12, at 149.

209. On the challenges of introducing and applying the principle of third party access to the heating sector, see Patrik Söderholm & Linda Wårell, *Market Opening and Third Party Access in District Heating Networks,* 39 ENERGY POL'Y 742 (2011); Paul Westin & Frederik Lagergren, *Re-Regulating District Heating in Sweden*, 30 ENERGY POL'Y 583, 591 (2002).

210. Boute, *supra* note 21, at 92.

211. The World Bank Infrastructure and Energy Department in Europe and Central Asia, *Regulation of Heat and Electricity Produced in Combined-Heat-and-Power Plants* 29 (The World Bank, Technical Paper, Oct. 6, 2003).

212. COMING IN FROM THE COLD, *supra* note 12, at 119.

attractiveness of centralized heat supply and affect the modernization of CHP installations. The allocation of costs to the electricity and heat output of CHP installations is thus an essential issue from an energy efficiency improvement perspective. Before analyzing how Russia aims to address this issue in the context of the modernization program of the heating sector, it is necessary to briefly introduce how CHP installations trade electricity on the Russian wholesale market.

A. Priority of Dispatch for CHP Electricity

The Federal Electricity Law establishes the fundamental principle of free market price formation for electricity exchanges on the wholesale market.[213] The price of electricity on the day-ahead market is formed on the basis of supply and demand.[214] The purpose of the day-ahead market is to determine the amount of electricity sold and purchased one day before its actual supply, and to fix hourly equilibrium (market clearing) prices for this electricity.[215] The day-ahead market organizes a competitive selection of bids that the sellers (producers) and buyers of

213. Participation in the wholesale market is limited to production installations with an installed capacity of five megawatts or above. Installations with an installed capacity between five and twenty-five megawatts can choose between the wholesale and the retail market. In accordance with The Federal Electricity Law, *supra* note 20, art. 36, para. 5, installations with an installed capacity of twenty-five megawatts or above must operate on the wholesale market. Smaller installations sell electricity on the retail market. The retail market is open to competition, except for the electricity supplied by "guaranteeing suppliers" – i.e., the suppliers of last resort for household and small commercial consumers. The latter supply electricity at regulated prices. The Federal Electricity Law, *supra* note 20, art. 37; Postanovlenie Pravitel'stva RF Ob utverzhdenii pravil funktsionirovaniia roznichnykh rynkov elektroenergeticheskoi energii v perekhodnyi period reformirovaniia elektroenergetiki [Decree on Rules for the Retail Market], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2006, No. 37, Item 3876; The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91; *see also* S. Korotonozhkin, Pravovye Problemye Tsenoobrazovaniia na Roznichnom Rynke Elektroenergii, PREDPRINIMATEL'SKOE PRAVO 4 (2010).

214. The Federal Electricity Law, *supra* note 20, arts. 30-32. Free-market price formation is limited to the so-called "price zones" of the wholesale market. In "non-price zones," regulated tariffs apply. This article focuses on price zones.

215. *Id*. at art. 32, para. 2; The Wholesale Market Rules, *supra* note 169, at Item 79.

electricity submit to the operator of this market – the Administrator of the Trading System (ATS) – in order to sell and purchase electricity to be physically supplied the following day. As a result of the competitive selection of bids, the ATS, for every hour of the following day, calculates the equilibrium prices.[216] Based on the outcome of the market, the ATS also determines the amount of electricity that the sellers and buyers shall produce and consume in accordance with the transactions that they have conducted in this market. The System Operator will dispatch production installations on the basis of these trading arrangements, taking into account physical constraints on the network. Dispatching commands are orders to deliver electricity to the grid that the System Operator gives to the operators of power plants connected to the Russian electricity network.

The Federal Electricity Law provides specific trading arrangements for the electricity produced from CHP installations. In accordance with Article 32, paragraph 2 of the Federal Electricity Law, CHP installations benefit from priority treatment in the selection of bids on the day-ahead market. ATS must prioritize the amount of electricity that CHP installations produce during their operation in heat extraction mode.[217] The electricity from CHP installations that is accepted in priority by ATS will be sold at the equilibrium market price. To benefit from priority selection and priority of dispatch, the operators of CHP installations must submit "price taking" bids. These bids are characterized by the fact that they do not specify the price that producers ask for the electricity they are selling on the market. They "take" (i.e., accept) the equilibrium market price as the price that will govern their electricity sales. The amount of electricity

216. The competitive selection of price bids takes place separately for every price zone. The Wholesale Market Rules, *supra* note 169, at Item 79.

217. The ATS must accept the bids of CHP installations after having accepted the bids submitted by installations providing ancillary (system reliability) services, and the bids submitted by nuclear power plants to meet the technical requirements for the safe operation of these plants. *See id.* at Item 87. On the impact of these priorities on the functioning of the spot market, see Moisei M Gel'man, *Antigosudarstvennyi perevorot v RAO 'EES Rossii'. Kak ego likvidirovat'?* 14 PROMYSHLENNYE VEDOMOSTI (2004); SERGEI A SVIRKOV, DOGOVORNYE OBIAZATEL'STVA V ELEKTROENERGETIKE 143 (2006); V IU SINIUGIN, POSTATEINYI NAUCHNO-PRAKTICHESKII KOMMENTARII K FEDERAL'NOMU ZAKONU 241 (2003).

indicated in price taking bids must, in principle, always be accepted and included in the hourly production and consumption schedules, unless it is technically impossible to supply this electricity,[218] or the amount of electricity indicated in the price taking bids of sellers exceeds the total amount of electricity indicated in the price bids of consumers (and vice versa).[219] The operators of CHP installations benefit from priority selection of their bids, and thus submit price taking bids for the amount of electricity produced in heat extraction mode, i.e., when the CHP plant produces heat together with electricity. When the CHP installation functions in condensing mode (i.e., sole production of electricity), operators submit normal price bids (i.e., bids specifying the price that the producers ask for their electricity).

By prioritizing CHP installations on the day-ahead market, Russia makes use of an innovative mechanism to stimulate alternative modes of electricity production. Priority of dispatch is a pillar of the European Union policy to promote the development of renewable energy sources.[220] This mechanism is now advocated to support CHP in Europe: to improve the efficiency of European energy supply, the European Commission proposes to oblige network operators to dispatch in priority the electricity generated from high efficiency CHP installations.[221] The European Union initiative thus reflects the Russian approach to the prioritization of CHP installations in the electricity market. In contrast to the Russian regulation, the European proposal limits priority of dispatch to high energy efficiency installations. In Russia, priority of dispatch applies to all CHP installations independently from their efficiency. It is only limited to the electricity produced in heat extraction mode. To stimulate the efficiency of CHP installations, Russia could consider linking the benefit of priority of dispatch to energy efficiency requirements,

218. The Wholesale Market Rules, *supra* note 169, at 80.

219. *Id*. at Items 80, 85.

220. Council Directive 2001/77/EC on the Promotion of Electricity Produced from Renewable Energy Sources in the International Electricity Market, art. 7, para. 1, 2001 O.J. (L 283) 33-40 (EC); Council Directive 2009/28/EC on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives, *supra* note 28, art. 16, para. 2.

221. *European Commission Proposal for a Directive on Energy Efficiency, supra* note 26, at 27.

and provide additional financial support to compensate for low electricity market prices.

B. The Cross-Subsidization Issue

Because of the joint production process, costs of CHP installations are common to both electricity and heat commodities, and there is no way to clearly establish what share of costs is attributable to electricity or to heat.[222] The allocation of the costs of CHP installations to the heat or electricity output of these installations is always arbitrary.[223] It takes place on the basis of different methodologies.[224] If both heat and electricity markets are liberalized, the market prices will balance the allocation of costs.[225] If the electricity market is liberalized but the heat market remains subject to regulated prices, as is the case in Russia, issues of cross-subsidization occur.[226] The rules determining the share of costs included in heat tariffs will influence the competitiveness of CHP installations on the liberalized electricity market.[227] The allocation of costs will also influence the attractiveness of heat produced from CHP in relation to other heat sources, in particular from decentralized boilers. A generous compensation of costs in heat tariffs will reduce the price bids that the operators of CHP installations submit on the day-ahead electricity market and thus stimulate the competitiveness of CHP plants on the electricity market. It will however increase heat tariffs and will thus stimulate consumers to switch to alternative heat sources (e.g., by investing in individual boilers).[228] Conversely, low recovery of costs in heat

222. The World Bank Infrastructure and Energy Department, *supra* note 211, at 29.

223. *Id.*

224. Jörgen Sjödin & Dag Henning, *Calculating the Marginal Costs of a District-Heating Utility,* 78 APPLIED ENERGY 1, 3 (2004); ENERGY CHARTER SECRETARIAT, COGENERATION AND DISTRICT HEATING – BEST PRACTICE FOR MUNICIPALITIES 31 (2006), *available at* http://www.encharter.org/fileadmin/user_upload/document/Energy_Efficiency__Cogeneration_and_District_Heating_-_2006_-_ENG.pdf.

225. COMING IN FROM THE COLD, *supra* note 12, at 119.

226. *Id.*

227. *Id.*

228. *Id.*

tariffs will penalize CHP installations on the electricity market because they will have to ask for higher prices on the day ahead of the market to recover the share of costs that the heat tariff did not cover. This will, however, reduce heat tariffs and improve their attractiveness in relation to other heat sources. Cross-subsidizing one commodity with the other by allocating a larger share of costs to the electricity or to the heat output of CHP installations impacts on the profitability of these investments.[229] It is therefore an important element for the modernization of these installations, i.e., the deployment of high efficiency CHP installations.

Phasing out of cross-subsidies is an important objective of the Russian energy policy.[230] Item 5 of the Fundamental Principles for the Formation of Electricity and Heat Prices in Russia[231] establishes the principle of the exclusivity of cost recovery. Tariffs cannot compensate for costs that are already covered in the price of other related products or services. In addition, Item 9 of the Fundamental Principles provides that tariffs for regulated activities cannot compensate for the costs made for other economic activities.[232] If heat companies provide services at regulated and unregulated (free market) prices, the costs related to the unregulated activities cannot be included in the tariff basis of the regulated activities.[233] Thus, regulated tariffs for heat supply cannot cover the costs associated with electricity sales on the liberalized wholesale electricity market. Moreover, suppliers of both electricity and heat are required to keep separate accounts for their electricity production and heat production

229. The World Bank Infrastructure and Energy Department, *supra* note 211, at 30.

230. For a definition and explanation of cross-subsidization in Russia, see KUZOVKIN, *supra* note 101, at 100.

231. The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91, at Item 5.

232. It must be noted that this principle primarily applies to activities with the same economic sector (e.g., supply and distribution activities in the electricity sector). Federal'naia sluzhba po tarifam, Pis'mo "O raz"iasneniiakh k metodicheskim ukazaniiam," Item 4 (Feb. 18, 2005) (letter on explanations of Methodological Instructions).

233. *Draft Principles and Rules for the Regulation of Heat Tariffs*, *supra* note 120, at Item 6. Similarly, this clause stipulates that profits from free market activities cannot lead to reduced tariffs for regulated services.

activities.[234] Despite the principle of the exclusivity of cost recovery and the policy objective of phasing out subsidies, the Federal Arbitrazh Court of the Northwest District recently accepted that artificially keeping heat tariffs at a low level could be justified given the negative social and economic impact that high heat tariffs could have on consumers.[235] The following sections analyze the issue of cross-subsidization of the electricity and heat output of CHP installations by looking at the allocation of operating costs (e.g., fuel costs) and investment costs (i.e., capital and return on investment).

C. Allocation of Operating Costs to the Electricity and Heat Output

Given that electricity and heat are produced in a joint process, it is a challenging task to allocate a specific percentage of fuel input to units of electricity and heat output.[236] According to Article 4 of the Federal Heat Law, the government of the Russian Federation must adopt rules for the allocation of fuel costs to the electricity and heat output of CHP installations. Before 1996, the allocation of fuel costs (or fuel consumption)[237] to the heat and electricity output was governed by the so-called "physical method,"[238] also referred to as the "energy method."[239] This cost

234. The Decree on the Regulation of Electricity and Heat Prices, *supra* note 91, at Item 6 (Fundamental Principles for the Formation of Electricity and Heat Prices); s*ee also Draft Principles and Rules for the Regulation of Heat Tariffs*, *supra* note 120, at Item 7; The Federal Electricity Law, *supra* note 20, art. 23, para. 2.

235. *Decision of the Federal Arbitrazh Court of the Northwest District No. F07-8429/11*, *supra* note 138; *Decision of the Arbitrazh Court of the Vologda District No. A13-13-1398/2011*, *supra* note 138.

236. The World Bank Infrastructure and Energy Department, *supra* note 211, at 30.

237. In Russian, "raspredelenie raskhoda topliva energeticheskimi kotlami," "Raskhod topliva," or "raskhod energii" can be defined as "fuel" or "energy consumption." The notion of "raskhod" also means "expense," or "cost." *See* OXFORD RUSSIAN DICTIONARY (2007).

238. Natalia Tarasovaya, *Kombinirovannaia vyrabotka: fizicheskii metod raspredeleniia raskhodov na toplivo* (Oct. 3, 2011), *available at* http://www.fstrf.ru/press/meeting/32/Vystuplenie_Tarasovoj_Natalii_Anatolyevny.ppt; Nekrasov, *supra* note 44, at 22.

239. The World Bank Infrastructure and Energy Department, *supra* note 211, at 30.

distribution methodology is based on the principle that heat is not a by-product of electricity production, but an output of equal value to electricity.[240] Accordingly, this methodology allocates fuel costs in relation to the amount of electricity and heat produced (i.e., on the basis of the electricity to heat output ratio). The "physical" or "energy" methodology takes into account the energy conversion efficiency of the turbines (i.e., the ratio between the useful output of the turbines and the primary energy input). From 1996, fuel cost allocation took place on the basis of the so-called ORGRES methodology,[241] named by the institution that developed this new approach.[242] This new approach introduced additional coefficients that, according to the industry, reduced the share of fuel costs taken into account for the calculation of heat tariffs.[243] The ORGRES methodology provided for new allocation rules of fuel costs when CHP installations operate in condensing mode (without heat extraction).[244] Moreover, it allocated most fuel related to the electricity consumption needs of the CHP plants (i.e., *in situ* consumption) to the electricity output of these installations.[245] This also transferred an important part of the fuel costs from the heat component to the electricity component.[246] The introduction of the ORGRES method can be explained by a political willingness to promote the competitive position of CHP installations on the

240. Tarasovaya, *supra* note 238, at 5; Nekrasov, *supra* note 44, at 22; *see also* The World Bank Infrastructure and Energy Department, *supra* note 211, at 30; Xue-min Ye, *Reduced Exergy Method for Heat-Electricity Cost Allocation in Combined Heat and Power Plants*, 5 ENTROPY 432, 433 (2003).

241. RAO UES, Metodicheskie ukazaniia (RD 34.09.105-960) po sostavleniiu otcheta elektrostantsii I aksionernogo obshchestva energetiki i elektrifikatsii o teplovoi ekonomichnosti oborudovaniia (May 12, 1996) [hereinafter *Methodology for the Calculation of Fuel for Thermal Power Plants*]; Prikaz Federal'noi Sluzhby po Tarifam "Ob utverzhdenii metodicheskikh ukazanii po raschetu reguliruemykh tarifov i tsen ha elektricheskuiu (teplovuiu energiu na roznichnom (potrebitel'skom) rynke" ROSSIISKAIA GAZETA [Russian Gazette] 2004, No. 242, Item 31 (The Order of the Federal Service for Tariffs on the Approval of the Methodological Instructions for the Calculation of Heat Tariffs).

242. Nekrasov, *supra* note 44, at 22.

243. Tarasovaya, *supra* note 238, at 5.

244. RAO UES, *Methodology for the Calculation of Fuel for Thermal Power Plants*, *supra* note 241, at Items 28-29.

245. *Id*. at Item 30.

246. Tarasovaya, *supra* note 238, at 5.

heat market in relation to the increasing share of decentralized heating sources. It was thus a reaction to the "boilerization" trend that affected the Russian heating sector. However, according to the industry, it has had an impact on the competitiveness of CHP installations in the electricity market.[247]

The Federal Heat Law mandates that the government of the Russian Federation develop new fuel allocation rules.[248] To ensure that the financial viability of CHP installations stimulate the modernization of these plants and maintain the integrity of the district heating system, the government will have to guarantee an appropriate balance between the competitiveness of CHP on the heat market and on the electricity market. The past experience with the "physical" and ORGRES methodologies illustrates the fact that this balancing exercise is a delicate task. Alternatives to the current and previous approaches must be elaborated. In this respect, the methodology of the "alternative way of heat supply" presents important benefits from an energy efficiency improvement perspective. This methodology allocates costs for heat supply based on the separate production of heat.[249] To stimulate the modernization of CHP installations, the Russian authorities could adopt benchmarks for the separate production of heat with a high energy efficiency factor. To stimulate the smooth modernization of the CHP infrastructure and avoid exposing existing installations to overly stringent standards that would jeopardize their financial viability in the short term, gradual benchmarks could be adopted.

New fuel allocation rules will have to take into account that CHP installations submit price taking bids on the wholesale market for the electricity they produce in heat extraction mode. With price-taking bids, the operators of CHP installations sell electricity at the equilibrium market price without being able to directly influence this price. CHP investors will therefore only be able to recover fuel costs (or a misallocation of fuel costs between the heat and electricity component) through higher price bids for the electricity they produce in condensing mode (i.e., in non-heat

247. *Id.*

248. The Federal Heat Law, *supra* note 18, at art. 4.

249. On this method, see The World Bank Infrastructure and Energy Department, *supra* note 211, at 31.

extraction mode). The financial viability and competiveness of high efficiency CHP installations will depend on cost allocation rules that adequately reflect the specific wholesale market trading arrangements that apply to CHP installations.

D. Allocation of Investment Costs

In addition to fuel costs, a key question for CHP installations relates to the allocation of investment costs to the electricity and heat output. This issue is of particular importance for high energy efficiency installations (including geothermal heat plants) that are characterized with relatively large investment costs. On the Russian electricity market, investors recover a large share of their investment costs on the basis of "capacity remuneration mechanisms."[250] These mechanisms remunerate investors for the installed capacity of their installations independently from the amount of electricity produced by these installations.[251] How do these mechanisms apply to high efficiency CHP installations? To what extent are the incomes received for the heat output taken into account in the electricity (capacity) market and vice versa? To answer these questions, it is necessary to briefly introduce the Russian capacity market.

In addition to electricity exchanges, the Russian wholesale market organizes capacity trade.[252] Demand for capacity is created by requiring electricity buyers to purchase an amount of capacity corresponding to their peak consumption.[253] Capacity supply consists of the availability of power plants to produce electricity.[254] Producers commit to maintain their installations in a state of readiness to deliver electricity to the grid. The System Operator organizes the capacity market four years preceding the

250. Boute, *supra* note 21, at 130.

251. The Wholesale Market Rules, *supra* note 169, item 42. *See also* A. Repina, *Pravovaia priroda generiruiushchei moshchnosti*, ZAKONODATEL'STVO 15 (2008).

252. On the Russian capacity market, see Boute, *supra* note 21, at 130-38; Olga Gore, et al., *Russian Electricity Market Reform: Deregulation or Re-regulation?*, 41 ENERGY POL'Y 676, 678-79 (2012).

253. The Wholesale Market Rules, *supra* note 169, Item 122.

254. *Id*. at Items 45-51.

supply of capacity.[255] The System Operator determines the amount of capacity traded based on the level of production needed to achieve long-term security and short-term reliability of electricity supply.[256] It selects capacity during a competitive process and solely on the basis of bids submitted by owners of production installations.

Besides the competitive capacity market, Russia trades capacity on the basis of long-term regulated contracts – the so-called "Agreements for the Delivery of Capacity on the Wholesale Market."[257] These regulated contracts concern the thermal production capacity that was sold to investors during the privatization of the former quasi-monopolist RAO UES (i.e., the power plants controlled by the OGKs and TGKs).[258] Indeed, in parallel to the electricity liberalization reform, Russia has privatized part of its electricity sector by selling the thermal production capacity of RAO UES to Russian and foreign investors.[259] Investors that purchased this thermal production capacity committed to implement the investment programs that RAO UES adopted for these generating companies. These investment programs particularly concerned the construction of power plants that are essential to guaranteeing the secure and reliable functioning of the Russian electricity system. Agreements for the Delivery of Capacity on the Wholesale Market thus result from the corporate restructuring process of RAO UES. They are characterized by regulated prices for a ten-year period and therefore are an exception to the competitive segment of the capacity market organized by the System Operator. Electricity buyers on the wholesale market are obliged to purchase a certain percentage of the installed capacity covered by these regulated agreements.[260] All electricity buyers thus contribute to financing the investment program of the former RAO UES in proportion to their peak consumption.

255. *Id*. at Item 113.
256. The Federal Electricity Law, *supra* note 20, art. 32.
257. The Wholesale Market Rules, *supra* note 169, at Item 2.
258. *Id*.
259. Boute, *supra* note 21, at 55.
260. The Wholesale Market Rules, *supra* note 169, at Item 124.

Heat supply is explicitly recognized in the regulation of the competitive and regulated capacity mechanisms. Regarding the competitive segment of the capacity market, Article 32, paragraph 1 of the Federal Electricity Law recognizes the necessity to take into account the development of the heat supply infrastructure in the context of the selection of capacity. As mentioned, the System Operator selects capacity supply bids four years in advance. It therefore takes into account the recommendations made by the government of the Russian Federation in the General Scheme for the Location of Electricity Installations[261] (i.e., the long-term development plan regarding the national electricity infrastructure).[262] The General Scheme contains forecasts and recommendations on the development of the heat production infrastructure, in particular of larger CHP plants. Importantly, it provides for ambitious modernization objectives of the CHP infrastructure.[263] The government recommends in the General Scheme for the Location of Electricity Installations that between 2020 and 2030 high efficiency CHP installations should be developed wherever possible to meet electricity and heat demand.[264] During the competitive selection of bids for capacity supply, the System Operator is thus likely to select high efficiency CHP installations that answer to useful heat demand. These installations are thus likely to benefit from capacity payments. From an energy efficiency improvement perspective, the decisive question is whether these payments will be sufficient to cover the relatively higher investment costs of high energy efficiency projects. This will determine the readiness of private investors to finance these projects. The allocation of

261. Rasporiazhenie Pravitel'stva RF General'naia skhema razmeshcheniia obektov elektroenergetiki do 2020 goda [The General Scheme for the Location of Electricity Installations], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2008, No. 11, Item 1038 (and subsequent amendments).

262. *See* The Federal Electricity Law, *supra* note 20, art. 32, para. 1.

263. *See* The General Scheme for the Location of Electricity Installations, *supra* note 261, at 16-17; The Russian Energy Strategy for the Period Until 2030, *supra* note 49, at 29, 63.

264. The General Scheme for the Location of Electricity Installations, *supra* note 261, at 14; The Russian Energy Strategy for the Period Until 2030, *supra* note 49, at 64.

investment costs between the heat and electricity output of CHP installations is an important element to answer this question.

Article 6 of the Federal Electricity Law elevates the economically well-founded nature (or economic justification) of capacity payments to a fundamental principle of Russian electricity law.[265] In accordance with this principle, investors in CHP installations should be entitled to recover their investment costs.[266] At the same time, this principle prevents investors from receiving more revenues than necessary to compensate for their investment costs. The principle of the economically well-founded nature of capacity payments in theory prevents investors from twice recovering the same costs through heat tariffs and electricity prices. As introduced above, the evaluation of what is economically well-founded or justified is a delicate exercise.[267] Allowing public authorities to second guess the economic justification of investment costs represents a large risk for private investors. Private investors might require high returns on investment to offset the high political and regulatory risks associated with investments in the Russian energy sector (e.g., risk of expropriation or unexpected and sudden revision of tariffs).[268] Public authorities could, however, refuse to acknowledge political risks and thus reject high returns as being unjustified or not economically well-founded. By preventing investors from integrating in prices what they consider as necessary risk premiums given the uncertain investment climate, the authorities would jeopardize private investments in the heating sector. Moreover, price caps (limits) apply in the competitive capacity market.[269] Investors could thus be prevented from recovering the higher investment costs of high

265. *See* ZAKHAROV, *supra* note 135, at 155; Boute, *supra* note 21, at 227; *Decision of the Federal Arbitrazh Court of the Northwest District No. F07-8429/11*, *supra* note 138; *Decision of the Arbitrazh Court of the Vologda District No. A13-13-1398/2011*, *supra* note 138.

266. Boute, *supra* note 21, at 227.

267. *Id.*

268. OECD, *supra* note 1, at 15. More generally, on risk premiums and the impact of political risks on investment flows, see Sudeshna G. Banerjee et al., *Private Provision of Infrastructure in Emerging Markets: Do Institutions Matter?,* 24(2) DEV. POL'Y REV. 175, 177 (2006).

269. *See generally* Gore, *supra* note 252.

energy efficiency CHP installations through capacity payments in the competitive segment of the capacity market. If investors in energy efficiency projects fail to recover part of their investment costs through capacity payments or fail to earn sufficient return on their investment, heat tariff authorities will be confronted with the delicate task of determining the share of investment costs that still need to be recovered.

CHP installations also play a key role in the regulated segment of the wholesale market. The investors that participated in the privatization of RAO UES are bound by commitments to construct new or modernize existing CHP installations.[270] The Finnish energy concern Fortum, for instance, invested in high efficiency CHP installations on the basis of the investment commitments that it made when it purchased regional thermal production assets (TGK) from RAO UES.[271] The installed capacity of these newly-constructed energy efficient plants will be remunerated at regulated prices for a period of ten years.[272] This long-term guarantee of regulated capacity prices provides considerable financial predictability to investors in energy efficiency projects and is therefore an important element in the modernization of the Russian heating sector. The allocation of investment costs to the electricity and heat component of CHP installations has however not been clearly regulated. The regulator of the wholesale market (the Market Council) fixes the regulated capacity prices on the basis of the price parameters approved by the government of the Russian Federation in its Decree on the Determination of Price Parameters for the Trade in Capacity.[273] It is not clear from this Decree whether all

270. Rasporiazhenie Pravitel'stva RF Ob utverzhdenii perechnia generiruiushchikh ob'ektov, s ispol'zovaniem kotorykh budet osushchestvliat'sia postavka moshchnosti po dogovoram o predostavlenii moshchnosti, SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2010, No. 35, Item 4582.

271. Anne Brunilla, *New Unit Inaugurated at Fortum's Tyumen Power Plant in Russia*, FORTUM (Dec. 21, 2010, 8:59 PM), www.fortum.com/en/mediaroom/pages/new-unit-inaugurated-at-fortums-tyumen-power-plant-in-russia.aspx.

272. The Wholesale Market Rules, *supra* note 169, at Item 119.

273. Postanovlenie Pravitel'stva RF Ob opredelenii tsenovykh parametrov torgovli moshchnost'iu na optovom rynke elektricheskoi energii (moshchnosti) perekhodnogo perioda [The Decree on the Determination of Price Parameters for

investment costs of CHP installations must be recovered through capacity payments or if part of these costs must be recovered through heat tariffs.[274] In the absence of specific regulatory provisions on the allocation of investment costs, the tariff authorities in charge of heat prices will have to assess to what extent the regulated capacity prices already sufficiently cover investment costs. The principle of the economically well-founded nature of capacity prices applies to the regulated segment of the capacity market. Here also, assessing what constitutes justified and economically well-founded investment costs and returns on investment will be a delicate task for the tariff authorities, in particular given the risky investment climate in the Russian energy sector. Given the difficulty of allocating a certain percentage of investment costs to the electricity and heat component, investors in energy efficient CHP plants would benefit from full recovery of all their investment costs – including a "reasonable" return on investment – through the regulated capacity prices. Electricity consumers are obliged to purchase a certain percentage of regulated capacity in proportion to their electricity purchases on the wholesale market. As the burden of regulated capacity prices is proportionally distributed among consumers, full recovery of investment costs through capacity prices will not affect the competitiveness of CHP installations on the electricity market. Importantly, it will positively influence the competitiveness of CHP installations on the heat market: if all investment costs of CHP installations are recovered through regulated capacity prices, the tariff authorities do not need to reflect these costs in the heat tariffs. They can thus adopt lower heat tariffs for the CHP installations that benefit from regulated capacity prices. This will stimulate their attractiveness as a heat

the Trade in Capacity], SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation] 2010, No. 16, Item 1922.

274. The Market Council also did not explicitly tackle this issue in the capacity price formation chapter of the Standard Agreement for the Agreements for the Delivery of Capacity on the Wholesale Market. The latter solely provides that capacity prices will take into account expected revenues of power installations on the electricity market. It does not refer to the incomes that CHP installations receive on the heat market. *See* The Standard Agreement for Accession to the Wholesale Market Trading System adopted by the Supervisory Board of the NP "ATS," Protocol No. 96, Annex 4 (July 14, 2006) (and subsequent amendments).

supply source and contribute to the priority development of CHP and the modernization of the Russian district heating sector.

VI. CONCLUSIONS AND RETURN ON RUSSIAN EXPERIENCE

Confronted with the pressing necessity to modernize the district heating sector, Russia has, under the Federal Heat Law, adopted a new legislative basis and tariff structure for heat supply. Energy efficiency improvement and the priority development of CHP are central components to this new structure. Renewable energy sources are indirectly included in the concept of energy efficiency and thus fall within the scope of the modernization program. The new tariff approach is aimed at enabling the realization of these modernization – i.e., energy efficiency and renewable energy – policy objectives. A legal analysis of this new tariff structure is relevant for the international environmental and energy law literature because of the high environmental, social, economic, and geopolitical importance of energy savings in the Russian heating sector. Given Russia's vast experience in the field, this analysis provides interesting lessons for states that intend to reorganize their energy systems towards more sustainable and climate friendly patterns by developing district heating and CHP.

The new tariff structure of the Federal Heat Law highlights the main challenge underlying the modernization of the energy infrastructure: balancing the long-term environmental, social, economic, and geopolitical benefits of energy savings with the short-term concerns of consumer protection and industrial development. In the long term, energy efficiency improvement measures contribute to greenhouse gas emission reductions, local air quality, affordability of energy supply, innovation, and energy security. In the short term, however, the higher investment costs of these projects result in tariff increases. This impact on prices is particularly sensitive in countries such as Russia where low energy tariffs are historically considered as a fundamental right. Short-term price increases are exacerbated by the regulatory and political risks that characterize investments in the Russian energy sector and affect the capital costs of energy projects in Russia. The Federal Heat Law recognizes the need to stabilize

investment conditions to attract investors in the modernization of heat supply. Long-term tariffs are advocated as a mechanism to reconcile investor and consumer interests. The new tariff structure moves from a short-term cost-plus tariff approach to long-term investment-based tariff methodologies. Cost-plus tariffs create incentives to increase energy consumption; they do not provide the visibility necessary to commit capital and technology in energy efficiency improvements measures. The return on investment methodology, in contrast, is more compatible with the specific capital intensive cost structure of energy efficiency investments. Following the new tariff philosophy, when cost-plus tariffs are maintained, it is essential that investors are guaranteed a tariff level which will not be reduced immediately following the implementation of energy efficiency improvement measures. Investors must have the right to financially benefit from energy savings by maintaining existing tariff levels for a sufficient period of time to recover investment costs. Tariff regulations must entitle heat companies that realize energy savings to the difference between the tariff level existing before the implementation of the energy savings measures and the lower operating costs resulting from these measures.

Under the Federal Heat Law, heat supply thus remains subject to centrally regulated tariffs. The law provides a legal basis to replace centrally regulated heat tariffs with liberalized prices, but limits this possibility to restrictive conditions. This liberalization initiative builds upon the ideology that opening energy markets to competition would stimulate efficiency improvements. Russia, however, falls short of organizing district heating on a free market basis: regulated heat tariffs remain the rule, and liberalization is the exception. The tariff authorities – and not the forces of supply and demand – are thus central in ensuring the financial viability of energy efficiency and renewable energy projects in the heating sector. In this respect, investment programs play a decisive role. By including energy efficiency and renewable energy measures in the investment programs of regulated companies, the authorities officialize their support for these measures. Under the Federal Heat Law and the Federal Energy Efficiency Law, investment programs provide strong signals to investors that their investment costs will be recovered through appropriate tariffs. Investors – in particular those of

foreign origin – could challenge the possible failure by authorities to implement this commitment before domestic courts or, more importantly, before international arbitral tribunals.[275] The inclusion by the authorities of specific energy efficiency and renewable energy projects in the investment programs of heat companies is thus another important mechanism to stabilize investment conditions and stimulate the modernization of the heating sector.

The regulation of CHP is another area where the Russian experience provides interesting lessons. It highlights the importance of cost allocation in a context where heat remains regulated while electricity is sold on a free market basis. Allocation rules that aim to stimulate centralized heat supply by artificially reducing heat costs and transferring them to electricity sales can affect the profitability of CHP installations if electricity prices do not rise to levels sufficient to recover these costs. This is especially relevant in connection with the priority of dispatch of the electricity produced by CHP installations, in particular when these installations submit price taking bids for the electricity they produce in heat extraction mode. This article has argued that appropriate allocation rules – such as benchmarks based on energy efficient boilers – provide an opportunity for the modernization agenda.

The Russian experience also illustrates the complex interaction between the federal and regional level of government in the energy sector. It highlights the importance of regional tariff autonomy for the modernization of heat supply. Regions must have the opportunity to implement ambitious energy efficiency and renewable energy policies without being constrained by the price control agenda of the federal authorities. The Federal Heat Law authorizes the regions to exceed tariff limits if such increases are necessary to implement heat and energy efficiency investment programs. Given that the regions are competent to determine these investment programs, the Federal Heat Law gives them the autonomy required to pursue ambitious energy efficiency policies, including the promotion of

275. Thomas Wälde, *Treaties and Regulatory Risk in Infrastructure Investment*, 34 J. WORLD TRADE 1, 5 (2000).

renewable energy. It is now for the regions to make use of this tariff autonomy and implement their energy efficiency and renewable energy agenda.

The contribution of the Federal Heat Law to energy efficiency improvements will thus depend on its implementation by regional authorities. With respect to tariff setting, the ultimate question is to what extent the authorities will tolerate the short-term price increases that are necessary to finance the capital costs of energy efficiency investments or the operating costs of biomass projects. In this context, what costs will the tariff authorities consider as economically well-founded and justified? When balancing investor and consumer interests, tariff authorities must pay particular attention to the long-term influence that energy efficiency improvement measures have on heat prices: by generating energy savings, these measures contribute to the future affordability of heat supply. These investments reduce the impact that primary energy price increases and volatility can have on end-consumer prices. Preventing investors from recovering their capital costs and earning reasonable returns will delay the modernization of the heating sector, stimulate "boileralization." and expose consumers that cannot afford individual boilers to higher heat prices in the long term. The Federal Heat Law and the Federal Energy Efficiency Law promote mechanisms such as the return on investment methodology and long-term tariffs that, in principle, make it possible to reconcile the short-term impact that higher capital investments can have on consumer prices with the long-term benefit that energy savings represent for consumer welfare. Russia has thus created a general framework for the modernization of the heating sector. It now needs to be implemented at the regional and business levels.