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FINANCING ENERGY EFFICIENCY INVESTMENT
FOR CLIMATE CHANGE MITIGATION

Potential and Best Alternatives for Investments in Implementing
Interfuel Substitution in the Federal
District of Siberia, Russian Federation



UNITED NATIONS

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Acronyms and Abbreviations

The acronyms and abbreviations as used in this report have the following meaning:

ASCEM	Automated System for Commercial Electricity Metering
BOOT	Build – Own –Operate – Transfer
C	Credit
CIW	Construction and installation works
COE	Coefficient of efficiency
CP	Cogeneration plant
CW	Commissioning works
D&ED	Design and estimate documentation
DENA	German Energy Agency
DNPVR	Discounted net present value of returns
EBC	European Business Congress
EBRD	European Bank for Reconstruction and Development
ED	Engineering documentation
EE-21	Energy Efficiency 21
EC	Own funds (equity capital)
ESCO	Energy service company
ESPC	Energy service provider companies
FAS	The Federal Antimonopoly Service
FEC	Fuel and energy complex
FER	Fuel and energy resources
FFEM	French Global Environmental Facility
FFCMI	Federal Fund for Compulsory Medical Insurance
FSD	Foundation for Sustainable Development
FTS	Federal Tariff Service
FZ	Federal Law
GDP	Gross Domestic Product

GEF	Global Environment Facility
GOST	Government standards
GRP	Gross regional product
HPUS	Housing and public utility sector
IFC	International Financial Corporation
IFS	Investment feasibility study
IGA	Investment grade audit
IHP	Individual heating plant
IP	Investment project
IPr	Investment premium
IRR	Internal Rate of Return
JSC	Joint-stock company
L	Leasing
LA	Legislative assembly
M	Municipality
MESCO	Interregional Energy Service Company
MUE	Municipal unitary enterprise
NGR	Necessary gross revenue
NI	Net income
NPV	Net Present Value
NPVR	Net Present Value of Returns
OPEX	Operating expenses
PLC	Public limited company
PPP	Public-private partnership
PSA	Production sharing agreement
R&D	Research and development
REC	Regional Energy Committee
RES	Renewable energy sources

RF	Russian Federation
RF CC	Civil Code of the Russian Federation
PF RF	Pension Fund of the Russian Federation
RF TC	Tax Code of the Russian Federation
RMO	The Russian government programme for municipal development support
Rospotrebnadzor	The Russian Federal Service for Consumer Rights and Public Wellbeing Supervision
Rostekhnadzor	The Russian Federal Service for Environmental, Technological and Nuclear Supervision
Rostekhnregulirovanie	The Russian Federal Agency for Technical Regulation and Metrology
RPA	Russian Production Association
RUDEA	Russian-German Energy Agency
RUSEFF	The Russian Programme for Sustainable Energy Funding
SIF	Social Insurance Fund
SNiP	Building Regulations
STS	Simplified taxation scheme
SUE	State unitary enterprise
T	Tariff
TFCMI	Territorial Funds for Compulsory Medical Insurance
UE	Unitary enterprise
UNF	United Nations Foundation
UNECE	United Nations Economic Commission for Europe
USAID	United States Agency for International Development
UST	Unified social tax
VAT	Value added tax
ZAO	Private company

Units of Measurement

This report uses the following unit of measurement:

g	gram
Gcal	Gigacalorie
\$	U.S. dollars
kWh	kilowatt-hour
kgoe	kilogram of oil equivalent
mln	million
bln	billion
RUR	Russian rubles
t	ton
toe	tons of oil equivalent
trl	trillion
ths	thousand
h	hour

Executive Summary

This analytical report reviews the impact made by existing energy efficiency and energy saving legislative / regulatory base and by operations of public utility enterprises on bringing about a favorable investment climate in the sector and ensuring conditions for efficient use of fuel and energy resources in the Russian Federation.

The report comprises 4 chapters.

Chapter 1 provides an analysis of basic provisions of the Federal Law "On Energy Saving" No.28-FZ as of 3 April 1996, Federal Law "On Energy Saving and Improving Energy Efficiency" No.261-FZ as of 23 November 2009 and the principal tools used to implement the policy aimed at improving energy efficiency.

The Chapter elaborates on tariff design for heat and electric energy, the legislative base governing taxation of economic entities in the energy sector as well as issues relating to technical regulation and standardizing consumption of energy and fuel resources for various equipment and processes.

Chapter 2 reviews mechanisms for implementing energy-efficient policy, in particular, public-private partnerships (PPP) and energy service companies (ESCOs). While ESCOs successfully operate in industrially-developed countries, in the Russian Federation they are going through initial stage of development. Analyzing ESCO activities in the Russian Federation, experience of industrially-developed nations (contract types and models for implementing ESCO projects abroad) and possible scenarios of using this experience in the Russian environment, the Chapter also provides information on regional and municipal energy saving programmes in the Russian Federation.

Economic efficiency parameters allowing a comparison of alternative investment options play an important role in investment decision-making. Chapter 3 elaborates on the methodology for assessing investment efficiency, procedures for development, coordination and approval of manufacturing and investment programmes implemented by public utility sector enterprises. The Chapter reviews potential sources of financing investment projects in the public utility sector.

Chapter 4 analyzes economic efficiency of investing into a project for converting liquid and solid fuel-fired boiler equipment to natural gas, using the example of company X based in the Siberian Federal District.

- 1 Different organizational and economic models for implementing the above project, built for the purposes of such analysis, review in detail:
 - Organization of legal relationship with regard to fixed assets within the public utility sector, in particular, ownership, the right of economic management, the right of operative management, lease and concession;
 - Financing scheme: using the enterprise's own funds or borrowed funds, with two options, involving credit and lease financing, considered for the latter case.
- 2 The following conclusions were made with reference to the findings of the analysis:
 - The incorporation of an investment premium reduces payback period and increases net present value (NPV) and internal rate of return (IRR) for the funds invested;
 - When only the tariff is applied, NPV becomes positive only for credit-financed scenarios;
 - Aggregate tariff varies in the range from 42 to 65 US dollars per Gcal. The tariff is significantly lower for scenarios using a lease option (42 US dollars per Gcal) which is explained by the fact that:
 - Amortization charges are not included into the tariff as they are shown on the lessor's balance-sheet;

- In accordance with the assumption made for the model, actual amounts of lease payments are influenced by the investment premium, determined by the local authorities, rather than the tariff specified by the Federal Tariff Service.
- 3 A comparative analysis of economic efficiency and cash-flow generation indicators for sub-scenarios under consideration reveals that:
 - Form of fixed assets' ownership is not critical for economic efficiency indicators and financial feasibility for the investor; investment demand for scenarios involving borrowed funds is only a third of the value for scenarios where capital investments are financed by own funds, a factor of considerable importance in a situation characterized by shortage of uncommitted funds.

Introduction

Within the framework of the Energy Efficiency-21 (EE-21) programme of the United Nations Economic Commission for Europe (UNECE), European Business Congress (EBC) and the United Nations Foundation (UNF) have co-financed the project "Financing Energy Efficiency Investments for Climate Change Mitigation". The project is also funded by the French Ministry of Foreign and European Affairs, the French Global Environmental Facility (FFEM) and the Global Environmental Facility (GEF).

EBC in particular finances implementation of the study on reducing emissions of greenhouse gases by implementing inter-fuel substitution in the Russian Federation.

The purpose of the study is to analyze existing legislation as related to efficient use of fuel and energy resources (FER) in the public utility sector and its impact on forming investment climate.

This issue is significant as it provides insight on bringing about a favorable investment climate as related to efficient use of FER and energy saving based on a crucial role played by the energy sector in ensuring reliable functioning of the economy and social sphere of the Russian Federation.

At present, energy-intensity of the gross domestic product (GDP) of the Russian Federation is somewhat higher than that in industrially-developed nations. Reducing specific energy intensity is viewed as a crucial objective energy policy of the Russian Federation [1].

To a considerable extent, high energy-intensity of GDP of the Russian Federation is explained by objective factors – the country's cold climate and the existing structure of industrial production.

At the same time, wasteful and inefficient use of fuel and energy resources in the Russian Federation is pretty common.

Outdated fixed assets, price disparity between fuel and energy resources and cheap gas, and the lack of an efficient mechanism for encouraging energy saving are the main factors that underpin wasteful use of FER.

Realization of the energy saving potential may be ensured through providing economic incentives to FER consumers to save energy, including encouraging investments into energy saving activities.

Natural gas dominates the nation's fuel and energy balance with more than 50 per cent of the total energy consumption, while oil and coal together account for another 35-36 per cent. At the same time, in some Russian regions, gas-supply network services are still unavailable.

Regional gasification programme currently underway in the Russian Federation will allow to convert liquid fuel and coal-fired boiler houses to a more eco-friendly natural gas.

Development and implementation of the Russian Federation's regional gasification programme is aiming to:

- Create solvent end-user gas markets and gain a foothold thereon;
- Ensure a rational utilization of gas pipelines, both existing and under construction;
- Ensure mutually-beneficial cooperation with regional and local authorities, create favorable economic conditions;
- Raise the efficiency of natural gas use;
- Improve ecological situation in the regions and reduce environmental impact;
- Promote a greater reliance on gas as a motor fuel.

As a major group of natural gas consumers in the regions, the housing and public utility (HPU) sector facilities and the population have to be duly prepared for connection to gas-supply networks which requires significant investment into modernization and new construction.

The main objective of today's public utility sector is to provide incentives for rational use of energy resources and create conditions for attracting investments to finance modernization of fixed assets.

This analytical report reviews the Russian Federation's legislative and regulatory base as related to energy saving and improving energy efficiency, building organizational and legal relations between economic entities within the public utility sector.

The report detailed information on regional and municipal energy saving programmes in the Russian Federation, potential sources of financing for investment projects in the public utility sector, and provides an analysis of consequences of their implementation.

The methodology for assessing economic efficiency of investment projects was used for conducting a comparative analysis of economic consequences of implementing various organizational-economic models for reconstructing and modernizing the public utility sector in the Russian Federation regions.

This paper focuses on the following aspects:

- Stimulating implementation of energy efficiency and energy saving projects through further development of the legislative and regulatory base;
- Development prospects for energy service companies and private-public partnerships in the Russian Federation;
- Basic trends relating to development and implementation of energy efficiency projects in the municipal housing and public utility sector;
- An analysis of business legal structure models used in implementing energy efficiency and energy saving projects in the housing and public utility sector of the Russian Federation regions.

1 Stimulating Implementation of Energy Efficiency and Energy Saving Projects Through Legislative and Regulatory Base

1.1 Legislative Base for Regulation of Energy Efficiency and Energy Saving Projects

First of all, we need to consider the legislative basis regulating the activities of suppliers and consumers of fuel and energy resources. At present, the Russian Federation has a multi-tiered system of legislative and regulatory acts that govern implementation of energy efficiency and energy saving projects in the housing / public utilities and industrial sectors.

Fundamental legislative acts comprise:

- Decrees of the President of the Russian Federation;
- Federal laws of the Russian Federation;
- Directives and orders of the Government of the Russian Federation;
- Building regulations as approved by the Ministry for Regional Development of the Russian Federation.

Decrees of the President of the Russian Federation define the main directions of the country's internal and foreign policy. Decrees also provide a framework for timely addressing of urgent regulation-related issues (including those pertaining to improving energy efficiency and energy saving). At a later stage, these issues are to be regulated by the federal laws of the Russian Federation. Presidential decrees are compulsory throughout the territory of the RF and must not contravene to the Constitution of the Russian Federation and federal laws. The main goals and priorities of the Russian Federation's energy policy are defined by the following decrees:

- Decree of the President of the Russian Federation "On Basic Directions of Energy Policy and Structural Modernization of the Fuel and Energy Complex until 2010" No.472 as of 7 May 1995;
- Decree of the President of the Russian Federation "On Basic Provisions of Structural Reform of Natural Monopolies" No.426 as of 28 April 1997;
- Decree of the President of the Russian Federation "On Some Measures to Improve Energy and Environmental Efficiency of the Russian Economy" No.889 as of 4 June 2008.

Federal laws of the Russian Federation set out the legal, economic and organizational basis of relations in the national fuel and energy complex (FEC), including fundamental provisions of legal regulation of electric and heat energy tariffs for the housing / public utility and industrial sector enterprises, as well as the basic provisions for stimulating energy saving and improving energy efficiency:

- Federal Law "On State Regulation of Electric and Heat Energy Tariffs in the Russian Federation" No.41-FZ as of 14 April 1995;
- Federal Law "On Gas Supply in the Russian Federation" No.69-FZ as of 31 March 1999;
- Federal Law "On Technical Regulation" No.184-FZ as of 27 December 2002;
- Federal Law "On Electric Energy Industry" No.35-FZ as of 26 March 2003;
- Federal Law "On the Basics of Tariff Regulation for Public Utility Complex Organizations" No.210-FZ as of 30 December 2004;
- Federal Law "On the Foundation for Facilitating Reforms in the Housing and Public Utility Sector" No.185-FZ as of 21 July 2007;

- Federal Law "On Energy Saving and Improving Energy Efficiency and on Amendments to Certain Legislative Acts of the Russian Federation" No.261-FZ as of 23 November 2009 (to substitute Federal Law "On Energy Saving" No.28-FZ as of 3 April 1996);
- Federal Law "Technical Regulations for Safety of Buildings and Structures" No. 384-FZ as of 30 December 2009.

To-date, the following draft federal laws have been developed and submitted to the State Duma of the Russian Federation for consideration:

- "On Using Alternative Types of Motor Fuel" (No. 130858-4);
- "On Heat Supply" (No. 177427-5).

Directives of the Government of the Russian Federation are by-laws issued pursuant to the Constitution, Presidential decrees and the federal laws. The legal basis for regulating implementation of energy efficiency and energy saving projects is represented by a number of by-laws listed in Appendix 1.

An important role in improving energy efficiency and energy saving is played by standardization, introduction of mandatory requirements applying to construction, reconstruction and operation of various facilities. The system of standards as related to energy saving comprises building regulations (as approved by the Ministry for Regional Development) and government standards (as approved by the Federal Agency for Technical Regulation and Metrology). Gradual transition to new technical standard documentation, based on technical regulations, national standards and codes, is currently underway.

The list of basic standards currently in force is detailed in Appendix 1.

1.1.1 Legislative Base Existing Prior to 2009

Efforts to improve energy efficiency of the Russian economy through establishment of a corresponding legislative basis began in the mid-1990s.

Decree of the President of the Russian Federation "On Basic Directions of Energy Policy and Structural Modernization of the Fuel and Energy Complex until 2010" No.472 as of 7 May 1995 formulates the main priorities and objectives of the energy policy of the Russian Federation as:

- Improving the efficiency of fuel and energy resource use and creating necessary conditions for gearing the national economy into the "energy-saving mode";
- Reducing adverse environmental impact from the energy sector;
- Realizing the energy saving potential through development and introduction of highly-efficient equipment.

1.1.1.1 Federal Law "On Energy Efficiency" No.28-FZ as of 3 April 1996

Pursuant to the above Decree, the State Duma passed the Federal Law "On Energy Saving" (No.28-FZ as of 3 April 1996)¹ [2]. While the Law provided for exemptions and preferences for enterprises involved in energy-saving activities, economic effect from these exemptions and preferences was nowhere near to the costs incurred by enterprises in the course of such activities. Poor efficiency of the law "On Energy Saving" was also explained by:

- A declarative character of some standards. Defining the matters subject to regulation, the Law did not provide an answer on how they should be regulated, offering no specific financial, economic or organizational incentives for energy saving.

¹ Lapsed with the passing of the new Federal Law "On Energy Saving and Improving Energy Efficiency" (No.261-FZ as of 23 November 2009).

- The absence of a detailed separation of authority between the federal, regional and municipal authorities;
- The absence of a clearly-regulated at the federal and regional levels system of control and supervision of compliance with the mandatory requirements relating to energy saving.

As an example, Article 3 of Federal Law "On Energy Saving" No.28-FZ as of 3 April 1996, while recognizing the need for efficient use of energy resources and introduction of energy-efficient technologies, provides no mechanisms for addressing this task.

Article 12 stipulates that the federal statistical body shall, in accordance with the procedure established by the Government of the Russian Federation, gather energy saving-related data. However, as the procedure is yet to be developed, no statistics on efficiency of energy resource use is available.

It should be noted that some requirements as stated in the Law could not be complied with due to subsequent changes in regulation of legal relations adjacent to energy saving. According to Art. 5, virtually all requirements aiming to restrict excessive consumption of energy are to be specified by national standards. However, pursuant to Federal Law "On Technical Regulation" No.184-FZ as of 27 December 2002 which came into force in 2002, national standards have lost their imperative character and are to be applied in a very limited number of cases.

When the inefficiency of the Federal Law "On Energy Saving" was finally recognized, it was substituted by Federal Law "On Energy Saving and Improving Energy Efficiency" No.261-FZ as of 23 November 2009.

1.1.1.2 Other Programmes and Regulatory Acts

Overall situation relative to efficient use of FER in the period prior to 2008-2009 may be characterized as follows:

Energy consumption by state-owned organizations became the focus of attention. In June 1997, the Directive of the Government of the Russian Federation No.832 "On Efficient Use of Energy and Water Resources by State-Owned Enterprises, Institutions and Organizations" was adopted. In 1997-1998, the Federal Government passed a number of legislative acts relating to energy saving, including Russian the Directive of the Government of the Russian Federation No.588 "On Additional Measures to Stimulate Energy Efficiency in the Russian Federation" as of 15 June 1998.

In particular, pursuant to the above Directive, the federal bodies of authority, when planning fuel and energy consumption quotas for subordinate state-owned enterprises and organizations, must:

- Specify targets for fuel and energy resource saving through utilization of available energy saving potential;
- When implementing energy saving programmes and activities, maintain the baseline level of financing the consumption of fuel and energy resources for a period which by one year exceeds the payback period for energy saving costs.

However, after the 1998 crisis, the issue of improving energy efficiency was apparently removed from the top-priority list and the federal government's policy to improve energy efficiency have lost its momentum.

A recent success story worth mentioning relates to the federal energy saving programme run by the Ministry of Education² of the Russian Federation in 1999–2005, its objective being to accumulate and disseminate energy efficiency knowledge within the framework of research-educational institutions. The programme's management structure was built in the form of a pyramid: deputy minister, scientific expert

² Ministry of Education and Science of the Russian Federation, established in 2004, took over the functions of the Ministry of Education and the Ministry for Industry, Science and Technology.

panel, executive management, two lead universities, 41 base universities, subordinate universities, and 20 energy saving centers. The programme proved to be budgetary efficient. Areas of energy efficiency activities and financing structure were defined by tripartite cooperation agreements on energy saving between the Ministry of Education, the Ministry of Energy and the corresponding regional administration (Figure 1-1). Under the agreement, the parties were to coordinate their efforts in implementing the joint programme involving a complex of research, development and production activities in educational institutions aimed at reducing public utility costs by implementing a package of organizational and technical measures to improve efficient use of energy resources.

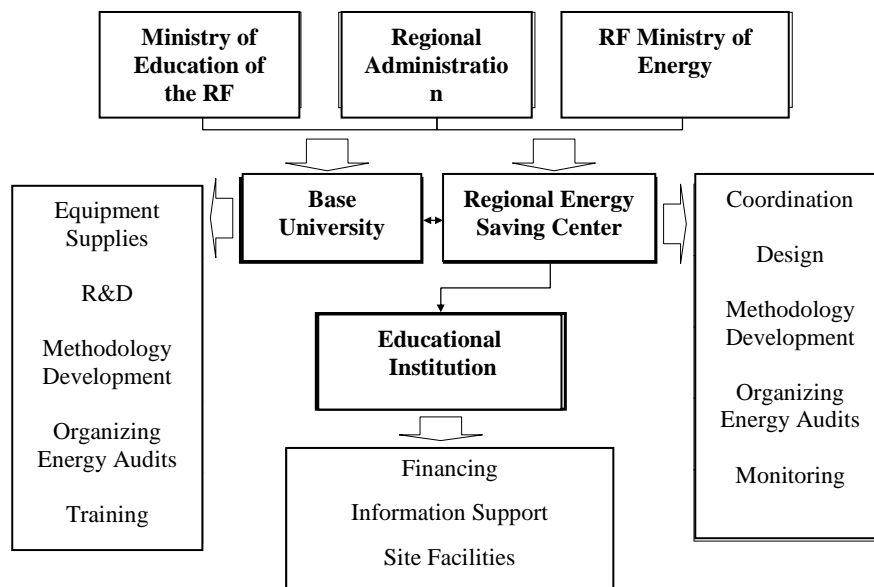


Figure 1-1. Organizational and financial structure of project management

The programme, inter alia, provided for the following activities:

- Establishing energy saving centers at educational institutions;
- Energy efficiency training and retraining of personnel;
- Development of regional energy saving and energy efficiency programmes;
- Development and implementation of research-and-engineering projects.

Implementation of projects aimed at improving the efficiency of energy use by state-owned facilities and installation of metering equipment have resulted in significant budget savings [3].

The Directive of the Government of the Russian Federation No.796 as of 17 November 2001 launched the Federal Target-Oriented Programme Titled *Energy-Efficient Economy in 2002-2005 and until 2010*" which was never implemented due to:

- The failure to establish the programme's management system;
- The absence of funding to ensure the operation of the programme's management system and projects' co-financing;
- The lack of a mechanism for attracting extra-budgetary funds.

In 2004, the federal budget allocated only 4 million rubles to finance implementation of the "Energy Efficient Consumption" subprogramme, with another 20 million rubles allocated in 2005. No funds at all were made available for the "Energy Efficiency in State-Owned Organizations" programme component. In the course of the 2004 administrative reform, energy saving was removed from the Federal Government's scope of duties [3].

In 2007, the state corporation *the Foundation for Facilitating Reforms in the Housing and Public Utility Sector* (Federal Law No.185-FZ as of 21 July 2007) was established. The Foundation provides financial support to the Russian Federation regions and municipalities, allocating funds to finance capital repairs of apartment buildings (including repairs of the buildings' power, heat and gas-supply systems, installation of metering equipment and control units) to improve the quality of the housing and public utility sector reforms and introduce resource-saving technologies. The Foundation will operate until 1 January 2012.

More legislative acts were adopted in 2008-2009. In our opinion, within the framework of this study, existing legislation should be reviewed separately from legislative acts that are no longer in force. Accordingly, several regulatory legal acts, which came into force prior to 2009 but are still in force as of today, are considered in more detail below.

1.1.2 Existing Energy Efficiency Legislation

As can be seen from the above information, the list of regulatory legal acts constituting the legislative base for operations of fuel and energy resource suppliers and consumers is quite extensive. Bearing in mind that this study intends to provide an analysis of investment climate in the public utility sector, some of these acts need to be considered in more detail.

These regulatory legal acts deal with:

- Efficient use of fuel and energy resources;
- Regulation of natural gas tariffs;
- Regulation of heat and electrical energy tariffs;
- The use of renewable energy sources.

1.1.2.1 Energy Strategy until the Year 2030

The main goals and objectives of further energy sector development in the Russian Federation are formulated by the Energy Strategy of the Russian Federation until the Year 2030 [1] ("the Strategy") which was endorsed in 2009.

In accordance with the Strategy, the Russian Federation's energy policy is to maximize efficient use of natural and energy resources and the energy sector's potential to ensure sustainable economic growth, improve the population's quality of life and help consolidate the country's foreign economic stand.

Along with energy security, energy efficiency of the Russian economy is viewed as a crucial strategic objective of the government's policy in the energy sector, thus emphasizing the significance of efficient use of fuel and energy resources for further development of the nation's economy.

The Strategy provides for a number of mechanisms of implementing the government's energy policy, aimed at improving energy efficiency of the economy. On the one hand, they include the introduction of a system of norms, standards and regulations enhancing energy efficiency of the economy. On the other hand, they create economic incentives for development of the investment, energy-saving, innovative, environmental and other priority components.

The Energy Strategy of the Russian Federation comprises 3 stages:

- 2013-2015: overcoming the recessionary trends in the energy sector;
- 2016-2022: improving energy efficiency through innovative development of the fuel and energy complex;
- 2022-2030: gradual transition to the energy sector of the future, including the use of new, non-carbon sources of energy.

The authority to implement the action programme as provided for by the Strategy is delegated to the Russian Federation Ministry of Energy, the Ministry for Economic Development, the Ministry for Natural Resources and Environment and the State Nuclear Energy Corporation (*Rosatom*).

In accordance with the Energy Strategy, energy saving in the heat-supply sector is to focus on: generation of heat energy, heat energy transmission systems, and heat energy consumption systems. By 2030, specific heat losses are expected to go down by 8-10%. The Strategy also provides for development and implementation of a package of measures to improve heat supply, including:

- Creating favorable conditions for attracting private investments in heat supply, including the introduction of an economically feasible return on investment method;
- Optimizing the existing tariff system (transition to a mandatory double-rate tariff, applying long-term tariffs under bilateral agreements) taking into account the interests of heat manufacturers and consumers alike;
- Formulating mandatory requirements to equipment manufactured and operated in the energy sector, improving energy efficiency of buildings;
- Rational use of government support mechanisms, including support within the framework of private-public partnership;
- Large-scale reconstruction and streamlining of fixed assets, including the use of renewable heat sources.

1.1.2.2 Basic Provisions of Federal Law "On Energy Saving and Improving Energy Efficiency" No.261-FZ as of 23 November 2009

A new stage of the government's policy on energy efficiency of the Russian economy begins with the signing of the Decree of the President of the Russian Federation "On Basic Provisions of Structural Reform of Natural Monopolies" No.426 as of 28 April 1997.

The Decree requires at least a 40% reduction in the energy-intensity of gross domestic product of the Russian Federation by 2020 (as compared to 2007). The Government is authorized, within the specified time-period (2008-2009) to:

- Develop laws providing for introduction of economic incentives to encourage energy saving activities by business entities;
- Develop laws aimed at greater responsibility of business entities for non-compliance with the limit values specified for environmental impact;
- Take technical regulation measures aiming to enhance energy and ecological efficiency of such branches of the economy as electric power industry, construction, public utility sector and transport;
- When designing tariff policy and projects to be funded from the federal budget, provide for allocations needed for supporting and encouraging the use of renewable energy.

Pursuant to the Decree of the President of the Russian Federation No.889, on 23 November 2009, the State Duma passed the Federal Law "On Energy Saving and Improving Energy Efficiency and On Amendments to Certain Legislative Acts of the Russian Federation" [4].

The Federal Law "On Energy Saving and Improving Energy Efficiency" No.261-FZ as of 23 November 2009 is aiming to create the legal, economic and organizational base for stimulating energy saving and improving energy efficiency.

The Law sets out the basic principles of legal regulation as related to energy saving and improving energy efficiency:

- Efficient and rational use of energy resources;
- Support and encouragement of energy saving and energy efficiency improvement;
- A systemic integrated approach to activities related to energy saving and improving energy efficiency;
- Planning of energy saving and energy efficiency improvement;
- The use of energy resources taking into account specific resource, production and technological, ecological and social conditions.

Basic provisions of the Federal Law "On Energy Saving and Improving Energy Efficiency" are detailed below:

- 1 New requirements and restrictions on goods turnover on the Russian Federation territory;
- 2 Requirements relating to energy efficiency and installation of metering equipment in buildings and structures;
- 3 Conducting of energy audits;
- 4 Implementation of energy saving and energy efficiency improvement programmes;
- 5 Conclusion of energy service contracts to ensure government and municipal needs;
- 6 Requirements to improve energy efficiency of state-owned enterprises;
- 7 Transition to long-term tariffs based on long-term regulation parameters to provide economic incentives for energy saving and improving energy efficiency;
- 8 A general outline for state support and funding of energy saving activities.

Implementation of this Federal Law implies development and adoption of a regulatory package containing a lot of technical indicators and norms. At the same time, the Law³ specifies the deadline (until 1 May 2010) for the Government of the Russian Federation to pass the necessary legislative and regulatory acts. The Order of the Government of the Russian Federation No.1830-r as of 1 December 2009 endorses an action programme to improve energy saving and energy efficiency aimed at implementation of the Federal Law No.261-FZ; the authority to implement the above measures is delegated to the following federal agencies: the Ministry for Economic Development, the Ministry of Energy, the Ministry for Industry and Trade, the Ministry for Regional Development, the Federal Antimonopoly Service (FAS), the Federal Tariff Service (FST), the Federal Service for Environmental, Technological and Nuclear Supervision (Rostekhnadzor), and the Federal Service for Consumer Rights and Public Wellbeing Supervision (Rospotrebnadzor) [5].

The Federal Law No.261-FZ as of 23 November 2009 introduces amendments to some legislative acts, in particular, relating to taxation and tariff design.

The following amendments were introduced to the Tax Code of the Russian Federation:

- 1 An investments tax credit may be granted to an organization if such organization is involved in⁴:

³ Art. 50

⁴ Art. 67 of the Tax Code of the Russian Federation. An investments tax credit provides for a deferred tax payment whereby an organization, within a specific period and within certain limits, is allowed to make deductions from its tax payments with a subsequent stage-by-stage payment of the credit amount and interest. The deduction is made for each payment of the corresponding tax, for which the investments tax credit is granted, for each reporting period, until the amount not paid by the organization as a result of all such deductions (the accumulated credit amount) becomes equal to the credit amount as shown in the corresponding contract.

- Activities to raise energy efficiency of product manufacture, performance of works or provision of services;
 - Investments to create facilities falling into the highest energy efficiency category, including apartment buildings and/or pertaining to renewable energy sources and/or pertaining to heat or electric energy generating facilities with a performance factor in excess of 57%.
- 2 Taxpayers are entitled to apply a special coefficient to the standard amortization rate (the maximum value being 2) for any fixed assets pertaining to high energy efficiency facilities⁵.

In accordance with the Budget Code of the Russian Federation⁶, state or municipal clients may enter into government or municipal energy service contracts with the price to be calculated as a percentage of the energy saving's value, for a term exceeding the validity of approved quotas for budgetary obligations.

The Federal Law No.261-FZ specifies the basic regulation principles for performance contracts in the Russian Federation (in the Law, "performance contract" is referred to as "energy service contract"). However, clearly-defined responsibility of each participant of an energy service contract (the state, the customer, financial institutions and energy service companies) is yet to be formulated.

In accordance with the Law, subject matter of an energy service contract is the contractor's performance of measures aimed at energy saving and improving energy efficiency of resource utilization by the customer⁷.

An energy service contract must stipulate:

- Specific value of energy saving to be ensured by the contractor under the contract;
- The contract's duration which cannot be shorter than the time-frame necessary for achieving the stipulated energy saving value.

An energy service contract may also contain:

- The contractor's obligation to ensure energy regimes as agreed by the parties, and conditions for using energy resources (including thermal regime, lighting intensity and other parameters);
- The contractor's obligation to install and commission metering equipment to measure consumption of energy;
- Requirement to calculate the energy service contract prices on the basis of parameters achieved, or to be achieved, as a result of the energy service contract's performance, inter alia, on the basis of the energy resources saved.

Subject to agreement between the energy buyer and the person having the right to sell, supply or distribute the corresponding energy resources, the terms of an energy service contract may be included into contracts for purchase-and-sale, supply or distribution of energy resources (except for natural gas)⁸, with the price to be set by the parties.

Such contracts may stipulate:

- Quantitative value of energy resources to be used by the parties when stipulating contractual obligations;

⁵ Art. 259 (para 3) of the Tax Code of the Russian Federation

⁶ Art. 3, Art. 72 of the Budget Code of the Russian Federation

⁷ Art. 19 of the Federal Law No.261-FZ as of 23 November 2009

⁸ Art. 20 of the Federal Law No.261-FZ as of 23 November 2009

- Requirement to make settlements under such contract on the basis of parameters achieved, or to be achieved, as a result of the contract's performance, inter alia, based on the cost of the energy resources saved;
- Provision granting a full or partial payment moratorium under such contract until the results of the energy service contract's performance have been achieved.

In addition, the Law grants to the state and municipal clients the right to enter into energy service contracts with the subject matter being the contractor's performance of activities aimed at energy saving and improving energy efficiency of energy resource use ("energy service contracts").

The pros and cons of the new Law "On Energy Saving and Improving Energy Efficiency" are summarized in the table below:

Table 1.1 Pros and Cons of the Law "On Energy Saving and Improving Energy Efficiency"

Advantages	Disadvantages
1. Article 50 of the Law specifies the deadline (by 1 May 2010) for the Government to adopt the necessary regulatory legal acts enabling the Law's implementation.	1. Many reference rules. To implement the Law, a large number of by-laws, including technical parameters and norms, will have to be adopted.
2. The Law introduces energy service contracts and stipulates specific targets and personal responsibility for violating the Law's provisions.	2. Organizational aspects need finalizing. As an example, the administrative body authorized to impose fines and penalties is not specified.
3. A detailed description of energy saving activities for the authorities, enterprises with government participation, state-owned organizations, and enterprises involved in activities subject to regulation.	3. No provisions to regulate energy saving at industrial enterprises, on transport and in trade industry. Coverage of heat-supply issues is minimal.
4. The transition to new household equipment standards is to encourage enterprises to begin technical modernization for manufacturing new energy saving products.	4. While the regional and municipal authorities are in a better position to finance energy saving technologies, the funding-related issues need further finalizing.
5. Metering of all energy resources (heat and electricity) becomes compulsory.	5. The bulk of costs associated with the activity (installation of meters, purchase of energy saving bulbs, etc.) are passed on to end-users.
6. The transition to tariff design using the return on investment method will allow to attract significant private investments into development of transmission and distributing electrical networks while maintaining a moderate tariff growth.	
7. Establishing an energy register to include energy data sheets of enterprises and buildings with the corresponding equipment and its energy consumption data. The register will allow to analyze the dynamics of the facilities' energy-intensity and greenhouse gas emissions.	

The Law "On Energy Saving and Improving Energy Efficiency" provides the following additional mechanisms for stimulating energy efficiency by:

- Setting target energy efficiency improvement indicators for state-owned organizations. Any budget funds saved by improving energy efficiency now remain at the state-owned organization's disposal;
- Setting out the basic provisions of energy service contracts allowing to attract private financial resources for modernizing state-owned facilities, using the funds saved on utility and amenity service bills to pay back the investments. In the residential sector, ESCOs may act as

management companies, selling an agreed-upon level of comfort to the building's residents for a specific fee;

- Introducing the requirement to use tariffs based on long-term parameters (in electric power industry);
- Introducing the requirement to install metering equipment for all energy resources, including heat energy, which also becomes a prerequisite for concluding energy service contracts;
- Requiring approval of regional energy saving programmes.

1.1.2.3 Legislative Regulation of Tariff Design

Gas Tariffs

In accordance with the Federal Law "On Gas Supply in the Russian Federation" No.69-FZ as of 31 March 1999⁹, natural gas prices and gas transmission tariffs are subject to government regulation.

Pursuant to this Law, the Government of the Russian Federation passed Directive "On State Regulation of Gas Prices and Gas Transmission Service Tariffs on the Russian Federation Territory" No.1021 as of 29 December 2000.

The Directive put into operation the "Basic Provisions for Design and Government Regulation of Gas Prices... on the Territory of the RF", pursuant to which government regulation on the Russian Federation territory applies to:

- Wholesale gas prices;
- Tariffs for gas transportation by transfer pipelines (for independent organizations);
- Tariffs for gas transportation by pipelines owned by independent gas transporters;
- Tariffs for gas transportation by gas-distribution networks;
- Tariffs for supply and sale services provided to end-users by gas suppliers (when regulating wholesale gas prices);
- Retail prices for gas supplied to the population.

Natural gas volumes, supplied to the consumers of the Russian Federation at regulated prices, constitute the regulated segment of the domestic natural gas market and make up approximately 70% of the total market (with the main supplier being the Gazprom Group of Companies), while the non-regulated market segment accounts for the remaining 30 per cent of the market (with the main supplier being the Gazprom Group of Companies and independent gas producers). Gas price in the non-regulated market segment (commercial price) is some 30-45% higher than that in the regulated segment.

Dividing the domestic gas market into regulated and non-regulated segments necessitates annual coordination and approval of natural gas volumes to be supplied to Russian regions at regulated prices (the so-called natural gas quotas). Natural gas quotas are calculated taking into account the volume of gas consumption in the year preceding the year of regulation. If consumption of gas declines, gas quotas allocated for the year of regulation are reduced correspondingly. Volumes consumed on top of the quotas are paid for or purchased at market price. This mechanism fails to provide consumers or regional governments with incentives for gas saving.

With the exception of households, all natural gas consumers fall into category 1, for which prices / tariffs for their products / services are not regulated by the government, and category 2, subject to government regulation of prices / tariffs for their products or services.

⁹ Art. 21

Category 1 consumers are represented by chemical, metallurgical, light industry enterprises, etc. They are not interested in gas saving because of low regulated prices for gas under quotas, higher domestic market prices for alternative fuels and in comparison with international FER prices.

Category 2 is represented by heat and electric energy producers and suppliers whose attitude to gas saving is determined by the legislation regulating the pricing policy on their products and services.

To improve government regulation of gas prices and promote the principles of market pricing on the domestic market, the Government of the Russian Federation issued Directive No.333 "On Improving State Regulation of Gas Prices" as of 28 May 2007. In accordance with the Directive, beginning with 1 January 2010, contract supplies (including long-term contracts) of gas produced by Gazprom JSC and its affiliated companies to all consumers (except for the population) will be made at wholesale prices to be determined using a gas price formula ensuring equal profit margin for domestic gas supplies and gas exports. This creates a legal basis for implementing market pricing mechanisms for natural gas to be sold on the RF territory, and this factor is expected to have a significant impact on efficient use of natural gas.

Summarizing the Subsection, it should be noted that, pursuant to Presidential Decree "On Certain Measures to Improve Energy and Environmental Efficiency of the Russian Economy" No.889 as of 4 June 2008, to achieve the strategic objective of a 40 per cent reduction in energy-intensity of the Russian Federation's economy by 2020, the Ministry of Energy established Russian Energy Agency (REA) (Order No.560 as of 16 December 2009). REA's functions comprise:

- Analytical support of efforts to establish the state fuel and energy complex information-support system and other state information resources relating to industry and energy sector, building a state information resource comprising databases on improving energy efficiency of production, sales and consumption of primary and secondary fuel and energy resources on the domestic and external markets;
- Devising and organizing implementation of a complex of measures to stimulate energy saving and improve energy efficiency by state-owned enterprises, the energy sector, industry and the public utility sector, with a greater reliance on renewable energy sources;
- Developing draft regulatory legal acts and methodological recommendations with the purpose of implementing the legislation of the RF on energy saving and improving energy efficiency, inter alia, through organizing and maintaining the state energy register and taking into account the use of energy-saving manufacturing technologies on the territory of the RF;
- Selection and assistance in implementation of energy saving projects in the Russian Federation;
- Organizing implementation of federal target-oriented energy efficiency programmes;
- Providing the regions of the Russian Federation with legal, information-analytical and research-engineering support, personnel training and retraining when introducing new energy saving and energy efficiency technologies to the national economy.

Electrical and Heat Energy Tariffs

As the activities of energy suppliers are legally recognized as operations of natural monopolies, the economic, organizational and legal base of government tariff regulation relating to their services is stipulated in a number of legal acts. At present, control over the operations of natural monopolies is carried out by the Federal Tariff Service (FTS), which delegates some of its authority to its regional branches – Regional Energy Commissions (REC). It should be noted that in some Russian regions, Regional Energy Commissions were renamed to Department for Tariffs (e.g., in Primorski krai and the Novosibirsk region) or to Department for Tariff Regulation and State Buying (in the Tomsk region).

Federal laws of the Russian Federation define the economic, organizational and legal basis for government regulation of electrical and heat energy tariffs, including tariffs for the public utility sector enterprises.

In accordance with the Federal Law "On State Regulation of Electric and Heat Energy Tariffs in the Russian Federation" No.41-FZ as of 14 April 1995[6], government tariff regulation is aimed at creating economic incentives ensuring the use of energy-saving technologies in production processes. Regulation of electrical and heat energy tariffs is carried out in accordance with the following basic principles:

- Ensuring economic feasibility of costs incurred by a commercial organization in the course of production, transmission and distribution of heat and electric energy;
- Verifying economic feasibility of planned (estimated) production costs and profit margin during tariff calculation and approval;
- Providing commercial organizations involved in production, transmission and distribution of heat and electric energy with funds to finance production development, etc., in the form of borrowed funds, private investments and other moneys;
- Creating conditions for attracting domestic and foreign investments;
- Calculating payroll total in accordance with the industry-specific tariff agreements;
- Competitive selection of energy equipment suppliers and contractors to be involved in energy facilities and electrical network construction;
- Taking into account the performance of energy suppliers over the period for which the previously approved tariffs applied.

In the public utility sector, the basic principles of tariff and surcharge regulation, inter alia, include the following provisions (Federal Law "On the Basics of Tariff Regulation for Public Utility Complex Organizations" No.210-FZ as of 30 December 2004 [7]):

- Establishing tariffs and premiums ensuring financial needs of the public utility sector enterprises as necessary for implementing their production and investment programmes;
- Encouraging reduction in production costs, improving economic efficiency of product manufacture / provision of services and the use of energy saving technologies by the public utility sector enterprises.

Inclusion of an investment premium (IPr) into a tariff¹⁰ is within the competence of the local authorities. When approving the investment premium amount, the local authorities take into account both the investment programme for the entity subject to regulation and the local population's paying capacity. The period of an IP's validity may not be shorter than 3 years and must correspond to the investment programme's implementation time-frame.

For the entire period of validity of tariffs for products and services of a public utility sector organization, additional funds saved as a result of such organization's improved performance efficiency when implementing its production programme, remain at the organization's disposal.

Pursuant to individual articles of Federal Law "On the Basics of Tariff Regulation for Public Utility Complex Organizations" No.210-FZ as of 30 December 2004, the following specific documents have been adopted:

- Directive of the Government of the Russian Federation No.464 "On Endorsing the Regulations for Financing Investment Programmes for Utility Complex Manufacturers of Goods and Services Relating to Electricity and/or Heat Supply" as of 23 July 2007;

¹⁰ Introduced by amendments in August 2008.

- Directive of the Government of the Russian Federation No.520 "On the Basics of Pricing Policy and the Order for Regulating Tariffs, Markups and Limit Indexes as Related to the Operations of Utility Complex Organizations" as of 14 July 2008.

The Federal Law "On Electric Power Industry" No.35-FZ as of 26 March 2003 sets out the basics of the state's investment policy in the power industry, in particular:

- Promoting attraction of investment by creating a favorable investment climate;
- Ensuring an economically-justified rate of return for invested capital, used to finance the operations of the power industry facilities subject to government price / tariff regulation;
- The use of innovative tools for attracting investment;
- Providing economic incentives for introduction of new highly-efficient power industry technologies, inter alia, to ensure development of small-scale and alternative power industry facilities.

According to the Directive of the Government of the Russian Federation No.109 "On Pricing Policy for Electrical and Heat Energy in the Russian Federation" as of 26 February 2004¹¹, the entity subject to regulation is entitled to choose one of the three methods of tariff regulation:

- Cost plus method;
- Return on investment method;
- Tariff indexation method.

It should be noted that, prior to July 2008¹², the cost plus method had no economic alternatives for designing tariffs applying to natural monopolies. By today, the electric power industry has accumulated certain experience in using the return on investment method in the sector. From 1 January 2009, the return on investment method has been used to set tariffs for power transmission services by the following energy sector enterprises: AstrakhanEnergo, DonEnergo, KurganEnergo, PermEnergo, RostovEnergo, RyazanEnergo, TverEnergo, TulEnergo and EnergoKurgan.

The cost plus method is based on reimbursement of economically-justified costs incurred by the entity subject to regulation and setting a permitted profit margin for such entity. Therefore, tariff calculation is based on the amount of gross revenues necessary for the organization in question.

It should be also noted that the regulatory body adjusts the tariff (the necessary gross revenue amount) depending on specific situation, for example:

- The enterprise's financial performance over the preceding year, i.e. the necessary gross revenue amount is increased by the amount of losses made in the year that precedes the year of regulation, and vice versa, is reduced by the amount of profits that exceeds the specified level;
- Indexation of cost items correspondingly the price index growth (personnel salary increases, appreciation of contracts with suppliers and subcontractors);
- Advances in prices and tariffs of natural monopolies (the difference from the preceding item being that the growth in certain prices and tariffs set by natural monopolies, in particular, natural gas prices, in addition to inflation processes, reflects the RF Government's determination to eliminate price disparity on the domestic fuel market. This means that, in accordance with the RF Government's plans, advance in natural gas prices will outstrip the price index growth;

¹¹ Art. 15

¹² Several amendments, governing state regulation of tariffs for services provided by natural monopolies, came into force in July 2008.

- Taking into account the enterprise's investment programme, etc.

Regulation using the cost-plus method hampers efforts to improve efficiency of equipment's operation and maintenance and realization of capital investments even if, with time, such capital investments may result in consumers' energy savings:

- Any costs that may be qualified as economically-justified (minor deviations from the norm accepted) will be included by the regulatory body into the tariff for the consumer. And, in the absence of competition on the heat-supply services market, the consumer will have no choice but to accept it. Accordingly, economically-justified costs are to be compensated by the consumer;
- The higher the aggregate costs incurred by the entity subject to regulation, the higher the profit margin, calculated as a percentage (5-12 per cent) of total production and marketing costs;
- Reduced production and marketing costs, obtained via resource savings, would automatically result in reduction of the next year's tariff. Accordingly, the manufacturer is not interested in cost reduction;
- One of the cost items for the cost-plus method is amortization of fixed assets. In accordance with the law, amortization is calculated on the basis of balance-sheet (book) value of fixed assets, which does not reflect the market value of such assets. If the equipment is outdated (and that is the case for an overwhelming majority of fixed assets in the public utility sector), its amount would be very small. Bearing in mind that amortization of fixed assets is one of the company's own sources of financing creation of fixed assets, this source becomes effectively unavailable for a majority of the public utility sector enterprises. On the other hand, as far as fixed assets are concerned, amortization is the main source of investment payback and, as amortization is calculated in consideration of the fixed assets' service life, this period would considerably exceed the investment payback period as desired by the investor.
- Pursuant to the Law "On Energy Saving and Improving Energy efficiency ...", a number of amendments relating to tariff design for services provided by heat and electric power industry enterprises were introduced to the Federal Law "On Government Regulation of Heat and Electric Energy Tariffs in the Russian Federation". It should be noted that, in accordance with the amendments to Art. 23 of the Federal Law "On Electric Power Industry":
- Beginning with 1 January 2012, government regulation of heat energy tariffs and tariffs for heat energy transmission services is to be carried out only in the form of long-term tariffs based on long-term regulation parameters, including those using the return on investment method.

Pursuant to the Federal Law "On Energy Saving and Improving Energy Efficiency and on Amendments to Certain Legislative Acts of the Russian Federation" (No.261-FZ)¹³, tariff regulation in the course of an activity subject to regulation is to be carried out mainly in the form of setting long-term tariffs based on long-term regulation parameters, including the methods ensuring return on investment. In accordance with the Federal Law "On the Basics of Tariff Regulation for the Utility Complex Organizations" No.210-FZ as of 30 December 2004¹⁴ (as amended by Law 261-FZ as of 23 November 2009), investment programmes in the heat-supply sector are to be financed by:

- Tariff design based on long-term regulation parameters;
- Setting premiums¹⁵ on top of heat energy tariffs;

¹³ Art. 25

¹⁴ Art. 15

¹⁵ These markups do not apply to the case where investment programmes are financed by setting a tariff based on the return on investment method.

- Setting premiums on top of tariffs for connecting to the public utilities infrastructure.

This way, the method for determining the value of service is being reformed by gradual transition from cost plus-based regulation to the return on investment method. In particular, in accordance with existing legislation, the return on investment method is to become the only method to apply to operations of natural monopolies in the electric power industry.

The main advantage of the return on investment method over the cost plus method is that tariff calculation is based on the capital employed (rather than on the book value of assets) and takes into account regional return on investment value, thus stimulating influx of capital.

Tariffs designed using the return on investment method are based on the necessary gross revenues (NGR) for a long-term regulation period (3-5 years), separately for each financial year in that period.

NGR comprises:

- The company's operating expenses;
- Payback of invested capital (capital depreciation);
- Return on invested capital.

It should also be noted that adjustments of the NGR, specified for the next financial year taking into account deviation of actual tariff calculation parameters from target values, are made during the regulation period.

The baseline level of operating expenses (OPEX) is set by the regulatory body using the cost-plus method and taking into account the operating expenses change index, based on benchmarking and analysis of deviations from the performance achieved by industry leaders. Operating expenses exclude amortization, interest on credit, rent, and payments for services provided by organizations involved in activities subject to regulation. Operating expenses for each subsequent year in a long-term period of regulation are determined by multiplying the baseline OPEX level by the consumer price index (indexation), the operating expenses efficiency index (reduction in OPEX at a pace as specified by the regulatory body – 1-2.5 per cent) and by the change in assets quantity index.

The regulatory body encourages companies to reduce operating expenses:

- If actual OPEX over the latest financial year have grown to a smaller value than specified by the regulatory body, the NGR is not reviewed for the entire period of regulation, which ensures certain benefits from savings;
- The baseline OPEX level, established for the next long-term period of regulation, is increased by the amount of OPEX savings obtained in the preceding period of regulation. Therefore, the regulatory body leaves the savings at the company's disposal for a 5-year period, extracting them when setting the tariff for the next period of regulation.

The method's underlying principle is to ensure payback of the invested capital within a specified period, being equal to the service life of the company's assets, and receive a standardized return.

Return on invested capital, comprising two components, is calculated on the basis of:

- 1 The amount of invested capital, payback of the capital invested prior to the period of regulation, rate of return for the capital (6-12 per cent) and a regional return coefficient;
- 2 Expenses provided under the agreed investment programmes, payback of investments, net working capital, rate of return for the capital (6-12 per cent), and a regional return coefficient.

The advantages of using the return on investment method are detailed below:

- Interest on borrowed capital is reduced, as long-term tariffs and their annual macroeconomic factors-based indexation reduce investment risks;

- Payback of equity capital and borrowed funds is ensured at a return level typical for industries with similar risk levels;
- Incentives for cost reduction and improving the quality and reliability of supply are created;
- Long-term tariffs, with annual indexation depending on inflation rate and taking into account other objective reasons, are established, thus improving cash-flow transparency and predictability.

Table 1.2 Advantages of Using the Return on Investment Method [8]

For Investors	For Consumers	For Regional Authorities
1. A return level comparable with that in industries with similar risks 2. The required investment rate of return 3. Guaranteed predetermined tariff level mid-term 4. Raising large amounts of financing 5. Incentives for efficient cost management 6. Increased efficiency of financial operations on capital markets	1. An influx of investments needed for connecting to the network and reducing wear-and-tear of existing networks 2. Channeling investments to construction of new and modernization of existing facilities 3. Tariff reduction in the medium-term perspective 4. Tariff dependence on reliability and quality of power transmission services	1. An influx of investments to infrastructure industries 2. Restricted price pressure on consumers 3. Economically-justified investment programmes 4. Direct dependence of tariff size on the required level of reliability and the pace of territorial development 5. Maximum transparency of the tariff design process

Tariff indexation method is used for setting tariffs for products and services of the public utility sector organizations in the event of an objective change in the organization's operational environment that affects the value of its products and services. Tariffs are determined by multiplying the preceding period's tariffs by indexes reflecting such changes in the operational environment.

These indexes are calculated using the values as determined by the RF Ministry for Economic Development and reflect changes in costs incurred by the public utility enterprises, in particular, specific cost items relating to the company's financial needs for implementing the public utility component of a production programme devised with reference to a specific line of such company's activity.

When this method is used, tariffs are calculated in accordance with methodological guidelines approved by the Federal Tariff Service¹⁶, taking into account:

- Cost reduction programmes for organizations involved in activities subject to regulation, such programmes to be agreed with the regulatory body;
- Changes in the composition and/or amount of financing for the power industry's investment programme;
- Deviations of actual product output on the retail market and/or services being provided from target values;
- Deviations of actual fuel prices from forecast values;
- Deviations of actual consumer price index value from the forecast value assumed when setting regulated tariffs / prices;

¹⁶ FST Order "On Endorsing Methodological Guidelines for Indexing of (Minimal and/or Maximal) Tariff Levels and Tariffs for Products / Services of Organizations Involved in Activities Subject to Regulation" No.275-e/4 as of 5 July 2005.

- Amendments to regulatory legal acts influencing expenses of organizations involved in activities subject to regulation;
- Changes in regulated fuel tariffs / prices in accordance with decisions made by the regulatory body;
- Changes in tax rates made in accordance with the Russian Federation’s taxation legislation;
- Changes in the amounts of payments provided for under contracts required for commencing operations in the electric power industry and on the wholesale and retail electric energy (capacity) markets in accordance with the Russian Federation legislation on the electric power industry;
- Technology-related specifics of electric energy / capacity production.

The regulatory bodies are entitled to apply the tariff indexation method where the consumer price index, as projected in a socio-economic development forecast for the Russian Federation, does not exceed 12 per cent in the calculation period subject to regulation.

A comparative analysis of the tariff regulation methods under consideration is given below.

Table 1.3 A Comparison of Tariff Regulation Methods

Method	Advantages	Disadvantages
Cost plus method	1. Traditionally used	1.No incentives for cost reduction 2. Absence of clear tariff projection
Indexation method	1. Maximum and minimum tariffs 2. Sufficiently clear tariff projection	1. Low incentives for cost reduction
Return on investment method	1. Incentives to increase investment volume 2. Clear tariff projection 3. Incentive for cost reduction	1. Methodological base needs finalizing 2. Time-consuming implementation

Box 1

On 11 November 2009, the State Duma adopted in the first reading the draft Federal Law "On Heat Supply" (No. 177427-5). To finalize the draft Federal Law, a special task force is now being established. The Law is expected to become effective in the spring of 2010. The Law "On Heat Supply" is intended to introduce a certain degree of competition in the heat-supply sector and harmonize the regulatory base related to heat-supply with existing regulatory base in adjacent industries. The basic provisions of the above draft Law are detailed below:

In the field of heat-supply, the Law defines the powers of the Government of the RF, federal bodies of authority, regional bodies of authority and local governments¹⁷.

In particular, it defines the powers of the federal authorities of the RF, regional authorities and local governments as related to tariff regulation¹⁸.

Where there exists an opportunity for an economically-justified transition of legal relations, emerging within the framework of a specific heat-supply system, from a condition characterized by the absence of competition to a competitive heat-supply market, tariff regulation may be abolished¹⁹.

Heat-suppliers²⁰ sell heat energy to consumers under a heat-supply contract which, inter alia, specifies heat-supply quality parameters and consumption regime.

Local governments must approve and annually update heat-supply schemes used as the base for further development of heat-supply networks (to meet demand for heat energy with a minimum environmental impact).

1.1.2.4 Legislation Governing the Use of Renewable Energy Sources

Encouraging the use of energy saving technologies, including renewable energy sources (RES), remains a major aspect of government regulation relating to energy saving and improving energy efficiency. Energy saving is defined as implementing organizational, technical, technological, economic and other measures aiming to reduce consumption of energy resources being used while maintaining the corresponding effect from their use²¹. Accordingly, the energy saving definition also relates to the use of RES. Encouraging the use of RES will allow the preservation of existing energy resources for future generations.

In 2005, the Russian Federation received a 350 thousand US dollars Global Environmental Facility grant from the International Bank for Reconstruction and Development to finance preparation of the "Russian Programme for Development of Renewable Energy Sources" project.

Work on the Russian Federation's regulatory legal base relating to the renewable energy industry began in 2007. Amendments to the Federal Law "On Electric Energy Industry" No.35-FZ as of 26 March 2003, adopted at the end of 2007, provided a framework for development of the renewable energy industry. Pursuant to this Federal Law, the Government of the Russian Federation is authorized to:

¹⁷ In particular, the local government's powers involve ensuring reliable heat supply to consumers throughout the municipality's territory, organizing audits of heat-suppliers and district heating networks, etc. In accordance with the Law, the local government may delegate all or part of its powers to a federal body of authority.

¹⁸ Relative to tariff regulation, the federal body of authority approves methodological recommendations on tariff design and stipulates maximum and minimum tariff rates, while the local governments set tariffs and markups. As for executive authorities, they can set tariffs other than those already set by the local government.

¹⁹ However, this provision contradicts to par. 2 Art. 23 of the Federal Law "On Electric Power Industry" as of 26 March 2003, which demonstrates the need for harmonizing the draft law with existing legislation.

²⁰ A heat supplier may be represented by a person being the legal owner of heat energy sources or district heating networks in a given heat-supply system.

²¹ In accordance with Federal Law "On Energy Saving and Improving Energy efficiency" No.261-FZ as of 23 November 2009.

- Approve the basic aspects of government policy for improving energy efficiency of the electric power industry, specifying target indicators for output and consumption of electric energy generated using RES;
- Approve action plan or programme for achieving the above target indicators;
- Formulate rules, criteria and procedure for qualification of generating facilities using RES;
- Support the use of RES and encourage introduction of energy-efficient technologies in accordance with the Russian Federation's budget-related legislation;
- Approve criteria for granting federal subsidies to compensate the cost of technological connection of generating facilities with an installed capacity not exceeding 25 megawatts that are recognized as qualified facilities using RES.

The price of electric energy generated using RES is determined by adding a markup to the equilibrium wholesale market price. Power networks must compensate line losses primarily by purchasing electric energy generated using RES.

The Law was followed by a number of refining documents:

- Directive of the Government of the Russian Federation No.426 "On Qualification of Generating Facilities Based on Renewable Energy Sources" as of 3 June 2008 (endorsing the procedure for qualification of generating facilities based on renewable energy sources);
- Order of the Ministry of Energy of the Russian Federation "On the Procedure for Maintaining the Register of Issued and Redeemed Certificates Confirming the Output of Electric Energy by Qualified Generating Facilities Using Renewable Energy Sources" No.187 as of 17 November 2008.

Development and implementation of highly-efficient resource saving technologies and new kinds of energy is performed within the framework of the federal target-oriented programmes:

- "Research and Development in Priority Areas of the Russian Federation's Research and Technology Complex in 2007-2012" (RF Government's Directive No.163 as of 17 October 2006);
- Order of the Government of the Russian Federation No.54 "The National Technology Base for 2007-2011" as of 29 January 2007.

The RES-related regulatory and legal framework is being reformed in accordance with the Decree of the President of the Russian Federation "On Certain Measures to Improve Energy and Environmental Efficiency of the Russian Economy" (No.889) providing for budget allocations to encourage implementing RES projects.

The Order of the Government of the Russian Federation No.1-r as of 8 January 2009 endorsed "The Basic Provisions of State Policy Aimed at Improving Energy Efficiency of the Electrical Power Industry through the Use of Renewable Energy Sources until 2020". The Ministry of Energy of the Russian Federation is made responsible for coordinating the policy's implementation by the federal authorities. The Order provides for the following activities to encourage the use of RES:

- Improving the system of target indicators;
- Organizing monitoring of compliance with target indicators;
- Improving the system of state statistical reporting relating to the use of RES;
- Developing a siting scheme for renewable energy generating facilities;
- Arranging for extra-budgetary investments to finance construction of green-field and reconstruction of existing sources of renewable energy;

- Elaborating a complex of measures to promote development of small businesses operating on the energy services market and using RES, and other measures.

For the period ending in 2020, the following target values for production and consumption of renewable electric energy are specified²²:

- 1.5 per cent - for 2010;
- 2.5 per cent - for 2015;
- 4.5 per cent - for 2020.

As already mentioned above, amendments to the tax code, made pursuant to the Federal Law "On Energy Saving and Improving Energy Efficiency and on Amendments to Certain Legislative Acts of the Russian Federation" (No.261-FZ), stipulate that investors in renewable energy sources may be granted an investments tax credit²³.

At present, the Committee for Energy is considering draft Federal Law "On Using Alternative Kinds of Motor Fuel" No.130858-4.

1.2 Technical Regulation and Standardization in the Public Utility Sector

Development and application of efficient standards and regulations ensures the following advantages:

- Unification of terminology and values;
- Codification of best practice and management system;
- Accumulation of necessary engineering experience;
- Development of a common testing, measurement and accounting methodology;
- Promotion of energy saving management practice;
- Support of research cooperation and policy harmonization in general;
- Assistance in raising user and consumer awareness and competence.

Harmonizing national and international standards will allow to:

- Set equivalent indicators thus providing a common basis for comparing energy efficiency in different countries;
- Minimize the costs of testing and verification of energy efficiency indicators for products on the increasingly globalized energy-consuming equipment markets;
- Simplify transfer to a more efficient energy-generation process;
- Accelerate introduction of best practices into regulatory mechanisms and real economy;
- Lower energy policy-related technical barriers in trade;
- Create a global energy-efficient technology market.

Standardization activities in the Russian Federation are basically governed by the Federal Law "On Technical Regulation" No.184-FZ as of 27 December 2002. The Law provides for a transition to a two-tier structure of technical standard documentation with the first tier represented by technical regulations

²² Except for hydropower plants with an installed capacity exceeding 25 megawatt.

²³ Art. 67 of the Tax Code of the Russian Federation

and the second – by national standards and codes. Technical regulations specify very general requirements that do not change with time. A package of refining documents, comprising national standards and codes, is put together for each technical regulation. Meeting the requirements of national standards or a given code becomes a sufficient condition for compliance with the technical regulation's requirements. At the same time, application of the second-tier documents is voluntary and boils down to the following: a) firstly, any of the documents featured in the technical regulation's evidentiary base may be selected for application; secondly, one's own evidentiary base, based on research, calculations, tests, contingency scenarios and risk assessments, may be also used. National standards²⁴ differ from the codes in the sense that a national standard covers a narrow aspect of a given issue and is approved by the national standardization body – the Federal Agency for Technical Regulation and Metrology. As for codes²⁵, they are adopted by specific ministries and cover a wide range of issues.

Pending the entry into force of the corresponding technical regulations, the documents adopted by the federal bodies of authority prior to the entry into force of the Federal Law "On Technical Regulation" are to be complied with throughout the entire territory of the Russian Federation. All technical regulation-related documents, adopted by the federal authorities following the entry into force of the above Law, are to be used for reference only. At the same time, the federal authorities have the right to make amendments to compulsory documents currently in force (which retain their compulsory status) [9].

Development of new regulatory legal base governing technical regulation is already underway. The Federal Law "Technical Regulations For Safety of Buildings and Structures" No.384-FZ as of 30 December 2009²⁶ became effective on 30 December 2009. This technical regulation sets out requirements to:

- Energy efficiency of buildings and structures²⁷;
- Include energy efficiency data of buildings and structures in design documentation²⁸;
- Operation of buildings and structures, which is to ensure compliance with the requirements of energy efficiency and provision of energy resource metering equipment²⁹.

Summarizing this Chapter, it should be noted that, pursuant to the Order of the Government of the Russian Federation No.1830-r "On Endorsing an Action Programme for Improving Energy Saving and Energy Efficiency in the Russian Federation" as of 1 December 2009, the Ministry of Energy has developed a draft state programme for energy saving and improving energy efficiency until the year 2020, which is currently being coordinated with the federal executive authorities.

The main objective of the state programme is to ensure rational use of fuel and energy resources through implementation of energy saving activities, raising energy efficiency in various branches of the Russian Federation's economy and reducing energy intensity of the GDP by 13.5 per cent (by 2020 as compared to 2007).

Activities within the programme cover all branches of the Russian Federation's economy. They are viewed not only as a tool for improving the efficiency of energy resource use for the purposes of further development of the nation's economy but also as a principal element of the country's technical modernization. Programme activities focus on:

²⁴ An analog of government standards (GOSTs)

²⁵ An analog of building regulations (SNiP)

²⁶ This Federal Law comes into force upon expiry of six months after the date of its official publication.

²⁷ Art. 13

²⁸ Art. 33

²⁹ Art. 36

- Improving energy efficiency in the electric power industry, the manufacturing sector, heat supply and public utility facilities, residential sector, agriculture, transport, state-owned institutions and services sector;
- Encouraging efforts to improve energy efficiency in the Russian Federation's regions;
- A greater reliance on renewable energy sources;
- Legal, regulatory, organizational and information support for activities aimed at improving energy efficiency.

The list of basic activities within the programme is detailed in Appendix 3. It should be noted that the programme provides for target-oriented agreements between the Government of the Russian Federation and enterprises / organizations from various branches of the economy, with the subject matter of such target-oriented agreements being:

- Agreeing and documenting target energy efficiency levels, reduction of contaminant and greenhouse gas emissions;
- Development of energy efficiency improvement plans at company level and specific targets to be achieved;
- Elaboration of the reporting and monitoring process to control performance;
- Introduction of tax incentives and other schemes to encourage implementing programmes for the support of energy efficiency activities in industry.

The programme's budget is estimated at 10.5 trillion rubles.

1.3 Regulation of Legal Relations Between Economic Entities and Municipal Authorities

1.3.1 Types of Public Utility Sector's Enterprises

Efficient organization of the public utility sector's property management remains an important component of implementing the Russian Federation's energy efficiency policy aiming to achieve the following objectives:

- Regulation of the public utility sector to ensure its operational capability and development, reliability and safety of the services being provided;
- Raising the efficiency of budget spending;
- Development of a market environment to improve the quality and affordability of the services being provided by the HPU sector.

Operations of the public utility sector organizations are regulated by regulatory and legal acts depending on a given form of incorporation. The main forms of incorporation of public utility sector enterprises are listed below:

- Municipal unitary enterprise (MUE);
- State-owned unitary enterprise (SUE);
- Public limited company (PLC);
- Joint stock company (JSC);
- Private company (ZAO).

1.3.1.1 Unitary Enterprises

A unitary enterprise is a commercial organization that has no ownership rights to assets it uses in its operation. All assets of the unitary enterprise are owned by the Russian Federation, a Russian Federation region or a municipality. A unitary enterprise, entitled to the right of economic management or operative management, is established by decision of an authorized government body (for SUEs) or local government (for MUEs).

Operations of unitary enterprises are regulated by the following legislative and regulatory acts:

- The Civil Code of the Russian Federation (Part 1) [11];
- Federal Law "On State-Owned and Municipal Enterprises" No.161-FZ as of 14 November 2002;
- Federal Law "On General Principles of Local Government Organization" No.131-FZ as of 6 October 2003.

The Federal Law "On State-Owned and Municipal Enterprises" No.161-FZ as of 14 November 2002³⁰ imposes certain restrictions on establishing SUEs (MUEs). For the public utility sector, most typical cases would be:

- The need to use assets not subject to privatization, including the assets necessary for ensuring the national security of the Russian Federation;
- The need to engage in activities aiming to address social issues.

The charter of a unitary enterprise is approved by the authorized federal agencies or by a local government and defines the enterprise's goals, objectives and lines of business.

All assets of the state / municipal unitary enterprise are held under the right of economic management or operative management. Speaking about the assets, it's important to emphasize that all assets, acquired or created in the course of the unitary enterprise's business activities (or operative management) belong to the state (or municipality) and are held by the unitary enterprise under the right of economic management or operative management only³¹.

A SUE (MUE) must annually pay to the corresponding budget part of the profits remaining at its disposal after paying taxes, in an amount as determined by competent government bodies of a given RF region or by local government.

The procedure for distributing profits generated by the unitary enterprise is established by the assets owner.

The unitary enterprise's manager is appointed by the wealth-holder (the local government) and performs the functions of the unitary enterprise's sole executive body. The unitary enterprise's manager is accountable for the enterprise's operations in accordance with the procedure and within the deadlines as established by the enterprise owner.

1.3.1.2 Joint Stock Companies

Legal status of joint stock companies is defined by:

- The Civil Code of the Russian Federation (Part 1);
- Federal Law "On Joint-Stock Companies" No.208-FZ as of 26 December 1995.

³⁰ Art. 8

³¹ Par. 3, Art. 213; par. 2, Art. 299 of the the Civic Code of the Russian Federation

Legal status of open (public) joint stock companies (JSC) whose shares are owned by government or municipal authorities is defined by:

- Federal Law "On Privatization of State-Owned and Municipal Property" No.178-FZ as of 21 December 2001.

The Law "On Joint Stock Companies" (No.208-FZ) defines the joint stock company as a commercial entity with the charter capital divided into several blocks of shares, certifying liability rights of the company members (shareholders) relative to the company. Shareholders are not liable for the company's obligations and bear the risk of losses associated with its operations within the value of the shares in their possession. The company is a legal entity entitled to separate assets to be shown on its balance-sheet. The company is liable for its obligations by all assets in its possession.

The company's supreme governing body is the general shareholders' meeting.

The general shareholders' meeting elects the members of the company's board. The board is in charge of overall management of the company activities. Day-to-day management is carried out by the company's executive body which reports to the board and the general shareholders' meeting.

Companies, founded by the Russian Federation, a Russian region or a municipality (save for companies formed during privatization of state and municipal enterprises) may be established in the form of a public company only.

The statutory minimal charter capital of a JSC is 1000 minimum monthly salaries as of the company's date of registration, of a ZAO – 100 minimum monthly salaries.

There's no limit on the maximum number of a JSC shareholders. For a ZAO, the maximum number of shareholders is fifty.

JSC shareholders have no right of first refusal with regard to the shares traded by other shareholders of such JSC. Shares of a ZAO cannot be publicly traded without the permission of the other shareholders.

In accordance with the Federal Law "On Privatization of State-Owned and Municipal Property" No.178-FZ, a JSC, established through reorganization of a unitary enterprise, becomes legal successor of such unitary enterprise. JSC charter must specify the goals and the scope of activities of the newly-established open joint stock company.

Shareholder rights for JSCs the shares of which are owned by the regions of the RF or municipalities are exercised respectively by the regional authorities or the local governments. Where 100 per cent of the JSC shares are in state or municipal ownership, the authority of the company's supreme governing body – the general shareholders meeting – is taken over by the regional authorities or by the local government.

The Government of the Russian Federation or federal bodies of authority may decide on exercising a special right ("the golden share") to participate in the JSC's management, for example, when privatizing the assets of unitary enterprises. In this case, representatives of the RF or, as the case may be, the Russian region are appointed to the board of directors and the JSC's auditing committee. Representatives of the RF or Russian regions are entitled to suggest issues for the agenda of annual shareholders' meetings and demand holding an extraordinary general shareholders' meeting. Representatives of the RF or Russian regions, sitting on the board of directors, enjoy the right of veto with regard to a specified number of issues.

Special right ("the golden share") is exercised once 75 per cent of all shares of a corresponding open joint stock company are alienated from state ownership. Special right ("the golden share") remains effective until determined otherwise.

1.3.1.3 Limited Liability Company

A limited liability company (PLC) is a business entity established by one or several persons, with its charter capital divided into equity shares. Members of a PLC are not liable for its obligations and bear the risk of losses associated with its operations within the value of the equity shares in their possession (The Civil Code of the Russian Federation, Part 1, Federal Law "On Limited Liability Companies" No.14-FZ as of 8 February 1998).

A PLC is entitled to separate assets to be shown in its balance-sheet. The company is liable for its obligations by all assets in its possession.

The maximum number of shareholders is 50.

Management bodies of a PLC are elected by at least a three quarters majority vote of the total company member votes.

The statutory minimal charter capital of a PLC is ten thousand rubles.

The company charter may grant the company or the company members the right of first refusal for equity shares, or specific portion of an equity share in the company's charter capital, offered for trading.

The company's supreme governing body is the general shareholders' meeting.

The company's sole executive body is elected by the general shareholders' meeting for a term as determined by the company charter. The sole executive body does not have to be elected from the ranks of the company members.

1.3.1.4 Potential Schemes for Reorganizing Public Utility Sector Enterprises

Based on the above, it may be concluded that, once a competitive environment in the industry is in place, the role of unitary enterprises will considerably decline as these entities cannot be viewed as efficient market participants. The role played by open joint stock companies and public limited companies will become more important. According to the Russian and international experience, such form of incorporation as JSC becomes economically viable only for major enterprises with a large number of shareholders – legal and physical persons, while PLC remains the optimal form of incorporation for small and medium businesses.

Existing legislation does not provide for a direct procedure to reorganize a unitary enterprise into a limited liability company.

In accordance with the version of the Federal Law "On Privatization of State-Owned and Municipal Property" No.178-FZ in force prior to 7 May 2009:

- Where the charter capital of a SUE (MUE), defined as the sum of the enterprise's net assets and the cadastral value of the land, exceeds the statutory minimum charter capital amount (100 thousand rubles), it may be privatized only through reorganizing the unitary enterprise into a JSC with 100 per cent of the shares in state or municipal ownership.

In accordance with the version currently in force:

- Where the charter capital of a SUE (MUE) exceeds the statutory minimum charter capital amount for a JSC (1000 minimum monthly salaries, which in 2009 amounted to 4.33 million rubles), it may be privatized only through reorganizing the unitary enterprise into a JSC;
- By decision of the local government, contributions to the JSC's charter capital may be made by non-monetary assets. In this case, for joint stock companies of strategic importance, the percentage of municipally-owned shares in the total number of the JSC's common shares may not be less than 25 per cent plus one share;

- Where 100 per cent of the JSC shares are in state or municipal ownership, the authority of the company's supreme governing body – the general shareholders meeting – is exercised on behalf of the corresponding shares' owner;
- As a property complex, the enterprise may be sold at an auction, if the buyer must meet certain conditions relating to such property.

Therefore, when reorganizing management in the public utility sector, the municipality may use the following options (Table 0.1):

- Establishing a new enterprise in the form of a PLC or JSC with the simultaneous liquidation of the unitary enterprise, taking over the unitary enterprise's assets with a subsequent handover thereof to the new entity (under a lease, concession agreement, etc.) or;
- Privatization of the municipal property using the procedure as provided under the RF legislation on privatization and, in particular, by the Federal Law "On Privatization of State-Owned and Municipal Property" No.178-FZ as of 21 December 2001:
 - Reorganizing the unitary enterprise into a JSC;
 - Selling the unitary enterprise's property complex at an auction.

During reorganization of the unitary enterprise into a JSC, municipal property originally held by the unitary enterprise under the right of economic management is contributed to the JSC's charter capital and, thus, passes into ownership of the newly-established joint stock company. The municipality then receives shares of the JSC in an amount corresponding to the percentage of the transferred assets in the charter capital.

1.3.1.5 Taxation of Public Utility Sector Enterprises

Taxation of public utility sector enterprises is done in accordance with the Tax Code of the Russian Federation [12]. The following taxes and contributions are levied on public utility sector enterprises:

- Profit tax;
- Property tax;
- Value-added tax (VAT);
- Insurance contributions to the Pension Fund, social insurance fund, the federal and territorial mandatory medical insurance funds.

It should be also noted that (when meeting certain requirements) the enterprise becomes entitled to a simplified taxation scheme.

Profit tax

Tax rate is established at 20 per cent (with 2 per cent going to the federal and 18 per cent - to regional budgets).

The tax base excludes³²:

- Income in the form of funds and other assets that were received by unitary enterprises from the assets' owner or bodies authorized by such owner.

In accordance with the Tax Code of the Russian Federation³³, for taxation purposes, expenses comprise the interest accrued on debentures provided that the amount of the interest accrued does not

³² Ch 25, Art. Art. 251 of the Tax Code of the Russian Federation

³³ Art. 269 of the Tax Code of the Russian Federation

significantly vary³⁴ from the prevailing interest rate applied to debentures that were issued during the same quarter on similar conditions. In the absence of debentures on similar conditions, and at the taxpayer's option, the maximum amount of the interest, that may be recognized as expenses, is equal to the refinancing rate of the Russian Central Bank, multiplied by 1.1 (when the debenture is denominated in rubles) and to 15 per cent (for debentures in foreign currency).

Property tax

In accordance with the Tax Code of the Russian Federation³⁵, property tax is levied on movable and immovable property shown on the balance-sheet of Russian organizations as fixed assets. The tax base is defined as the year average value of assets. The tax rate is set by regional laws and may not exceed 2.2%.

It should be noted that unitary enterprises, along with enterprises of the other forms of incorporation (JSC, ZAO or PLC) are subject to property tax as:

- The unitary enterprise has a balance-sheet of its own (Federal Law "On State-Owned and Municipal Enterprises" No.161-FZ as of 14 November 2002).
- Amortizable assets, received by the unitary enterprise from the assets' owner under the right of economic management, are subject to amortization by this enterprise³⁶.

VAT

VAT is levied on products and services sold on the RF territory, with the tax rate being 18 per cent³⁷.

Where the local governments lease assets out to a heat supplier incorporated as a PLC/JSC, and the VAT is paid by the lessee of such assets, the lessee must calculate, deduct from the income payable to the lessor, and pay the corresponding tax amount to the budget. The tax base is defined as the sum of the rent inclusive of VAT. Where the MUE leases assets out to a JSC with the municipality's permission, the lessee must transfer the rent amount, including the VAT, to the lessor, who calculates and pays the VAT to the budget.

Insurance contributions

From 1 January 2010, the Federal Law "On Amendments to Certain Legislative Acts of the Russian Federation and Declaring Invalid Certain Legislative Acts of the Russian Federation Due to the Adoption of the Federal Law "On Insurance Contributions to the Russian Federation's Pension Fund, Russian Federation's Social Insurance Fund, the Federal Mandatory Medical Insurance Fund and Territorial Mandatory Medical Insurance Funds" No.213-FZ as of 24 July 2009 abolished the unified social tax (UST). Prior to 1 January 2010, for a cumulative tax base of up to 280 thousand rubles (for each physical person), the UST rate was set at 26 per cent. The average UST rate was equal to 20 per cent.

³⁴ A deviation exceeding 20% both ways.

³⁵ Art. 374 of the Tax Code of the Russian Federation

³⁶ Ch. 25, Art. 256 of the Tax Code of the Russian Federation

³⁷ Ch. 21, Art. 146 and Art. 164 of the Tax Code of the Russian Federation

The UST was replaced by insurance contributions to the Pension Fund, social insurance fund, the federal mandatory medical insurance fund and territorial mandatory medical insurance funds. The tax base for calculating insurance contributions for each physical person is set in an amount not exceeding 415 thousand rubles (progressive total from the beginning of the reporting period³⁸. Tax rates, introduced by Federal Law "On Insurance Contributions to the Russian Federation's Pension Fund, Russian Federation's Social Insurance Fund, the Federal Mandatory Medical Insurance Fund and Territorial Mandatory Medical Insurance Funds" No.213-FZ as of 24 July 2009 are detailed in Table 1.4³⁹.

Table 1.4 Insurance Contribution Rates in the Russian Federation

	Rate	
	In 2010	From 1 January 2011
Pension fund	20.0 %	26.0 %
Social insurance fund	2.9 %	2.9 %
Federal mandatory medical insurance fund	1.1 %	2.1 %
Territorial mandatory medical insurance fund	2.0 %	3.0 %
Total	26 %	34.0 %

Simplified taxation scheme (STS)

Enterprises operating under the simplified taxation scheme are exempt from the following taxes:

- Profit tax (except for tax on dividend income and operations with specific debentures);
- Property tax;
- VAT (except for VAT levied on goods imported to the customs territory of the RF, and VAT levied under a partnership deed).

The above taxes are substituted by a single tax. All other taxes are levied in accordance with existing legislation.

In addition, the enterprise is to pay insurance contributions introduced by Federal Law No.213-FZ as of 24 July as detailed in the table below⁴⁰.

Table 1.5 Insurance Contribution Rates Under the Simplified Taxation Scheme

	Rate	
	In 2010	From 1 January 2011
Pensions Fund	14.0 %	26.0 %
Social insurance fund	-	2.9 %
Federal mandatory medical insurance fund	-	2.1 %
Territorial mandatory medical insurance fund	-	3.0 %
Total	-	34.0 %

An organization becomes eligible for the STS if, in nine months of the year, in which its application to apply the STS is submitted, the organization's income did not exceed 15 million rubles⁴¹. Simplified taxation scheme may not apply to:

³⁸ Par. 4 Art. 8 of the Federal Law "On Insurance Contributions to the Pension Fund of the RF, the Social Insurance Fund of the RF, the Federal Mandatory Medical Insurance Fund and Territorial Mandatory Medical Insurance Funds" No.212-FZ as of 24 July 2009.

³⁹ Art. 12, Art. 57

⁴⁰ Art. 12, Art. 57

- Organizations having branches and/or representative offices;
- Organizations that are more than 25 per cent owned by other organizations;
- Organizations with an average workforce (in the tax period) exceeds 100 operatives;
- Organizations with a depreciated value of fixed assets and intangible assets in excess of 100 million rubles.

Simplified taxation scheme may be applied to municipal unitary enterprises⁴².

The tax base is defined as:

- Income (with the tax rate set at 6 per cent); or
- Income less expenses⁴³ (with the tax rate set at 15 per cent).

It should be noted that the regional laws of the RF may stipulate differentiated tax rates in the range of 5-15 per cent depending on a given taxpayer category⁴⁴.

Specific tax base option is selected by the taxpayer. The tax base comprises:

- Sales proceeds;
- Non-sale income.

In accordance with the Tax Code⁴⁵, the tax base excludes:

- Income as specified in Article 251 of the Tax Code of the RF, including income in the form of funds and other assets that were received by unitary enterprises from the assets' owner;
- Dividend income⁴⁶,
- Income from operations with specific types of debentures⁴⁷.

Expenses associated with purchase (fabrication, construction) of fixed assets for the period of the fixed assets' use, reconstruction, modernization and streamlining are accepted once these fixed assets are commissioned. As for any purchased (fabricated, constructed) fixed assets prior to the transition to the STS, their value is attributed to expenses as follows (for fixed assets with a useful service life):

- Under 3 years: during the first year of operating under the STS;
- From 3 to 15 years: 50 per cent of the value - in year 1 of operating under the STS, another 30 per cent - in year 2 and the remaining 20 per cent - in year 3;
- Over 15 years: during the first 10 years of operating under the STS by equal amounts of the fixed assets' value.

⁴¹ To be indexed using a deflator factor, which is set annually for each following calendar year.

⁴² As the municipal unitary enterprise holds its assets under the right of economic management, the assets may not be divided into, or distributed by equity shares (Ministry of Taxation of the RF's Letter No.22-1-16/39-B025 as of 1 January 2004).

⁴³ Inter alia, expenses include rent and lease payments for leased equipment, interest on credits and loans, VAT amounts for goods paid, insurance contributions to mandatory pension insurance, and contributions to mandatory social insurance against bodily injury.

⁴⁴ Ch. 26, Art. 346.20 of the Tax Code of the Russian Federation

⁴⁵ Art. 346.15 of the Tax Code of the Russian Federation

⁴⁶ Par. 3, Art. 284 of the Tax Code of the Russian Federation

⁴⁷ Par. 4, Art. 284 of the Tax Code of the Russian Federation

1.3.2 Options for Organizing Legal Relations Between Business Entities and Municipal Authorities

Public utility infrastructure may be placed in management with an organization of any form of incorporation, including municipal enterprises, under a corresponding contract. Legal relations between business entities and municipal authorities as related to the public utility sector assets may come in the form of:

- The right of economic management;
- The right of operational management;
- Lease;
- Concession;
- Management of JSC shares.

The most typical scheme would be leasing municipal and public utility sector facilities out to a private enterprise provided that such enterprise assumes certain investment obligations.

1.3.2.1 The Right of Economic Management and the Right of Operational Management

Legal regulation of the right of economic management and the right of operational management is carried out in accordance with:

- The Civil Code of the Russian Federation (Part 1, Chapter 19);
- Federal Law "On State-Owned and Municipal Enterprises" No.161-FZ as of 14 November 2002;
- Federal Law "On General Principles of Local Government Organization in the Russian Federation" No.131-FZ as of 6 October 2003.

Assets held by the unitary enterprise are owned by the Russian Federation, a Russian region or a municipality, with their rights being exercised by competent bodies of government authority. In particular, they control the intended use and preservation of the assets held by the enterprise. The owner is entitled to a percentage of profits generated through the use of assets held by the enterprise under the right of economic management. The enterprise may not sell or lease out any of the immovable property held under the right of economic management without the owner's permission. All other assets can be disposed by the enterprise on its own, save where otherwise provided under the law or other regulatory acts⁴⁸.

However, the right of economic (or operational) management emerges not only to the assets placed with the SUE / MUE by the owner. All property, purchased or constructed by the enterprise in the course of its business operations (or operational management) also belongs to the government⁴⁹. It should be also noted that the unitary enterprise is liable for its obligations by all its assets⁵⁰. Accordingly, in the event of inefficient management (bankruptcy), public utility facilities may be seized by the creditors. On the other hand, the enterprise may surrender the right of economic management⁵¹, in particular, when the probability of a bankruptcy is high, thus making it impossible for the creditors to fully recover the debts.

⁴⁸ Art. 295 of the Civil Code of the Russian Federation

⁴⁹ Par. 3, Art. 213; Par. 2 Art. 299 of the Civil Code of the Russian Federation

⁵⁰ Par. 5 Art. 113 of the Civil Code of the Russian Federation

⁵¹ Ch. 15, Art. 235; Ch. 19, Art. 299 of the Civil Code of the Russian Federation

In accordance with the Civil Code of the Russian Federation⁵², a state-owned enterprise, holding assets under the right of economic management, manages such assets in accordance with its business purposes, instructions issued by the assets' owner and the intended use of such assets. A state-owned enterprise markets its products on its own, however, the procedure for income distribution is determined by the owner of the assets held by the enterprise⁵³. All operations of a state-owned enterprise are carried out in accordance with a budget of profit and loss approved by the assets' owner⁵⁴.

1.3.2.2 Lease

Lease of municipal property is regulated in accordance with:

- The Civil Code of the Russian Federation⁵⁵,
- Federal Law "On Privatization of State-Owned and Municipal Property" No.178-FZ as of 21 December 2001;
- Federal Law "On Concession Agreements" No.115-FZ as of 21 July 2005;
- Federal Law "On Protection of Competition" No.135 as of 26 July 2006;
- The Tax Code of the Russian Federation;
- Procedures for leasing out government assets at the municipal level.

Under a lease agreement, the municipality (as the lessor) undertakes to place, for a fee, the public utility infrastructure facilities in temporary possession and use by a municipal organization or a private enterprise (as the lessee). In this case, a long-term contract is normally signed. Lease agreement may be signed for individual buildings and structures for leasing the entire enterprise as a property complex. Some provisions of the Civil Code of the RF and the Federal Law "On Protection of Competition" as related to lease are detailed below:

- The lessee must use the leased property in accordance with the terms of the lease contract and, where such terms are not specified – in accordance with the property's intended use⁵⁶;
- A change of the leased property owner is not deemed grounds for amendments or termination of the lease contract⁵⁷. Accordingly, a change of the leased property owner will not result in any changes in the management system for such property;
- With the owner's permission, the lessee may assign its leased property rights to third parties without having to conduct any tenders or auctions⁵⁸;
- The contract must provide for the lessee's obligation to pay the owner a rent for using the municipal property⁵⁹. This rent is accumulated in the budget;

⁵² Art. 296 of the Civil Code of the Russian Federation

⁵³ Art. 297 of the Civil Code of the Russian Federation

⁵⁴ Art. 19 of the Federal Law "On State and Municipal Unitary Enterprises" No.161-FZ.

⁵⁵ Part 2 Ch. 34

⁵⁶ Ch. 34, Art. 615 of the Civil Code of the Russian Federation

⁵⁷ Ch. 34, Art. 617 of the Civil Code of the Russian Federation

⁵⁸ Par. 4 Art. 17.1 Ch. 4 of the Federal Law "On Protection of Competition" No.135-FZ

⁵⁹ Ch. 34, Art. 614 of the Civil Code of the Russian Federation

- Unless otherwise provided under the lease contract, the lessor must perform capital repairs of the leased property at its own cost⁶⁰. In this case, repairs by the lessor may impact the conditions for using the leased property, making these dependent on the lessor's actions, duration and quality of repairs.

Pursuant to the Federal Law "On Protection of Competition" No.135⁶¹, state-owned and municipal assets may be leased only via competitive tendering⁶² and auctions⁶³, save for the rights to such assets, to:

- State-owned and municipal institutions;
- A legal successor of a privatized unitary enterprise⁶⁴.

It should be noted that a lease contract places into the lessee's holding and/or use an already existing property. However, with regard to such property, there's no definite ban on any changes made to the leased property: the contract requires to surrender the property in a condition as stipulated under the contract⁶⁵. When entering into the lease contract, an additional agreement – a programme for development, modernizing and reconstruction of the public utility infrastructure, specifying the lessee's investment obligation – may be provided for. This agreement would typically include the following provisions:

- Specific outcomes and efficiency indicators of the lessee's operations;
- The operator's obligations to devise and perform production and investment programmes to raise investments, and mechanisms for payback of investments raised;
- Provisions regulating ownership rights to the newly-established facilities;
- The lessee's obligation to provide the local government bodies with information on actual implementation of the municipal property management and on other issues, etc.

Payback of the lessee's investments may be ensured by the following methods [13]:

- Inclusion of the investment component into the public utility services tariff;
- Financing the investments through rent (when the municipal authorities allow the enterprise to use the rent for investment projects' funding);
- Privatization of public utility infrastructure facilities (if the municipality cannot ensure payback of investments through tariffs or budgetary payments, the private company privatizes those public utility infrastructure facilities that were built using private investments).

However, the last mechanism would be the least preferred one as it breaks up the municipal public utility infrastructure. In addition, a high percentage of private public utility infrastructure may lead to monopolistic overpricing. The optimal option would be inclusion of the investment component into the

⁶⁰ Ch. 34, Art. 616 of the Civil Code of the Russian Federation

⁶¹ Par. 1 Art. 17.1 Ch. 4

⁶² To be held as per the procedure as specified under Federal Law "On Concessions Agreements" No.115-FZ as of 21 July 2005.

⁶³ To be held as per the procedure as specified under Federal Law "On Privatization of State-Owned and Municipal Property" No.178-FZ as of 21 December 2001.

⁶⁴ Where such property is not shown on the list of the private unitary enterprise's assets subject to privatization, but is technologically and functionally linked to the privatized property and is classified by law as a civil rights object not to be released for turnover, or as the facilities that may remain in state or municipal ownership only.

⁶⁵ Art. 624 Ch. 34 of the Civil Code of the Russian Federation

public utility services tariff as it allows to avoid a sharp rise in tariffs while ensuring investments payback within a few years.

1.3.2.3 Concession Agreement

The right of economic management is regulated under:

- Federal Law "On Concession Agreements" No.115-FZ as of 21 July 2005.

Under a concession agreement, the concessioner (in our case, a public utility enterprise) undertakes, at its own cost, to create and/or reconstruct immovable property as specified under the agreement (subject matter of the concession agreement⁶⁶), the title to which belongs, or will belong, to the cessionary (the municipality, on behalf of which the local government body is acting), and operate the facility being transferred. A concession agreement is signed following a corresponding tender⁶⁷.

Basic provisions of a concession agreement typically include:

- The concessioner's obligations to create and/or reconstruct the facility in question;
- Duration of the concession agreement taking into account the investments' payback period;
- Goals and time-period for operating the facility in question;
- Amount and form(s) of concession payments, payment procedure and deadlines.

Additional provisions may stipulate:

- Product sales volume;
- Procedure and conditions for setting tariffs and markups for the company's products;
- Investment outlays needed for creating and/or reconstructing the facility in question, etc.

The main rights and obligations of the parties under a concession agreement in accordance with Law No.115-FZ are detailed below.

The cessionary:

- Undertakes to grant to the concessioner, for a period as specified under the agreement, the right to hold and use the facility in question for performing the activities as provided for⁶⁸;
- Is entitled to bear part of the expenses associated with the creating and/or reconstruction of the facility in question, use (operate) such facility and provide the concessioner with government or municipal guarantees in accordance with the budget legislation of the RF⁶⁹;
- The facility subject to reconstruction under the concession agreement must be owned by the cessionary as of the concession agreement's date⁷⁰.

The concessioner shall:

⁶⁶ A concession agreement deals with immovable property, including pipeline transport facilities, facilities for generation, transmission and distribution of heat and electric energy, public utility infrastructure networks and other public utility facilities.

⁶⁷ Art. 13 of Federal Law "On Concession Agreements" No.115-FZ

⁶⁸ Par. 1 Art. 3

⁶⁹ Par. 13 Art. 3

⁷⁰ Par. 4 Art. 3

- Within the time-frame as specified under the concession agreement, create and/or reconstruct the facility in question and commence its operation⁷¹;
- Operate the facility in question for purposes and in accordance with the procedure as specified under the concession agreement⁷²;
- Perform the activities as specified under the concession agreement (switching to other activities is allowed only with the cessionary's permission⁷³, while any changes in the intended use of the facility to be reconstructed are not allowed)⁷⁴;
- Provide discounts as stipulated under the RF federal laws, regional laws or regulatory legal acts issued by local authorities⁷⁵;
- Maintain the facility in question in proper condition, perform, at its own costs, current and capital repairs and bear the facility's maintenance expenses⁷⁶;
- Surrender the facility to the cessionary within the deadline as established under the concession agreement⁷⁷ (this provision guarantees that title to the municipal property is retained by the municipality and that public interests in a corresponding community are properly served).

The facility being the subject matter of the concession agreement and other property handed over by the cessionary under the concession agreement are shown on the concessioner's balance-sheet separately from any other assets owned by the concessioner⁷⁸. Products and income, received by the concessioner as a result of the activities as provided under the concession agreement, belong to the concessioner⁷⁹. The agreement specifies payments to be made by the concessioner for the benefit of the cessionary during the operation of the facility in question⁸⁰. However, the concessioner may be exempted from such payments if its products are marketed at regulated tariffs, or where the cessionary bears some of the expenses associated with creating and reconstructing the facility.

RECs prescribe tariffs and markups for products being marketed with reference to the amount of investment and time-frame for the project's implementation as specified under the concession agreement⁸¹.

1.3.2.4 Management of JSC Shares

A unitary enterprise is reorganized into a joint stock company with more than 25% of all shares owned by the municipality. The founder hands over the network infrastructure to the JSC as its

⁷¹ Par. 2 Art. 8

⁷² Par. 2 Art. 8

⁷³ Par. 2 Art. 8

⁷⁴ Par. 5 Art. 3

⁷⁵ Par. 2 Art. 8

⁷⁶ Par. 2 Art. 8

⁷⁷ Par. 1 Art. 14

⁷⁸ Par. 16 Art. 3

⁷⁹ Par. 7 Art. 3

⁸⁰ Par. 1 Art. 7

⁸¹ Par. 3 Art. 18

contribution to the charter capital. This model is in effect privatization of fixed assets within the public utility infrastructure which, once included into the JSC charter capital, pass into ownership of the JSC.

Where the municipality owns more than 50% of the shares, the local authorities remain the enterprise's beneficial owner. A disadvantage of this model is that it is not oriented to business as public authorities are not supposed to be involved in profit maximization operations. The goal of public authorities is to efficiently perform its functions as prescribed by law. This model does not address a key issue – forming effective private management. Where an enterprise is controlled by a local government body, acting in the capacity of the beneficial owner, all political risks, associated with the municipality's influence on this business are retained. Rather than realized through institutions of corporate management, they are being formalized within the framework of specific relations. At the same time, private investors will not be too eager to invest into such enterprises as influence of the authorities on operations of such enterprises may be critical, while the interests of private investors and local authorities may be essentially different.

On the other hand, when title to public utility infrastructure passes from the local authorities to a private company, the local authorities are in effect relieved of the responsibility to provide utility services [10]. At the same time, in this case, to stay in control, the municipality may exercise special right ("the golden share") which may eliminate the above disadvantages.

1.4 Conclusions

Efforts to improve energy efficiency of the Russian economy through establishment of a corresponding legislative basis began in the mid-1990s. The Federal Law "On Energy Saving" No.28-FZ, adopted in 1996, proved to be inefficient due its declarative character.

While a number of regulatory legal acts aimed at improving energy efficiency were passed in 1996-2008, it should be noted that after the 1998 crisis, the energy efficiency issue was apparently removed from the top-priority list and the federal government's energy efficiency policy has lost momentum. One of the success stories during that period relates to the federal energy saving programme run by the Russian Ministry of Education in 1995-2005.

A new stage of the government's policy relating to energy efficiency begins in 2008. Presidential Decree "On Certain Measures to Improve Energy and Environmental Efficiency of the Russian Economy" No.889 as of 4 June 2008 requires by 2020 to achieve at least a 40% reduction in energy-intensity of the Russian Federation's GDP as compared to 2007. The Federal Law "On Energy Saving and Improving Energy Efficiency" (No.261-FZ) as of 23 November 2009 stipulates a number of specific measures aimed at improving energy efficiency of the RF economy:

- New requirements and restrictions on goods turnover on the Russian Federation territory to ensure the turnover's energy efficiency;
- Requirements relating to energy efficiency and installation of metering equipment in buildings and structures;
- Obligation to develop programmes for energy saving and improving energy efficiency at the regional and municipal levels, and for enterprises involved in activities subject to regulation;
- Obligation to conduct energy audits;
- Implementation of energy saving and energy efficiency improvement programmes;
- Legalization of energy-service contracts in the RF;
- Requirements to improve energy efficiency of state-owned enterprises;
- Gradual transition to long-term tariffs based on long-term regulation parameters;
- Provision of tax benefits.

However, implementation of the above activities will require prior development and adoption of many by-laws, including technical regulations and standards.

Encouraging the use of RES remains a major aspect of the energy saving policy. Work on the Russian Federation's regulatory legal base relating to the renewable energy industry began in 2007. Target values for production and consumption of renewable electric energy are set at 1.5 per cent in 2010, 2.5 per cent - in 2015 and 4.5 per cent - in 2020.

The Ministry of Energy has developed a draft government energy saving and energy efficiency improvement programme until the year 2020. The main objective of the programme: by 2020, to ensure a 13.5 per cent reduction in the energy-intensity of the GDP (as compared to 2007). It should be noted that the programme provides for special agreements between the Government of the Russian Federation and enterprises / organizations from various industries, including the manufacturing sector. The programme's budget is estimated at 10.5 trillion rubles.

As for legal relations between business entities and municipal authorities, it could be concluded that, as of today, capital assets of public utility enterprises are typically owned by municipalities, while

the facilities' management is carried out by private companies (typically, JSCs or PLCs) under a lease contract or (less frequently) a concession agreement. This situation is explained by the following:

- The right of economic management proved to be an inefficient municipal property management model;
- Accordingly, this necessitates reorganization of the public utility sector enterprises through attracting private investment;
- The municipality retains responsibility for the provision of public utility services.

2 Development Prospects for Energy Service Companies and PPP in the Russian Federation

2.1 Current Status of Energy Efficiency and Energy Saving in the Russian Federation

As mentioned in the previous Section, efforts to improve energy saving commenced in the Russian Federation in the mid-1990s after the adoption of the Federal Law "On Energy Saving", with energy saving programmes becoming the principal tool for implementing the government's energy efficiency policy.

The sub-programme "Reforming and Modernizing the Russian Federation's Housing and Public Utilities Complex" within the *Housing for 2002-2010* federal target-oriented programme became an important document to underpin further activities of regional authorities.

In 2003 – 2005, experience gained when implementing the Russian Federation's first energy saving programmes was used by many Russian regions for releasing their own programmes for energy saving / improving efficiency of fuel and energy resource use for 2004-2010.

In general, regional programmes addressing energy saving issues are aimed at improving the existing situation in the public utility sector's heat power industry, as heat and power-supply networks account for greatest energy losses caused by poor engineering performance standards, worn-out equipment, inadequate heat-insulation of buildings, and high electrical resistance of power networks. A review of 17 regional programmes, including republican, regional and municipal projects, is provided below.

2.1.1 Review of Regional and Municipal Energy Saving Programmes

1 Municipal Energy Saving Programme for the town of Sovetsk, Kaliningrad region in 2004-2008⁸² [14]

The programme was initiated by the Sovetsk mayor with reference to Federal Law "On Energy Saving" No.28-FZ as of April 3, 1996, the RF Government's Directive "On the Federal Target-Oriented Programme *Energy Saving in the Russian Federation*" No.80 as of 24 January 1998, and the Kaliningrad regional law "On Energy Saving" No.134 as of 21 June 1999.

The programme is aiming to improve the efficiency of energy resource use by the town's state-owned and public utility enterprises, establishing an economic and legal mechanism for achieving the programme's objectives.

The main goal of the programme is to create conditions ensuring maximum efficiency of fuel and energy resource use, implement prospective energy saving-related scientific and technological achievements, coordinate energy manufacturer and consumer interests as related to efficient use of energy resources.

When implemented, the programme is expected to reduce load on the town's fuel and energy complex and ensure addressing of social issues through reduction in fuel and energy-supply subsidies to state-owned and public utility enterprises, enhance energy security and improve environmental situation in the town.

⁸² Resolution No. 646 of the Sovetsk Municipal Council, Kaliningrad region, as of 29 October 2003.

2 Government Target-Oriented Programme for Development of Energy Facilities for the Public Utility Sector in the Irkutsk Region from 2004 to 2006⁸³[15].

The government-funded regional target-oriented programme "Development of Energy Facilities for the Public utility sector in the Irkutsk Region from 2004 to 2006" was devised within the framework of the subprogramme "Reforming and Modernizing the Russian Federation's Housing and Public Utilities Complex" of the *Housing for 2002-2010* federal programme as approved by Russian Federation Government's Directive No.797 as of 17 November 2001, and based on the development and reforming concept for heat power industry of the Irkutsk region's public utility sector (as approved by Irkutsk Governor Decree No.365 as of 14 November 2000).

The programme is to continue implementation of measures provided for within the framework of the government-funded regional target programme for development of heat power industry of the Irkutsk region's public utility sector until 2003 as approved by the Regional Legislative Assembly (resolution No.12/25-3C as of 28 November 2001).

The programme is to address technical, technological and economic issues facing the heat power industry of the Irkutsk region's public utility sector within the framework of an integrated systemic approach.

Implementation of the measures as provided under the programme is expected to reduce the risk of major emergency situations at heat power industry facilities, improve quality and reliability of heat supply, create factors of sustainable economic development for the public utility sector's heat power enterprises, and reduce the cost of utility services for the population.

3 Regional Target Programme for Energy Saving in the Bryansk Region for 2005-2010⁸⁴ [16].

The regional target programme for energy saving in the Bryansk region (2005-2010) was devised within the framework of the Federal Law "On Energy Saving" No.28-FZ as of 3 April 1996, the Bryansk region law "On Energy Saving: No.26-3 as of 15 May 2000, the catalog of regional issues to be addressed via management by objectives (as approved by Bryansk regional administration's decree No.185 as of 21 May 2002), and by Governor's Panel of Experts resolution No.5/1 as of 19 September 2003.

The programme is aiming to ensure a phased reduction in energy intensity of all products and services in the Bryansk region.

The regional target programme for energy saving in the Bryansk region (2005-2010) provides for activities aimed at addressing the following issues:

- Improving efficiency of energy generation through reconstruction and streamlining of the fuel and energy sector (FES) industries;
- Development of alternative and small-scale power sector facilities;
- Providing the regional industry and population with sustainable energy resources;
- Introducing highly-efficient import-substituting equipment and materials for use in the FES;
- Development (with participation of the region's R&D institutions) of new energy saving technologies for use in production, transmission and consumption of fuel and energy resources;
- Ensuring accounting for all energy resources that are generated and consumed in the region;
- Reducing environmental impact from the FES.

⁸³ Resolution No.31/8-ZS by the Irkutsk region Legislative Assembly as of October 31, 2003.

⁸⁴ Resolution No.3-1519 by the Bryansk Regional Duma as of 25 November 2004. The document lapsed with the passing the Bryansk Regional Duma resolution No.4-21011 as of 27 November 2008.

4 Programme for Reforming and Modernizing the Housing and Public Utilities Complex in the Republic of Tatarstan for 2004-2010⁸⁵[17].

The programme's main goals are to:

- Ensure quality standards in the provision of the housing / public utility (HPU) services;
- Improve reliability and sustainability of the housing / public utility systems with a simultaneous reduction in wasteful costs;
- Establish a targeted social assistance system to reduce public utility costs for underprivileged categories of the population.

The programme's main objectives are to:

As related to reforming the housing / public utility services:

- Improve the quality of the housing / public utility services;
- Improve the industry's funding schemes;
- Enhance social orientation of HPU policy;
- Develop and implement a complex of measures aiming to form apartment building complexes and create conditions for establishing and functioning of house owners' associations;

As related to modernization of the housing / public utility sector:

- Change the industry's technical and technological base to provide foundation for future reforms, ensure government support for the modernization process in the sector;
- Improve investment appeal of the HPU infrastructure.

To implement its basic objective, the programme provides for activities aimed at ensuring energy and resource saving in the HPU sector:

- Installation of metering equipment to control water and energy consumption;
- Arrangement for extra-budgetary financing for resource-saving activities;
- Developing recommendations on the choice of resource-saving technologies to be used for the housing fund;
- Improving efficiency of energy source and heat networks through cost reduction;
- Devising prospective development schemes for heat, electricity and water-supply to residential communities;
- Organizing small firms (within the HPU) for disposal of municipal waste;
- Organizing energy audits of resource suppliers.

5 Programme for Reforming and Modernizing the Housing and Public utility sector in the Town of Nurlat and the Nurlat District, Republic of Tatarstan in 2005-2010 ⁸⁶[18].

As a component of the republican *Housing* target-oriented programme, the programme provides for a complex of measures aiming to enhance reliability of the public utility systems, improve sustainability

⁸⁵ The Law of the Republic of Tatarstan as of 11 December 2004.

⁸⁶ Head of the Nurlat district and the town of Nurlat administration decree No.438 as of 3 May 2005.

of the housing and public utility sector and ensure a comfortable and safe living environment for the population.

The programme is to address the issues of excessive wear-and-tear of fixed assets, introduction of resource-saving technologies and development and wide application of measures to encourage efficient and rational operations of the public utility sector enterprises, maximum utilization of all available resources by such enterprises (including their own) to ensure provision of reliable and sustainable services to consumers.

The programme aims to ensure quality standards in the provision of the housing / public utility services, improve reliability and sustainability of the housing / public utility systems with a simultaneous reduction in wasteful costs, and establish a targeted social assistance system to reduce public utility costs for underprivileged categories of the population.

The programme's main objectives are to:

As related to reforming the housing / public utility services:

- Improve the quality of the housing / public utility services;
- Improve the industry's funding schemes;
- Enhance social orientation of HPU policy;
- Develop and implement a complex of measures aiming to form condominiums and create conditions for establishing and functioning of housing owners' associations;

As related to modernization of the housing / public utility sector:

- Change the industry's technical and technological base to provide foundation for future reforms, ensure government support for the modernization process in the sector;
- Improve investment appeal of the HPU infrastructure.

6 Programme for Replacement of Electric Meters in the Housing and Public utility sector of Shelekhovo Municipality in 2006-2016⁸⁷ [19].

The programme for replacement of electric meters in the housing and public utility sector of Shelekhovo municipality in 2006-2016 was approved by the local Duma in an effort to promote organizing of proper accounting for electric energy consumption in the town of Shelekhovo, with reference to GOST 6570-96 "Induction Electric Meters for Active and Reactive Energy. General Technical Conditions" as approved by the Russian Gosstandard's directive No.118 as of 31 March 1997, the Irkutsk region law "On Local Government in the Irkutsk Region"⁸⁸, and the Shelekhovo Municipality Charter⁸⁹.

The programme's main goals are to:

- Ensure integrated technical policy in energy saving for the housing and public utility sector of the Shelekhovo municipality;
- Reduce commercial losses of electric energy in the housing sector;

⁸⁷ Resolution No.32-rd by Shelekhovo Duma as of 23 June 2005. The document lapsed with the passing of Shelekhovo Duma resolution 318-RD AS OF 29 May 2008.

⁸⁸ Art. 6

⁸⁹ Art. 8, Art. 28

- Allocate additional funds to finance development of power supply in the Shelekhovo municipality.

The programme's objectives are to:

- Improve the quality of electric energy accounting;
- Reduce commercial losses of electric energy in the housing sector and provide equipment enabling application of zonal tariffs to the population.

7 Integrated Programme for Energy and Resource Saving in the City of Irkutsk until 2006 [20].

The programme, based on the main postulates on the federal programme "Energy Saving in Russian Federation for 1998-2005", was devised with reference to the following regulatory legal acts:

- Federal Law "On Energy Saving" No.28-FZ as of 3 April 1996;
- Directive of the Government of the Russian Federation No.832 "On Efficient Use of Energy and Water Resources by State-Owned Enterprises, Institutions and Organizations" as of 8 July 1997.

The programme takes into account the basic provisions of the Russian Federation's public utility sector reform concept as approved by President of Russian Federation Decree No.425 as of 28 April 1997 (as amended by Presidential Decree No.528 as of 27 May 1997), the subprogramme "Energy Saving in the Housing and Public utility sector" as approved by Russian Federation Government's Directive No.80 as of 24 January 1998, as well as the measures and requirements suggested by Russian Federation Government's Directive No.588 "On Additional Measures to Stimulate Energy Efficiency in the Russian Federation" as of 15 June 1998.

The programmes aims at:

- Ensuring efficient use of energy resources in the course of their production, transmission, storage and consumption;
- Elimination of technical causes and consequences of improper engineering systems' use (with the principle being to save on more expensive items and on whatever could be saved at minimum costs; and cut losses where they are excessive);
- Thorough review, targeting and concentration of resources in efficient energy-saving activities;
- Reliance on energy-efficient technologies, energy-consuming and diagnostic equipment, structural and insulation materials, energy resource metering equipment, and energy consumption automated control systems;
- Verification of measurements (commercial accounting) for energy resources being delivered and consumed;
- Taking into account the interests of energy resource consumers, suppliers and producers (with implementation of energy saving activities not to compromise the sanitary situation;)
- Reducing financial load (associated with the maintenance of the city's heat engineering facilities and public utility sector) on the city budget and population;
- Ensuring greater participation of enterprises, organizations of all forms of incorporation, educational institutions, the media and the population in energy-saving activities in Irkutsk.

8 Municipal Target Programme for Energy Efficiency in the Housing and Public utility sector in the City of Voronezh in 2006-2010⁹⁰ [21].

The programme was endorsed with reference to the Federal Law "On Energy Saving" No.28-FZ as of 3 April 1996 and Voronezh region law "On Energy Saving" No.72-II-OZ as of 24 December 1998.

The programme aims to:

- Attenuate the continuing decline in energy efficiency and ensure maintaining of a generally constant level of energy costs in commercial output generated by the housing / public utility sector;
- Systematize and regulate settlements between consumers and suppliers of services;
- Reduce heat energy subsidies to the population;
- Mitigate negative public response to the transition to a federal standard-based system of payment for energy resources consumed;
- Reduce budget subsidies granted to local educational, health-care and cultural institutions, etc. to compensate for their energy costs.

The programme's objectives are to be achieved through a phased implementation (depending on availability of funds to finance priority activities) of efficient technologies and energy saving equipment, development of effective financial-economic mechanisms for production, transmission and use of energy resources, organization of energy saving activities, and introduction of accounting systems in the period from 2005 to 2010.

9 Programme for Energy and Resource Efficiency in the Republic of Tatarstan in 2006-2010⁹¹ [22].

The programme was devised pursuant to the Law of the Republic of Tatarstan "On Energy Efficiency" No.1816 as of 21 October 1998, the Directive of the State Council of the Republic of Tatarstan "On Draft Land Charter" as of 27 April 2001, the Address of the President of the Republic of Tatarstan to the State Council "On the State of Affairs and Basic Directions of Socio-Economic Policy in 2003", and the Concept for efficient use of resources in the Republic of Tatarstan as approved by Republic of Tatarstan Cabinet of Ministers Decree No.199 as of 11 April 2003.

The programme sets out the main directions of government policy and indicators relating to efficient use of resources. Specific activities with indication of time-frame, scope of work and sources of funding are to be detailed in industry-specific, regional energy efficiency programmes and in programmes released by individual enterprises.

The programme's objective is to implement the strategy of integrated use of fuel-and-energy and other material resources with a simultaneous improvement in the quality of life, competitiveness of local products and preservation of eco-systems, to form efficient labor market timely providing the employer with labor of the necessary skills, and the employed – with jobs, decent salaries and working conditions meeting specified labor safety requirements.

The programme aims at:

- Creating optimal regulatory-legal, organizational and economic conditions for implementing the energy-saving strategy;

⁹⁰ Resolution No.2-II by Voronezh City Duma as of 25 January 2006. The document lapsed with the passing of Voronezh City Duma resolution No.161-II as of 6 September 2006.

⁹¹ Law of the Republic of Tatarstan 24-ZRT as of 23 March 2006.

- Improving mechanisms for financing and implementing energy and resource saving programmes and projects;
- Introduction of modern equipment, technology and materials ensuring qualitative improvement in efficiency of energy and resource use for the republican economy thus enhancing its export potential;
- Preservation of eco-systems and ensuring environmental safety;
- Ensuring a balanced structure of supply and demand for skilled labor;
- Provision of decent jobs.

10 Energy and Resource Efficiency in the City of Kazan for 2006-2010 ⁹² [23].

To reduce consumption and raise efficiency of energy resource use, the City of Kazan Executive Board devised a municipal energy resource efficiency programme for 2006-2010.

The programme's main objective is to gear the city's housing / public utility sector and state-owned enterprises into an energy-saving development mode, and reduce overall energy costs through creating of organizational, economic, research-engineering and other conditions ensuring highly-efficient use of energy resources.

Achieving the programme's objective implies addressing the following tasks:

- Further development of the regulatory legal base as related to energy resource efficiency;
- Establishing financial and economic mechanisms encouraging efficient use of energy and attractive conditions for investing in energy saving activities;
- Improving the system of energy audits and monitoring;
- Ensuring regular supervision over rational and efficient use of energy resources;
- Conducting energy efficiency audits for projects implemented in Kazan and tariff analyses;
- Improving energy accounting and control regulations;
- Organizational and methodological support for enterprises involved in energy saving activities;
- Establishing a system for competitive selection of business projects in the field of energy saving that are fully or partly funded from budgetary sources (municipality's contract for implementing energy and resource efficiency projects);
- Enhancing public awareness of the energy efficiency issue:
 - Building publicly-accessible databases containing information on energy saving activities, technologies and equipment, and related technical standard documentation;
 - Organization of personnel retraining courses;
 - Organization of annual exhibitions and experience-exchange seminars;
 - Propaganda of energy saving in the media.

⁹² Resolution by the Kazan City Duma No.8-12 as of 18 October 2006.

11 Regional Target-Oriented Energy Saving Programme for the Krasnodar Krai in 2006-2010 ⁹³ [24].

The regional target programme "Energy Saving in the Krasnodar Krai for 2006-2010" was approved in accordance with Federal Law "On Energy Saving" No.28-FZ as of 3 April 1996, Krasnodar krai law "On Energy Saving" No.401-K as of 7 August 2001, and the regional head of administration decree "On Developing the Regional Programme *Energy Saving in the Krasnodar Krai for 2006-2010*" (No.275-r as of 8 April 2005).

The programme aims at:

- Further implementation of the energy saving policy in the Krasnodar krai;
- Improving efficiency of FER and creating necessary conditions for completing the transition of the regional economy to an energy-efficient development pattern;
- Providing the regional economy and population with sustainable energy resources;
- Reducing environmental impact from the FES;
- Ensuring energy security in the Krasnodar krai.

The above goals are to be achieved through:

- Development of regulatory legal base as related to energy saving;
- Enhancing rational use of fuel and energy through wide application of energy technology and equipment by FER consumers in various branches of the regional economy;
- Improving energy-generation efficiency via reconstruction and streamlining of the FES industries on a new technological base;
- Completing installation of energy resource metering equipment and systems in accordance with specified requirements;
- Inclusion of alternative fuels and energy sources into the regional fuel and energy balance;
- Use of local fuel;
- Reduction in environmental impact from the FES facilities and improving ecological situation.

12 Regional Target-Oriented Programme for Energy Saving in the Nizhniy Novgorod Region in 2007-2010 ⁹⁴ [25].

The regional target-oriented programme for energy saving in the Nizhniy Novgorod region in 2007-2010 was devised with reference to resolution of the Government of the Nizhniy Novgorod "On Approving the Concept and Developing the Energy Saving Programme for the Nizhniy Novgorod Region for 2005-2010" No.306 as of 31 December 2004.

The programme aims to:

- Ensure a faster transition of the regional economy to an energy-saving development pattern and reduction in regional GDP's energy intensity through creating of organizational, economic, research-engineering and other conditions ensuring highly-efficient use of energy resources;
- Enhance the Nizhniy Novgorod region's energy security.

The programme's main objectives are to:

⁹³ Resolution by the Krasnodar Krai Legislative Assembly (No.2594-P as of 25 October 2006).

⁹⁴ Resolution by the Nizhniy Novgorod Government No.4 as of 10 January 2007.

- Improve efficiency of energy generation by reconstruction and streamlining of the FES industries on a new technological base;
- Design highly-efficient import-substituting equipment and materials for use in the FES;
- Reduce environmental impact and improve ecological situation;
- Enhance rational use of fuel and energy through wide application of energy technology and equipment;
- Diversify fuel and energy types being used and involve local energy resources in the fuel and energy balance;
- Consolidate financial resources to enable programme implementation.

13 Programme for Energy and Resource Efficiency in the Leninogorsk Municipality, Republic of Tatarstan for 2006-2010 ⁹⁵ [26].

The Programme for Energy and Resource Efficiency in the Leninogorsk Municipality for 2006-2010 was approved by Leninogorsk District Council's resolution No.31 as of 27 June 2007 pursuant to Republic of Tatarstan Law "On Approving the Republic of Tatarstan's Programme for Improving Energy and Resource Efficiency in 2006-2010" No.24-ZRT as of 23 March 2006 and Republic of Tatarstan Cabinet of Ministers' Decree "On the Republican Target Programme for Improving Energy and Resource Efficiency in the Republic of Tatarstan in 2006-2010" No.634 as of 28 December 2005.

The programme's main goal is to ensure the transition of the municipality's housing / public utility sector and state-owned enterprises to an energy-efficient development pattern and reduction in overall energy costs through creating of organizational, economic, research-engineering and other conditions ensuring highly-efficient use of energy resources.

Achieving the programme's goal implies the following activities:

- Improving the energy consumption accounting and control rules;
- Implementing the strategy of an integrated efficient use of FER, reducing specific FER consumption by municipal institutions, enterprises and organizations of all forms of incorporation;
- Introducing modern technology, equipment and materials ensuring quality heat-insulation of educational and residential buildings, laboratories and production facilities;
- Conducting integrated energy audits at municipal institutions;
- Organizing methodological support for enterprises involved in energy and resource efficiency activities;
- Introduction of alternative energy sources;
- Training of skilled energy saving personnel;
- Raising public awareness of the energy saving issue.

⁹⁵ Resolution by Leninogorsk Municipal Council No.31 as of 27 June 2007.

14 Municipal Target Programme for Energy Saving in the Housing and Public utility sector and State-Owned Institutions in the City of Vladimir for 2008-2010 ⁹⁶ [27].

The programme was devised pursuant to the Federal Law "On Energy Saving" No.28-FZ as of 3 April 1996 (as amended by Federal Laws No.42-FZ as of 5 April 2003 and No.232-FZ as of 18 December 2006), Vladimir region law "On the Regional Target Programme for Energy Saving and Improving Reliability of Energy Supply in the Vladimir Region's Fuel and Energy Sector in 2006-2010" No.24-OZ as of 13 March 2006 (as amended by Vladimir region law No.69-OZ as of 2 June 2006), Vladimir Region Governor's Decree "On Concept Programme for Energy Saving in the Vladimir Region's Housing and Public utility sector and State-Owned Enterprises for 2006-2010" No.34 as of 25 January 2006.

The programme is aiming to raise efficiency of fuel and energy resource use in Vladimir, using this as a basis for ensuring sustainable provision of energy to the city's population in the context of a projected growth in housing construction, the city's transition to an energy saving development pattern, reduction of environmental impact from the city's energy facilities and cutting the city budget's energy-related costs.

The programme aims to:

- Organize accounting for heat, electrical energy and water;
- Improve efficiency in production, supply and consumption of heat, electrical energy and water;
- Identify extra-budgetary sources (including loans and own funds provided by private investors) to finance energy saving projects in the city's housing and public utility sector and state-owned institutions.

15 Target-Oriented Municipal Programme for Energy and Resource Saving at the Municipal Public Utility Facilities in the Town of Verkhnya Pyshma in 2008-2010 ⁹⁷ [28].

The Programme for Energy and Resource Saving at the Municipal Public Utility Facilities in the town of Verkhnya Pyshma in 2008-2010 was devised to implement the Directive of the Government of the Sverdlovsk Region "On Government Support for Reconstruction and Modernization of Engineering Infrastructure of the Sverdlovsk Region's Municipal Housing / Public Utility Sector to Improve Its Energy Efficiency" No.107-PP as of 14 February 2007.

The programme was devised to reduce wasteful use of energy resources by the public utilities facilities, ensure rational use of subsidies from the local budget to compensate for energy suppliers' costs and reconstruction of municipal public utilities facilities. To that end, priority in 2008-2010 will be given to planning of resource consumption by the housing / public utility sector and state-owned enterprises, and introduction of new technology along with reconstruction of municipal energy and water-supply facilities.

The programme's basic activities:

- Systemic efforts to implement technical and organizational measures;
- Devising financial mechanisms for mandatory government investments into energy saving projects;
- Organizing a system of accounting and regulation of natural and energy resources (supplied and actually consumed);
- Introducing annual limits for energy consumption by state-owned organizations in accordance with standard norms and planning of energy costs (to be compensated from the local budget);

⁹⁶ Resolution by the City of Vladimir People's Deputies Council No.278 as of 21 November 2007. The document lapsed with the passing of City of Vladimir People's Deputies Council resolution No.280 as of 23 December 2009.

⁹⁷ Resolution by Verkhnya Pyshma Duma No.52/3 as of 31 January 2008.

- Regulation of economically-justified costs when designing energy tariffs;
- Attracting funds from the population and other investors.

16 Government Target-Oriented Programme for Energy Saving in the Sverdlovsk Region for 2009-2011 ⁹⁸ [29].

The government target-oriented programme for energy saving in the Sverdlovsk region for 2009-2011 was endorsed in accordance with the Directive of the Government of the Sverdlovsk region "On Approving the Regulations for Government-Funded Target-Oriented Programmes in the Sverdlovsk Region" No.1185-PP as of 30 November 2007 and Sverdlovsk Region Government's Directive "On Development of Regional Government-Funded Programmes in 2008 and Organizing Data Gathering During Implementation of the Regional Government-Funded Target-Oriented Programme" No.1323-PP as of 21 December 2007.

The region's programme for energy saving in the Sverdlovsk region for 2009-2011 is to address the following objectives relating to energy saving activities of the Sverdlovsk regional authorities:

- Ensuring reliable supply of fuel and energy resources and their rational consumption;
- Improving energy efficiency of production, transmission, distribution and consumption of fuel and energy resources;
- Raising energy efficiency of heat, water, gas and power-supply systems;
- Integrated development of local, alternative and renewable sources of energy in the Sverdlovsk region.

The programme's goals:

- A 10-25 per cent reduction in energy costs for the region's state-owned institutions (through installation of modern energy-efficient equipment);
- A 10-15 per cent extension of service life for power equipment installed in the region's state-owned institutions (through introduction of chemical water treatment systems in local boiler plants).

17 Energy Saving Programme for the City of Moscow in 2009-2011 and Until 2020 ⁹⁹

Target-oriented programme "Energy Saving for the City of Moscow in 2009-2011 and Until 2020" was developed with reference to the City of Moscow concept programme "Energy Saving for the City of Moscow in 2009-2013 and Until 2020" as approved by the Moscow Government's Directive No.1078-PP as of 11 December 2007.

The programme fully satisfies the requirements of the Decree of the President of the Russian Federation "On Certain Measures to Improve Energy and Environmental Efficiency of the Russian Economy" No.889 as of 4 June 2008, the requirements of Federal Law "On Energy Saving" No.28-FZ as of 3 April 1996, City of Moscow Law "On Energy Saving in Moscow" No.35 as of 5 July 2006, and the Directive of the Government of Moscow "On the Procedure for Development, Approval, Financing and Control of Implementation of the City of Moscow Target Programmes" No.33-P as of 17 January 2006.

The programme aims at:

- Ensuring a reliable, no-shortage energy supply for the Moscow economy;

⁹⁸ Resolution by the Sverdlovsk Regional Government (No.603-PP as of 19 June 2008).

⁹⁹ Moscow Government resolution No.1012-PP as of 28 October 2008.

- Creating favorable conditions for making energy saving attractive to business;
- Active involvement of all consumer groups in energy and resource saving.

Higher efficiency of fuel and energy resource use in Moscow will allow to cut consumption of all types of fuel and energy resources to a level making possible to achieve the planned pace of the city's socio-economic development within the framework of the gas consumption limit as approved for Moscow.

In addition, implementing the programme activities is to help reduce air emissions through:

- Improving efficiency of heat and electric energy generation by new generating units at thermal power plants, combined-cycle and gas-turbine power plants installed at district heating plants and major departmental boiler houses;
- Decommissioning of outdated energy facilities (peak-load boilers, boiler houses in residential buildings, boiler houses operated by industrial enterprises);
- Optimizing and redistribution of heat load from peak-load boiler houses and district heating plants to co-generation thermal power plant units;
- The use of secondary energy resources by industrial and public utility sector enterprises (better utilization of the available fuel resource potential);
- The use of alternative and renewable energy sources (biogas, solar energy, surplus gas and water pressure, rejected heat from thermal power plants) and devising utilization schemes for all heat and electricity generated.

Analysis of the above documents was conducted by comparing the basic indicators as declared in the programmes. These programmes are to be financed from the budgets of various levels, by own funds of specific enterprises, receipts from consumers of the HPU services, borrowed funds, investors' funds and through various equipment lease schemes.

Table 2.1 details the main indicators of the above programmes.

Table 2.1 Basic Parameters of the Energy Saving Programmes Under Consideration

N o.	Programme Title	Implementation Period	Amount and Sources of Funding	Expected Deliverables (According to the Programme)	Economic Effect	Estimated Savings of Fuel and Energy Resources as against Consumption Volume ¹⁰⁰
1	Energy and Resource Efficiency in the Republic of Tatarstan in 2006-2010	2006-2010	Funds from the Republic of Tatarstan budget and other sources not prohibited under existing legislation	Improved environmental situation, a 12.5% reduction in energy intensity of the regional domestic product (TOE/million rubles), including a 10% reduction for electric and 14% - for heat energy.	Reduction in the share of fuel and energy resources in material costs, reduction in the materials/output ratio, reduced consumption of fuel used for heat generation	In the energy sector: a 9% reduction in specific fuel consumption (g/kilowatt-hour) (for Tatenergo JSC), a 5% reduction (for Tatcommunenergo); a 22% reduction for Tatselzhilcomkhov (kg OE/Gcal)
2	Programme for Reforming and Modernizing the Housing and Public Utilities Complex in the Republic of Tatarstan for 2004-2010	2004-2010	Federal budget: 33,196 million rubles	Improved quality of housing and public utility services, improved reliability of engineering support systems, a 40% reduction in the level of wear-and-tear of water-supply and sewage networks, a 25% increase in the percentage of energy-saving housing development	Economic effect: 1,090.1 million rubles	
3	Energy Saving in the Krasnodar Krai	2006-2010	Regional and local budgets, extra budgetary sources. Total funding: 1,839.7 million rubles, including 1,757.5 million rubles (95.5%) from extra budgetary funds	A 3,800 million kilowatt-hour/year reduction in electric energy consumption; a 1020 K Gcal/year reduction in heat energy consumption, a 21.5 K ton/year reduction in air emissions	Reduction in energy-supply costs: 1,685 million rubles	Electric energy: 21%; Heat energy: 6%*
4	Energy Saving in the Sverdlovsk Region	2009-2011	Regional budget: 264.5 million rubles	Installation of 58 automatic control units at heat-supply facilities, installation of 2 heat pumps, construction of 6 mini thermal power plants, reconstruction of 38 boiler plants	A 10-15% reduction in energy resources payment costs	

¹⁰⁰ Fuel and energy consumption data quoted from Form 11-TER. Other consumption data quoted from the corresponding energy saving programmes.

No.	Programme Title	Implementation Period	Amount and Sources of Funding	Expected Deliverables (According to the Programme)	Economic Effect	Estimated Savings of Fuel and Energy Resources as against Consumption Volume ¹⁰⁰
5	Energy Saving in the Nizhniy Novgorod Region	2007-2010	Total funding: 20,287.3 million rubles, including 16,553.8 million rubles (81.6%) from extra budgetary funds	A 60 K TOE reduction in energy resource consumption in the fuel and energy complex; an increased output of electric energy to 9.4 billion kilowatt-hour/year (about 2%) by 2010	Reduced budget costs associated with payments for fuel and energy resources by state-owned institutions and the housing / public utility sector (more than 7% per year)	
6	Regional Target Programme for Energy Saving in the Bryansk Region	2005-2010	Total funding: 78.5 million rubles, including 54.5 million rubles (69.4%) from extra budgetary funds	A 6-7 million m ³ /year reduction in gas consumption; A 7.5-9 million kilowatt-hour/year reduction for electric energy; A 5-10% reduction for heat energy and water		Gas: up to 1%; electric energy: 0.35%*
7	Integrated Programme for Energy and Resource Saving in the City of Irkutsk until 2006	2003-2006	Municipal budget funds, extra budgetary sources	A 20-30% reduction in consumption of energy resources and water	Reduced budget costs associated with payments for fuel and energy resources	
8	Further Development of Energy Facilities for the Public utility sector in the Irkutsk Region from 2004 to 2006	2004-2006	1,185.8 million rubles	Heat savings amounting to 10,920 K Gcal/year (42.5%)	Economic effect: 270,5 million rubles/year	Heat energy: 38%*
9	Energy Saving in the Housing and Public utility sector and State-Owned Institutions in the City of Vladimir for 2008-2010	2008-2010	Total funding: 98.75 million rubles, including 54.78 million rubles (55.5%) from extra budgetary funds	Electric energy savings: 2.85 million kilowatt-hour; Heat energy savings: 3.67 K Gcal; Fuel savings: 150 K TOE; A 420-ton reduction in air emissions	10.13 million rubles for the entire period	Electric energy: 3.3%; heat energy: 2.3%; fuel: 1.67%
10	Energy Efficiency in the Housing and Public utility sector in the City of Voronezh for 2006-2010	2006-2010	Total funding: 1,282 million rubles, including 595.05 million rubles (46.4%) from extra budgetary funds	Energy saving effect: 1,525 K Gcal (heat energy); 86.3 K kilowatt-hour (electric energy)	Economic effect: 1,675 million rubles/year. A 15-20% reduction in heating costs, a 30-60% reduction in cold water supply costs for state-owned institutions and municipal enterprises	

No.	Programme Title	Implementation Period	Amount and Sources of Funding	Expected Deliverables (According to the Programme)	Economic Effect	Estimated Savings of Fuel and Energy Resources as against Consumption Volume ¹⁰⁰
11	Energy and Resource Efficiency in the City of Kazan for 2006-2010	2006-2010	1050.94 million rubles with amount and sources of funding finalized on an annual basis after passing of the corresponding resolutions	Reduced consumption of energy resources, including: electric energy savings of 46 million kilowatt-hour; heat savings of 2.3 million Gcal; gas savings of 74.5 million m ³ ; water savings of 2 million m ³ ; improved environmental situation	1270.7 million rubles	Electric energy: 8%; heat energy: 61%; gas: 18%; water: 3.2%
12	Target-Oriented Municipal Programme for Energy and Resource Saving at the Municipal Public Utility Facilities in the town of Verkhnya Pyshma in 2008-2010	2008-2010	Funding from the local budget: 87.650 million rubles Additional sources of funding may also be used	A 15% reduction in consumption of energy resources	Reduced heat generation costs for municipal boiler plants; reduction in the cost of utility services for state-owned institutions	
13	Municipal Energy Saving Programme for the Town of Sovetsk, Kaliningrad region in 2004-2008	2004-2008	Funds from the local, regional and federal budgets and extra budgetary funds. Total amount of funding: 9.4 million rubles	Installation of highly-efficient boiler equipment, a 30% reduction in energy consumption by state-owned and housing / public utility sector enterprises; reduction in air emissions	Reduced fuel purchase costs, reduction in the cost of utility services for the population	
14	Replacement of Electric Meters for the Housing and Public utility sector of Shelekhovo Municipality in 2006-2016	2006-2016	Total funding: 30.468 million rubles, including 28.7 million rubles (94.2%) from extra budgetary funds	A 15.8 million kilowatt-hour reduction in electric energy consumption	4-5 million rubles	Electric energy: 23.3%
15	Programme for Reforming and Modernizing the Housing and Public utility sector in the Town of Nurlat and the Nurlat District, Republic of Tatarstan in 2005-2010	2005-2010	Total funding: 392.8 million rubles Data on funding structure not available	A 35% reduction in production costs for water supply and sewage	Installation of water consumption meters, a 15% cut of tariffs; Economic effect: 49.8 million rubles (in 2005-2006)	
16	Energy and Resource Efficiency in the Leninogorsk Municipality, Republic of Tatarstan	2006-2010	Total funding: 804.7 million rubles, including 566.7 million rubles (70.4%) from extra budgetary funds	Reduced specific loss as compared to 2005: 11.2% for heat (Gcal/m ²); 9.2% for water (m ³ /person); A 13.8% reduction in the share of energy resources costs;	705.2 million rubles	

N o.	Programme Title	Implementation Period	Amount and Sources of Funding	Expected Deliverables (According to the Programme)	Economic Effect	Estimated Savings of Fuel and Energy Resources as against Consumption Volume ¹⁰⁰
				A 16% reduction in water consumption		
17	Energy Saving Programme for the City of Moscow in 2009 – 2011 and until 2020	Phase 1: 2009- 2011 Phase 2: until the year 2020	117,283.86 million rubles (175,51.80 million rubles from the Moscow City budget, 99,732.06 million rubles from extra budgetary funds)	Total electric energy savings: 5,007.00 million kilowatt-hour; total heat energy savings: 11.98 million Gcal; total water savings: 108,43 million tons; total reduction in electric capacity: 1962.50 Megawatt; total natural gas savings: 2.46 million TOE; total reduction in air emissions: 5.93 K tons		

Expected Deliverables

As can be seen from Table 2.1, for a majority of the programmes, expected deliverables relate to reduced consumption of electricity, heat and fuel, expressed both in percentage of consumption in the base year and in absolute values (million kilowatt-hour, thousand Gcal, thousand toe).

Anticipated economic effect from programmes' implementation:

- Reduced energy intensity of the gross regional product;
- Budget savings in subsidies granted to the HPU sector and state-owned enterprises to compensate for their energy costs;
- Reduced heat energy generation costs;
- Reduced fuel-purchase costs;
- Reduced tariffs for water and energy resources.

While review of existing programmes and their expected deliverables would be easier if based on previous implementation data, as a rule, no such data is available. However, there are a few exceptions from this rule:

The programme for energy saving in the Krasnodar krai for 2006-2010 mentions a 2002-2005 programme with the same title that was aimed at "...creating economic and organizational conditions for efficient use of energy resources and improving energy efficiency of the Krasnodar krai economy". Activities implemented within the framework of this programme comprise reduced losses during distribution and consumption of electric energy; replacement of existing electric meters by a higher class of precision devices, commissioning new generating capacity in the region, replacement of a considerable percentage of morally and physically outdated boiler-house and heat-network equipment, and optimization of heat-supply systems of the region's urban and rural communities.

The 25 December 2005 Directive of the Republic of Tatarstan Cabinet of Ministers points out that the implementation of the "Energy Saving in the Republic of Tatarstan for 2000-2005" republican target-oriented programme resulted in a 28% reduction in energy intensity of the republican domestic product, with the main branches of the local industry achieving threshold values for indicators as set by the programme.

The programme for "Further Development of Energy Facilities for the Public utility sector in the Irkutsk Region from 2004 to 2006" mentions activities that were implemented in 2000-2003 within the framework of the regional programme for development of the public utility sector energy enterprises until 2003, in particular, reconstruction of heat-supply networks in 23 urban communities resulting in a total effect of 90.73 million rubles/year; design, manufacture and commissioning of several 0.5-3.0 Gcal/h water-heating boilers; development of the "Design and Installation of Information Computer Complexes for Managing Heat-Supply Systems" project meant to ensure optimal functioning of heat supply facilities in the town of Ust-Kut.

The last column of Table 2.1 reflects projected programme efficiency, whereby the anticipated savings of an energy resource are correlated with its consumption in the base year. Unless shown in the programmes, consumption data in the base year were quoted either from the state statistical report Form 11-TER or using Gazprom promgaz JSC data.

The analysis of the 17 programmes aimed at energy saving or improving efficiency of energy supply indicates that:

- Bearing in mind that heat and power-supply networks account for highest energy losses, an overwhelming majority of the programmes are specifically or to a certain extent aimed at improving the situation in the public utilities energy sector;
- The programmes' goals and objectives vary from purely declarative to very specific ones;

- In our opinion, the major drawback of the programmes under consideration is the uncertainty of financing (with government funding varying from 4.5 to 54% and the amount of funding to be finalized on an annual basis depending on the financial standing of a given region);
- As a rule, mechanisms for implementing the energy saving projects are not specified or, where specified, not working.

A major drawback of the existing system for energy and resource management relates to poorly-defined mechanisms. Given the deficit of government budgets, own funds provided by enterprises remain the main source of funding energy saving projects. At the present stage of the energy saving programmes' implementation, with gross mismanagement already eliminated and low-cost fast-payback measures implemented, top priority is given to modernization of morally and physically outdated fixed assets, introduction of innovative technical and technological solutions in the field of energy generation and consumption. All this requires attracting considerable investment. To raise such investment resources, effective mechanisms for project implementation, including a comparable with alternative investment scenarios rate of return and money-back guarantees, will have to be designed. As mentioned above, in industrially-developed nations, one of such mechanisms is provided by energy service companies (ESCOs). The next subsection elaborates on activities of companies implementing energy-efficient and energy saving projects in the Russian Federation.

2.1.2 Current ESCO Activities in the Russian Federation

Beginning with the mid 1990s, high energy efficiency zones became one of the most popular ways for execution of energy efficiency projects in the Russian Federation.

The Russian Federation's energy efficiency zones represent a cluster of projects being executed within a single district, city or region, where favorable economic conditions for installation of energy-efficient facilities are created. Normally, such zones, characterized by a strong public outreach component, involve promotion of energy-efficient technologies, search for ways to provide favorable economic conditions ensuring projects' implementation, demonstrations of energy-efficient technologies and equipment, regulatory reform to provide a legal basis for energy saving and standardization of energy consumption, and adoption of modern pricing and taxation policy, with the purpose of subsequent dissemination of experience gained in such demonstration zones throughout the territory of the RF.

Establishing an energy efficiency zone necessitates an integrated systemic approach to addressing the energy saving issue, devising an energy saving programme as a component of socio-economic development on a given territory, and achievement of specific technical and economic parameters.

In today's legislative environment, implementing demonstration zone projects (a more appropriate name would be "experimental energy saving zones") becomes the only method for refinement of energy saving technologies, as the energy savings obtained in the course of a project may be reinvested into additional energy saving activities.

The procedure of government support for high energy efficiency demonstration zones is defined in the Directive of the Government of the Russian Federation No.998 "On State Support for Establishing Pilot Energy-Efficient Zones in the Russian Federation" as of 12 October 1995 [30]. The Directive authorizes the Ministry of Science and Ministry of Energy of the RF to act as guarantors for obligations associated with reimbursement of costs incurred by Russian and foreign investors in connection with the supply of energy saving equipment and devices as well as the provision of assistance during execution of joint projects in the demonstration zones.

The Russian Federation's demonstration zones represent a testing ground for fine-tuning the federal and regional energy saving regulatory legal base, organizational and financial methods of project implementation, introduction of energy-efficient technologies and equipment based on domestic research, and adaptation of international experience to Russian environment.

Such demonstration zones have already been established in a number of Russian regions within the framework of the international "Energy Efficiency – 2000" project funded by the UN Economic Commission for Europe.

Other demonstration projects are being implemented with the funding provided by the Global Environmental Facility, the World Bank and the European Bank for Reconstruction and Development (EBRD)¹⁰¹.

The main objectives of the demonstration zones are:

- Creating conditions for approbation, demonstration and promotion of aggregate effect from the use of market intermediation, energy saving technology and equipment;
- Improving the regulatory legal base for energy saving, addressing the issues of standardization, certification and metrology;
- Adoption of modern tariff and taxation policy for the purpose of further dissemination of positive experience throughout the Russian Federation territory.

Demonstration zones are a cluster of energy saving projects aiming to ensure:

- Assistance to reforms in the housing / public utility sector;
- The use of progressive technologies for efficient energy generation, transmission and consumption;
- Development of the regulatory legal base and financial-economic mechanisms, creating an infrastructure for implementing specific energy saving projects.

Box 2

Examples of high energy efficiency demonstration zones currently operating in the Russian Federation:

Several large-scale projects, jointly funded by the federal, regional, local and other sources, have been implemented within the framework of the Russian high energy efficiency demonstration zones concept. These comprise:

- The UNECE-funded "Energy Efficiency 21" project;
- The UNECE-funded "Energy Efficiency Investment Project Development for Climate Change Mitigation" project, co-financed by the UN Fund for International Partnerships (the Turner Foundation);
- The BEAR (Barents Euro-Arctic Region) project of international cooperation in the field of energy;
- The Russian Federation Government project "Creating Conditions for Lowering Main Barriers to Energy Efficiency in the Russian Federation's Housing Sector and Heat Supply", co-financed by the Global Environmental Facility;
- The project for modernizing heat supply in the town of Semionov, Nizhniy Novgorod region, co-financed by the regional authorities and a World Bank loan;
- The project for modernizing heat supply in the town of Mytishchi, co-financed from the funds provided under an EBRD loan and the regional budget;
- The project for reconstruction of heat-supply system in Kirovsk-based kindergarten No.12, financed by the Norwegian Government and Nordic Environment Finance Corporation. A revolving fund, established within the framework of this project is used to finance execution of other energy saving projects;
- The Swedish Government-funded project for conversion of boiler houses to wood waste (being implemented in a number of Russian regions);

¹⁰¹ <http://www.ebrd.com>

- The Netherlands Government-funded project for reconstruction of heat-supply system in the Murashkino community, Nizhniy Novgorod region, being implemented using the "joint implementation" mechanism as defined by the Kyoto Protocol;
- The Nordic Council of Ministers project for training energy sector professionals participating in generation, transmission and efficient use of energy in industry and the housing / public utility sector in the north-western part of the RF. The project's participants include organizations from Denmark, Norway, Sweden, Finland and Saint-Petersburg, the Leningrad region, Karelia, the Murmansk and Archangelsk regions;
- The Canadian Government-funded "Support for Municipalities in Energy Policy Planning and Transfer of Canadian Know-How" project.

The number of draft projects prepared within the framework of the Russian Federation's high energy efficiency demonstration zones now exceeds 150.

Pilot Projects

1 Projects Delivered by DENA

In the summer of 2009, Sverdlovsk became a pilot region for implementing energy saving programmes. Within the framework of Russo-German cooperation, a pipeline of 9 energy efficiency projects was established, including an agreement with the Sverdlovsk region's ministry of the PHU sector and the Association of the Presidential Programme Graduates.

In the Russian Federation, DENA¹⁰² successfully delivers the projects "Energy Saving in the Housing Fund" (2004), the "Manual on Financing Energy Efficiency Projects in the Russian Federation's Public Heat-Supply" (2007) and on establishing a strategic energy efficiency task-force. In the Sverdlovsk region, DENA is planning to implement a number of joint Russo-German investment projects with a focus on energy efficiency and the use of renewable energy sources, promoting the introduction of latest technologies in waste disposal and water supply. RUDEA¹⁰³, the Russo-German Energy Agency, was established in the Russian Federation on the basis of DENA.

2 Projects Delivered by BASF¹⁰⁴

In Yekaterinburg, the German company BASF intends to launch pilot energy efficiency projects in two areas simultaneously – an energy-efficient modernization of an old residential building in Mira street and provision of thermal insulation for a portion of district heating network in Yekaterinburg.

When implementing both projects, BASF intends to demonstrate an integrated approach to the use of innovative technologies and energy-efficient materials. In particular, the first energy-efficient modernization model (for the old building) involves thermal insulation of the roof, walls and basement. The project provides for installation of energy metering equipment and the introduction of an automatic energy use control. As estimated by experts, following the modernization, primary energy consumption will be reduced by 73 per cent. With the average energy costs of a standard-design 5-storey apartment building being 1.9 million kW/h per year, annual energy savings may reach up to 1.4 million kW/h.

¹⁰² DENA (German Energy Company) a center of expertise in the field of energy saving and renewable energy sources. DENA offers consultancy services on energy policy development and provides assistance to prospective innovations, promoting achievement of quick results for goal-oriented energy efficiency improvement and efficient use of renewable energy sources. <http://www.dena.de>

¹⁰³ RUDEA (Russisch-Deutsche Energie Agentur) is an inter-governmental center of competency in the field of energy efficiency and renewable energy sources in the Russian Federation. <http://rudea-energy.com>

¹⁰⁴ BASF – Badische Anilin- & Soda-Fabrik - the Chemical Company, the world's largest chemical concern with more than 150 manufacturing sites on all continents, supplying its products to customers from 200 countries. The concern's product portfolio comprises oil and natural gas, chemicals, plastics, special-purpose chemicals, products for agriculture and fine chemistry products. In Russia and the CIS, apart from product sales, BASF operates a number of manufacturing facilities. <http://www.basf.com>

The second experimental energy saving model is being developed for a 2-kilometer portion of Yekaterinburg district heating network. From their international experience, BASF specialists estimate that energy savings obtained during heat distribution via a pipeline may amount to 98 per cent, provided that BASF fully uses its technologies and innovative products. BASF is already operating a Russian-based manufacturing site – Elestocam PLC, a joint venture, established by NizhnekamskNeftekhim JSC and Elestogran GmbH, a subsidiary of BASF S.E.

Proper timing of these solutions is manifested by the Russian draft law "On Energy Saving" (No.111730-5) which, in particular, stipulates the need for "requirements to building energy efficiency, organization of mandatory energy audits and requirements to buildings' energy performance data". As the world's leader in innovation, BASF intends to continue cooperation with the Russian government and commercial stakeholders: the German concern already participates in energy-efficient building construction projects in many countries of the world. In 2008, BASF invested more than 400 million Euros in energy efficiency, conservation of resources and development of new technology.

Both test models are to be realized within the framework of "Yekaterinburg – an Energy Efficient City" project aiming to introduce energy-efficient solutions in a given city. The project's pilot status makes these models especially significant as, following their successful implementation, they may be disseminated to other Russian cities and regions.

BASF is actively cooperating with the Sverdlovsk regional government and the Yekaterinburg city administration. This approach may significantly improve the situation in the PHU sector: energy-efficient modernization of Yekaterinburg's 3000 five-storey apartment buildings may save the city up to 4.2 billion kW/h of energy on an annual basis.

Activities of Some Russian-Based Energy Service Companies

Inter-Regional Energy Service Co.

ZAO Inter-Regional Energy Service Company (MESCO)¹⁰⁵ was established for implementing large-scale (federal) and local (regional) programmes for reconstruction of heat and energy-supply networks in cities, urban settlements and enterprises, improving the efficiency of energy use and energy saving. The company is part of the NIKA holding company¹⁰⁶.

MESCO's previous experience of development and 'turn-key" implementation of major investment projects includes:

- Reconstruction of heat-supply system in the town of Dzerzhinsk (population – 270 thousand) in 2001-2003, with an annual economic effect of 160.3 million rubles;
- Reconstruction of heat-supply system in the town of Semionov, Nizhniy Novgorod region, in 2000-2002, with an annual economic effect of 28.9 million rubles;
- Reconstruction of heat-supply system in Severny neighborhood, Gorodets, Nizhniy Novgorod region, in 2001, with an annual economic effect of 17.7 million rubles, and other projects.

In 2000-2002, MESCO was awarded and successfully delivered 2 projects in Kaliningrad, funded within the framework of a World Bank sub-loan (with the projects' budget of 760 thousand US dollars).

In recent years, similar activities were being implemented in Syzran, Chapayevsk (Samara region), Kirov, Nizhniy Novgorod and many other Russian towns.

Another area of MESCO activity relates to reconstruction of street lighting in Russian cities.

¹⁰⁵ <http://www.mesko.ru>

¹⁰⁶ <http://nika.ru>

Following installation of 2700 energy-efficient lamps in Dzerzhinsk in 2002, consumption of electric energy was reduced by 47 per cent (without compromising the rated illumination values), while operating expenses were down by 600 thousand rubles.

Another energy saving programme was implemented in 2002-2003 in Vladimir.

More than 3500 lamps, supplied by a Nizhniy Novgorod manufacturer, were installed, resulting in approximately 40 per cent savings of electric energy (with annual savings of 3.2 million rubles), while operating expenses were down by 900 thousand rubles.

At present, the following MESCO projects are underway:

- Operations within the framework of the World Bank for Reconstruction and Development (WBRD)¹⁰⁷-funded "Urban Heat Supply" project include:
- Reconstruction of 2 municipal boiler houses in Dubna;
- Reconstruction of heat-supply system in Krasnoyarsk (involving installation of individual heating plants and rerun of heat networks);
- Equipment supplies and replacement of heat networks in Volgograd;
- Reconstruction of two 50 Gcal/h and 30 Gcal/h boiler houses in the town of Domodedovo, Moscow region.
- A survey and preparation of feasibility study for reconstruction of district heat-supply system in Domodedovo, Moscow region.

ZEiM-ESCO

The ESCO was established in 1999 on the basis of the engineering services department of ZEiM JSC¹⁰⁸ in order to organize and coordinate energy saving activities. On 19 July 2000, the company was reorganized to ZEiM-ESCO, oriented to installation of automated systems, reconstruction, streamlining, modernization of production, efficient transmission and consumption of various kinds of energy, energy saving activities in various industries, provision of energy services with an integrated approach and turnkey delivery of projects.

The company's basic activities comprise:

- Conducting energy audits with development of an energy saving programme and the issue of the enterprise's energy performance data sheet;
- Implementing integrated projects for reconstruction of industrial facilities;
- Package supplies of process equipment;
- Design of process automation and information-support systems;
- Investment activities and refinement of financing schemes;
- Installation, commissioning and start-up of process control systems;
- Consultancy and training;
- Monitoring operation of completed projects, provision of technical services.

The company participates in organization of energy saving activities, primarily in preparation of proposals for organizing pilot energy efficiency projects at energy sector facilities.

¹⁰⁷ <http://www.worldbank.org>

¹⁰⁸ <http://www.zeim.ru>

Within the framework of the "Demonstration Zone" project in the Chuvash Republic, ZEiM-ESCO is working on pilot projects meant for subsequent dissemination, demonstration, promotion, refining a variety of energy saving schemes and positive experience. The ESCO acts as the general contractor implementing energy saving projects ranging from energy audit to turnkey delivery of facilities, based on a partnership with the enterprises based in the Republic and in other RF regions. These projects cover production of heat energy, distribution, rational use, and utilization. The demonstration zone comprises a cluster of energy saving projects.

ZEiM-ESCO has taken part in the following completed projects:

- 1 Reconstruction and construction of thermal plants and boiler houses, in particular:
 - Thermal plant at Kanashsky railway car repair works in the Chuvash Republic. The project's payback period is within 2 years;
 - Boiler house No.18, owned by a Cheboksary-based printing works. The project's payback period was 1.5 years;
 - Boiler house owned by Ulyanovsk sugar refinery in the village of Tsilna, with payback period being 6 months;
 - Savinovo district heating plant in Kazan;
 - Modular heating plants in the HPU sector (apartment buildings, industrial premises, public buildings and institutions, health care and cultural facilities) in Khanty-Mansiysky district, with payback period being 1.5-2 years;
 - Reconstruction of TPP-2, TPP-3 and boiler house owned by Buket Chuvashii brewery in the town of Novocheboksarsk, construction of a boiler house for Lapsary-based institution No.YuL-34/1.
- 2 Establishing a high energy efficiency demonstration zone in the Lapsary community of Cheboksary, in particular:
 - In New Lapsary, Chuvash Republic: a pilot project based on residential buildings, social / cultural facilities and a boiler house. The project involves activities throughout the entire energy chain (production – distribution – consumption). In 5 months, economic effect amounted to 976.0 thousand rubles with an anticipated payback period of 2-3 years;
 - In the Sosnovka community of Cheboksary's Moskovsky district: using local renewable hydro-energy resources for heat supply to school and hospital via heat pumps. The facility is currently being commissioned. Costs – 2.5 million rubles, payback period – 3 years.

Longer-term, ZEiM-ESCO is planning to get involved in:

- Heat-pump heating and hot water-supply systems (alternative energy) in *Chuvashia* sanatorium, Zavolzhie;
- Metering systems in buildings and residential communities in Cheboksary and other Chuvash towns, individual heating plants, dispatching control;
- Small-scale energy facilities within the city;
- Installation of variable-speed drives in Shumerlya, Chuvash Republic;
- Introduction of physical-chemical techniques and means for preventing scale formation in boiler houses and heat-supply networks in the towns of Shumerlya, Alatyr, Kanash and Tsivilsk, Chuvash Republic;
- Construction and reconstruction of TPPs and boiler houses;
- Introduction of *Physonic* devices;

- Using new technologies for efficient use of local energy resources.

2.2 Models Used for Implementing ESCO Projects Abroad

2.2.1 Basic Provisions

Energy service companies (ESCOs) became the most efficient business model in the field of energy saving and energy efficiency. [31].

The range of services provided by ESCOs to end-users of energy resources comprises:

- Energy audit;
- Development and implementation of an energy-efficient project or an energy saving project;
- Equipment operation and maintenance;
- Monitoring actual energy savings;
- Supply and installation of equipment, construction, installation and start-up & commissioning works;
- Energy supply, etc.

ESCOs differ from other companies operating on the energy services market, such as ESPCs¹⁰⁹ in the sense that ESCOs:

- Guarantee achieving a certain level of energy savings in the course of a given project;
- Provide energy services at lower prices;
- Typically finance or facilitate arrangement for financing a recommended project;
- Measure and update savings throughout the entire project funding / implementation period, or for a period as stipulated under the contract.

Normally, ESCOs relations with the client are regulated through Energy Performance Contracting.

When signing an energy performance contract, the external organization (the ESCO) develops, implements and finances (or facilitates financing of) the energy efficiency project or project for construction of a renewable energy generation facility. ESCO's remuneration is received from cost savings obtained by the client enterprise or from generated energy (where renewable energy sources are used). ESCO's operations continue until all its costs, associated with the project's implementation, are compensated and the calculated savings are confirmed.

ESCO compensation types may be roughly classified into **energy performance contracts** and **energy supply contracts**.

Energy performance contracts comprise:

- Shared savings contracts;
- Guaranteed savings contracts;
- Paid-from contracts.

Energy saving contracts comprise:

- Chauffage contracts;
- BOOT¹¹⁰.

¹⁰⁹ ESPC - Energy Service Provider Companies.

Basic terms of each ESCO contract type are in more detail considered below.

It should be noted that performance contracting became the most popular business model.

2.2.2 ESCO Project Implementation Phases

The following ESCO project phases may be distinguished:

- Energy audit;
- Planning;
- Implementation;
- Results monitoring.

Phase 0. Energy Audit

Another widely-used term is IGA¹¹¹ (investment grade audit).

An investment grade audit (at the client's cost) is normally conducted under a separate contract and precedes the conclusion of the contract with the ESCO. The audit provides the client with an opportunity to implement some of the suggested activities on its own, while including the remaining activities into the contract.

In contrast with a traditional energy audit, which implies that all conditions remain constant in time, IGA involves a more precise forecast of energy consumption, adding the risk assessment component, which assesses the conditions in specific processes. An IGA comprises:

- Risk management;
- The "human factor";
- Measurement and monitoring of actual energy savings;
- Funding-related issues;
- Principles of reporting;
- Overall project planning strategy.

Phase 1. Planning

Project development begins with planning based on source data and the other necessary information. The client and the ESCO sign a separate planning contract, including the baseline principles of the energy service company's remuneration. Within this phase, the ESCO verifies its energy saving calculations that were presented in the energy audit report.

Where either party wants to terminate the project, it bears the costs of all work completed. If the project goes into the implementation phase, the ESCO's costs are not reimbursed by the client immediately but included into the costs for the second phase.

Phase 2. Implementation

Upon completion of the planning phase, the parties agree upon the energy saving activities and the project's funding scheme. The client undertakes to pay for the ESCO services from the savings obtained in the course of the energy project being implemented and based on their profit margin. The

¹¹⁰ BOOT (Build-Own-Operate-Transfer): private ownership and use of the facility is allowed for a certain period, upon expiry of which the facility passes into state ownership.

¹¹¹ IGA - Investment Grade Audit

implementation phase comprises: detailed planning, equipment installation, equipment commissioning, personnel training and commencement of monitoring.

Phase 3. Results Monitoring

Monitoring and payment for the ESCO services begin upon completion of the equipment's installation.

The process of results monitoring, verifying savings obtained by the energy efficiency projects, is a crucial phase associated with the ESCO project implementation as quantification of savings presents the base for payments.

Energy savings are estimated as the difference between the controlled basis and the measured consumption. The controlled basis is the forecast of how much energy would be required in the absence of the energy efficiency activities, assuming that control parameters (such as the weather, building occupancy, production rates, etc.) remain unchanged. Computation of savings may be based on engineering calculations using special or short-term measurements, computer modeling and historical data, analysis of the energy provider's meter data (using a simple comparison of bills) for a regression analysis of many variables, and calibration energy modeling.

2.2.3 Funding Schemes for ESCO Projects

A performance contract must regulate and ensure compatibility of three factors:

- 1 Project implementation costs;
- 2 Remuneration of the ESCO services by the client;
- 3 Monitoring of actual savings.

Costs, associated with implementing energy efficiency projects, are subdivided into:

- Fees for services provided by third-party experts;
- The cost of arranging for financing;
- Investment costs (associated with creating fixed assets).

There exist three sources of funding for energy efficiency projects:

- Funding by the ESCO;
- Funding by the client;
- Third-party funding.

Funding by ESCO

Acting as the project's investor, the ESCO may invest own or raise borrowed funds in the form of a credit or lease. However, it should be noted that investing of own funds by ESCOs is uncommon.

Funding by Client

The client finances the project using own or borrowed funds, while investments payback is ensured by the energy savings guaranteed by the ESCO. This financing scheme may also use a credit. In this case, the client, as a direct loan recipient, must provide the financial institution with guarantees.

The purpose of the savings guarantee is to demonstrate to the bank that the project, for which the loan is granted, is capable of generating a positive cash-flow, i.e., that the anticipated savings amount would be sufficient to cover the corresponding payment obligations.

Therefore, the availability of savings guarantee reduces risks which, in turn, is reflected in the credit interest rate.

Third-Party Financing (TPF)

The project is funded by a third party, i.e., a financial institution, without attracting client or ESCO resources. The financial institution may either acquire rights to energy savings or ensure security in the form of the project's equipment.

There exist two types of TPF performance contracts, the difference relating to the party that actually borrows the funds: the ESCO or the client (Figure 2-1, Figure 2-2).

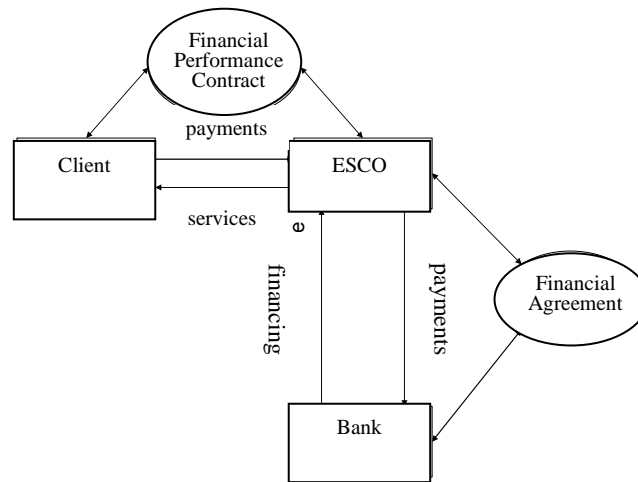


Figure 2-1 Third-party funding with the ESCO acting as the borrower

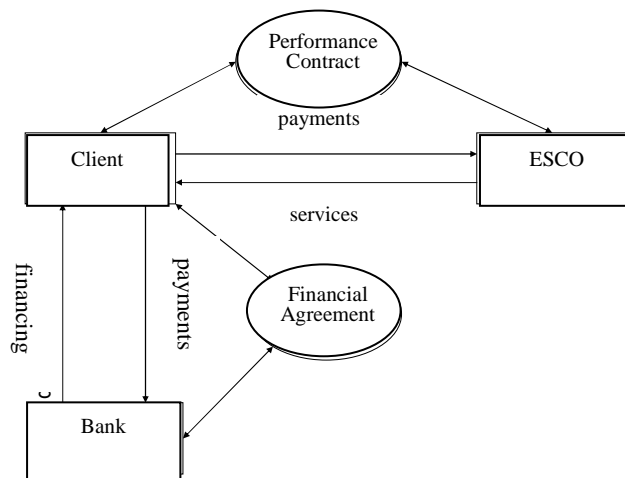


Figure 2-2 Third-party funding with the client acting as the borrower

2.3 ESCO Contract Models

2.3.1 Energy Performance Contracting

Shared Savings Contracts

Under a shared savings contract, income is generated from energy savings obtained when implementing energy saving activities as recommended by the ESCO. In this case, the amount of saved costs is split between the ESCO and the client, while the contract term is agreed upon between the parties in advance. No specific rules for such splitting exist as they depend on project costs, contract term and risks borne by the ESCO and the client.

Under this contract, financing arrangements are made by the ESCO, while the expected payments from the client's energy savings are used as security.

In effect, in this case, the ESCO acts as the project's investor. Under this contract, the ESCO may have a high capital leverage, as a result, financial institutions may refuse to grant loans to the ESCO.

At present, this contract type is not a popular option as it involves high risks.

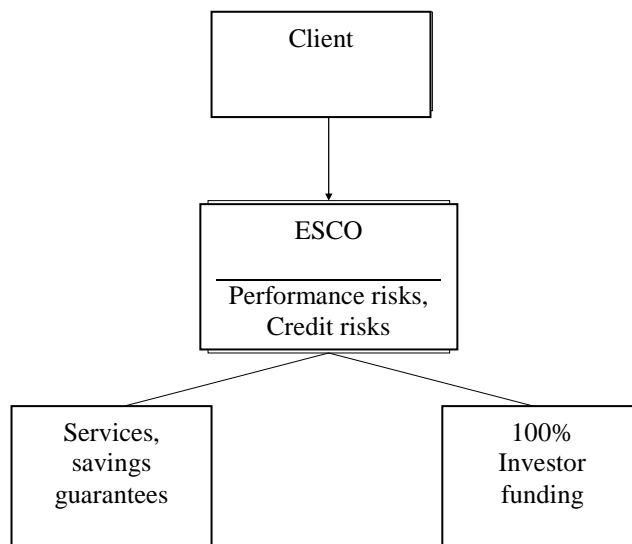


Figure 2-3 A shared savings contract

Guaranteed Savings Contracts

A guaranteed savings contract means that the ESCO guarantees a certain level of energy savings, thus insuring the client in the event that such level is not actually achieved.

Typically, this contract comprises a number of inter-related contracts:

- Installation contract which defines the equipment to be erected and work procedures;
- Financing contract which defines the schedule of payments to be made by the client;
- Guarantees contract, where the ESCO guarantees to the client a certain savings level.

Under a guaranteed savings contract, the ESCO bears all risks associated with the project's development, installation and performance, while leaving aside the risks associated with repayment of the credit. The projects are funded by the clients who may secure financing at banks or other financial institutions. Where the savings are not sufficient to cover debt servicing, the shortfall will have to be compensated by the ESCO. Where the savings exceed the guaranteed level, payments made by the client are agreed with in accordance with the ESCO's savings percentage.

Typically, a contract of this kind must contain a provision stating that the guarantees are sufficient, i.e. the amount of energy savings is sufficient for the client to perform its debt commitments, provided that the price of energy does not fall below a predetermined minimum level. Payment schedule is based on the savings level – the greater the savings, the quicker the repayment.

The main advantage of this contract is that it ensures a reduction in financing costs.

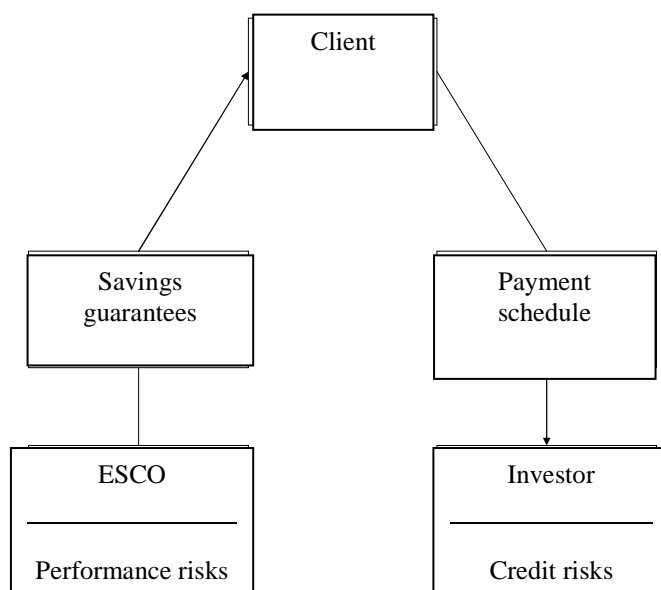


Figure 2-4 A guaranteed savings contract

A brief comparative analysis of a guaranteed savings contract and a shared savings contract is provided in Table 2.2:

Table 2.2 A Guaranteed Savings Contract Versus a Shared Savings Contract

Shared Savings	Guaranteed Savings
Performance is linked to the cost of energy saved.	Performance is linked to the level of energy savings.
Payments to the ESCO are dependent on energy prices.	The value of energy savings guarantees the servicing of debt commitments at a predetermined minimum acceptable price.
The ESCO bears all performance and credit risks as under the conventional financing scheme.	The ESCO bears all performance risks, while the client – credit risks.
Normally, the debt is outside the client's balance-sheet.	If the client becomes the borrower, the debt is shown on its balance-sheet.
While it may be used by clients having no access to financial resources, the client's creditworthiness is still a requirement.	Requires the client to be creditworthy.
Extended measurement and verification	Extended measurement and verification
Big ESCOs are preferred; small ESCOs depend on credits too much to deliver more projects	The ESCO may deliver more projects without regard to high debt
Projects with a short payback period are preferred due to greater financing costs	A larger-scale and more comprehensive project made possible by lower financing costs

Paid-From Contracts¹¹²

Under a paid-from contract, the ESCO normally receives the greater part or all savings obtained by the client (typically, beginning with 70%) until it compensates its expenses including interest. The ESCO guarantees that the amount of savings will be sufficient to pay the project's costs for a certain number of years. Where the amount of savings is insufficient to pay the project's costs (including interest) for the agreed time-frame, the contract is terminated with the client being relieved from any obligations.

Normally, the ESCO reserves the right to undertake additional energy saving activities for the duration of the contract (at its own costs) until the savings achieve the amounts sufficient to pay the project's costs.

Interest rate for paid-in contracts varies depending on whether the creditor identifies any credit risks for the ESCO or the client. As all savings are earmarked for compensating the project's costs, contracts of this kind are concluded for shorter time-periods than the other contract types. Advantages for the client are:

- The ESCO must ensure a minimum savings level;
- Where actual savings are greater than expected, the client gets all benefits;
- Payments are based on a "transparent accounting" (with the client knowing current costs and potential margin).

This model is normally used for non-commercial organizations (clinics, schools, etc.)

2.3.2 Energy Supply Contracts

Chauffage Contracts¹¹³

Chauffage contracts are mostly used in Europe. Under a chauffage contract, the ESCO provides to specific end-consumers a wide range of services (such as heating, lighting, transport, etc.) at predetermined prices, such services comprising current maintenance and training of local personnel. Where the energy supplies market is competitive, the ESCO is also responsible for purchasing fuel / electric energy. ESCO's remuneration depends on the cost-efficiency of the above process. Specific provisions of chauffage contracts are as follows:

- Client's payments to the ESCO are based on provision of services rather than on cost savings;
- The contract's objective is operation and servicing;
- Long contract term (20-30 years) is explained by the fact that the contract may provide for construction or modernization of the client's costly fixed assets (such as a thermal power plant or a cooling facility);
- Client savings are not guaranteed. Sometimes, the main goal of the client under such a contract boils down to the transfer of its non-core activities to a specialized contractor.

Build – Own – Operate – Transfer Contracts (BOOT)¹¹⁴

The BOOT model implies that the ESCO develops, builds, finances, owns and operates the equipment for a certain time-period, ultimately handing these assets over to the client. This model

¹¹² "First out"

¹¹³ Chauffage (the French for "heating")

¹¹⁴ BOOT: Build-Own-Operate-Transfer

requires establishing a special-purpose enterprise for a given project. Clients sign long-term supply contracts with the BOOT operator and pay for the services provided, while such fee includes capital and operating costs and profits generated by the project.

BOOT schemes are becoming extremely popular financing vehicles of co-generation projects in Europe. The parties' relationship under a BOOT contract are shown in Fig. Figure 2-5.

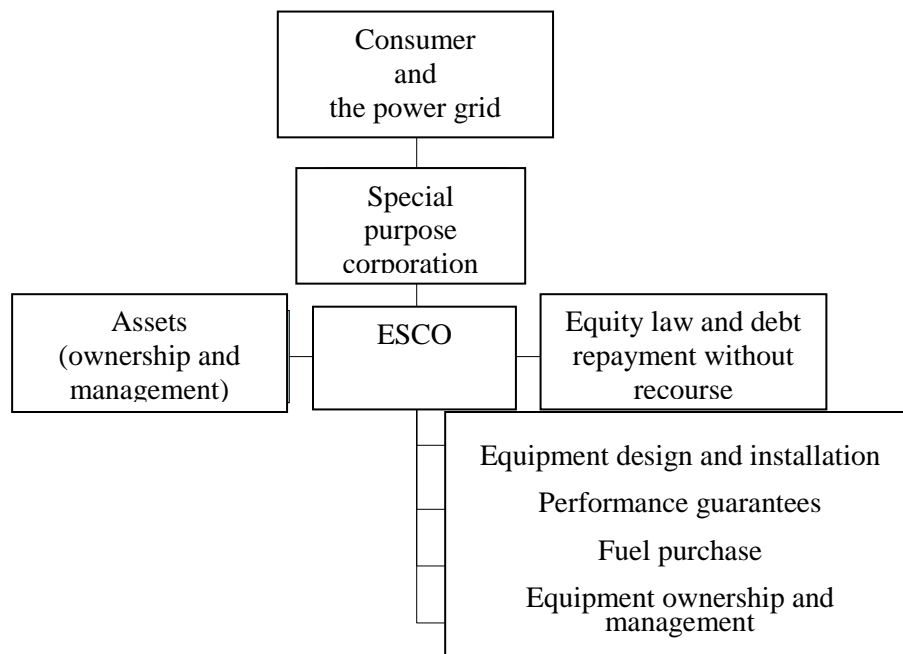


Figure 2-5. BOOT model

2.4 Public-Private Partnership

As of today, there's no standard definition of public-private partnership or federal laws regulating PPP.

The Directive of the Government of Moscow "On the City's Target Programme for Establishing an Innovative System in the City of Moscow in 2008-2010" No.781-PP as of 2 September 2008 defines public-private partnership as an institutional and organizational alliance between the state and business for the purposes of implementing national and international, large-scale and local projects of social significance covering a wide range of activities: from developing strategically-important manufacturing industries and research and development (R&D) to provision of public services. As a rule, an alliance like this is temporary, as it is formed for a certain time-frame to deliver a specific project, and is discontinued after the project's completion.

From the narrow (economic) point of view, the following basic characteristics of public-private partnerships could be identified:

- The parties to PPP are the state and private business;
- The parties' cooperation is based on an official, legal contract;
- The parties cooperate on an equal basis;
- PPP has a clear public and social outreach;
- When implementing projects through PPP, the parties contributions and resources are consolidated;

- Financial risks and costs, as well as the results achieved, are distributed between the parties in a pre-determined proportion.

To a wide extent, the main forms of PPP as related to economy and state administration would comprise:

- Any mutually-beneficial forms of cooperation between the state and business;
- Government contracts;
- Lease relationships;
- Financial lease (leasing);
- Public-private enterprises;
- Production sharing agreements;,,
- Concessions.

Definitions of public-private partnerships are included in laws on PPP passed in some Russian regions (the Tomsk region, Saint-Petersburg).

In the today's Russian Federation, the most modern and prospective PPP tools are:

- Investment Fund;
- Development bank;
- State corporations;
- Special economic zones;
- Russian venture company;
- Concessions.

The list of regulatory legal acts regulating relations emerging in connection with the organization of a public-private partnership is detailed below (the said regulatory legal acts are shown in the hierarchical order in terms of their dominance from 1996 to 2009):

1 The Civil Code of the Russian Federation

Defines legal status of participants in civil transactions, grounds for emergence and procedure for exercising ownership rights and other proprietary rights, rights to the results of intellectual activity and equivalent means of individualization (intellectual rights), regulates contractual and other obligations as well as other property and personal non-property relations.

Mechanisms of coordination between the federal authorities, municipal authorities and business entities are implemented through contractual forms of cooperation. In accordance with Article 125 of the Civil Code of the Russian Federation, state bodies of authority may, on behalf of the Russian Federation and Russian Federation regions, by their actions acquire and exercise property and personal non-property rights and obligations and appear before court within the scope of their competence as defined by the corresponding regulatory acts. Municipal bodies of authority may, on behalf of their municipalities, by their actions acquire and exercise rights and obligations referred to in par. 1 Article 125 within the scope of their competence as defined by the corresponding regulatory acts.

2 The Order of the Government of the Russian Federation "On Endorsing the Federal Target Programme *Economic and Social Development of the Far East and Transbaikal Regions Until 2013*" No.480 as of 15 April 1996

This programme, intended to develop the region's mining potential, aims to establish new mining centers with a corresponding transport and energy infrastructure on the principles of public-private

partnership. The Order emphasizes the importance of introducing new incentives for encouraging investment activities based on public-private partnership.

3 Directive of the Government of the Russian Federation No.613 "On the Federal Programme Research and Development in Priority Areas of the Russian Federation's Scientific and Technological Complex in 2007-2012" as of 17 October 2006

The Programme is aimed at further development of scientific and technological potential of the Russian Federation to implement the nation's priority development objectives as related to science, technology and engineering. This objective necessitates addressing a major task, namely, consolidation and concentration of resources on prospective research and technology through a wider use of the public-private partnership mechanism, inter alia, through R&D contracts placed by private business and companies committed to innovation.

4 Directive of the Government of the Russian Federation "On Endorsing Decision-Making Rules for Concluding Long-Term Government (Municipal) Contracts for Works / Services with a Prolonged Production Cycle" No.978 as of 29 December 2007

The Directive authorizes government customers to conclude long-term government contracts, for a term and within the Russian Federation Investment Fund budget, within the framework of investment projects being implemented through public-private partnerships.

Action needed:

- Development and approval of investment projects;
- Concluding contracts for the supply of goods and provision of other services for federal and municipal needs.

5 Directive of the Government of the Russian Federation "On the Federal Target-Oriented Programme for Southern part of the Russian Federation (2008-2012)" No.10 as of 14 January 2008

The programme was devised to ensure development of a mechanism for public-private partnership in implementing infrastructure projects.

Documents to be developed:

- Procedures for implementing the programme;
- Activity programme;
- Infrastructure projects.

6 Directive of the Government of the Russian Federation "On the Government Committee for High Technology and Innovations" No.667 as of 12 September 2008 (together with the Regulations on Government Committee for High Technology and Innovations)

The main objective of the Committee is to ensure coordination between the federal bodies of authority in formulating and implementing a unified government policy as related to further development of the research and engineering complex, the nation's innovation system, and steady technological modernization of the Russian Federation economy, including improvement of the public-private partnership mechanisms in the field of high technology and innovation. The above objectives are to be achieved through reviewing suggestions on development of the public-private partnership mechanisms as related to research and innovations.

Implementing the mechanism of coordination between the federal authorities, municipal authorities and business entities will require:

- Development and approval of a coordination procedure for the federal authorities involved in development and implementation of a unified government policy as related to further

development of the research and engineering complex, the nation's innovation system, and steady technological modernization of the Russian Federation economy;

- Initiating the Russian Federation Government's orders instructing the authorized government bodies to issue legal acts with the provisions aimed at:
 - Improving public-private partnership mechanisms relating to high technology and innovations;
 - Preparing suggestions on development of public-private partnership mechanisms as related to research and innovations.

7 Order of the Government of the Russian Federation "On Endorsing the Concept Federal Target Programme *National Technology Base for 2007-2011*" No.1761-r as of 18 December 2006

The Order implies that implementation of the above integrated projects is to be performed by the business community with government participation on the principles of public-private partnership.

Implementing the mechanisms of coordination between the federal authorities, municipal authorities and business entities will require project preparation and subsequent approval of the corresponding contracts establishing legal relationship for a public-private partnership.

8 Order of the Government of the Russian Federation "On the Concept of the Federal Target Programme for Southern part of the Russian Federation (2008-2012)" No.754-r as of 9 June 2007

The programme implies implementation of socially-significant capital-intensive projects aimed at development of public-private partnership and predominantly oriented to elimination of infrastructure constraints for further development of business and the social sphere.

To provide a mechanism of coordination between the federal authorities, municipal authorities and business entities, a number of socially-significant capital-intensive projects, addressing the goals of public-private partnership development and detailing corresponding action plans, need to be devised and approved.

9 Order of the Government of the Russian Federation "On the Concept of Long-Term Socio-Economic Development of the Russian Federation Until the Year 2020" No.1662-r as of 17 November 2008

The Order provides for structural diversification of the economy based on innovative technology development, improving competitiveness of leading branches of the economy through the use of public-private partnership mechanisms, improving access of Russian companies to long-term investment sources, providing various branches of the economy with highly-skilled managerial, engineering and technical personnel, supporting exports of products with high added value and a rational protection of domestic markets, taking into account current international practice in this field. For the purposes of transition to a socially-oriented development model, in its relations with business entities, the government will follow the principles of developing public-private partnership, aiming to reduce business and investment risks, primarily relating to research, development and dissemination of new technologies, development of the transport, energy and public utility infrastructure. During this stage, the main priorities of the government's social and economic policy include liberalization of economic environment, reduction of investment and business risks, and forging the institutions of public-private partnership.

Implementing mechanisms of coordination between the federal authorities, municipal authorities and business entities will require the following action:

- Conducting a risk analysis;
- Developing draft regulatory legal acts aimed at encouraging measures to disseminate modern technologies;

- Devising programmes for development of the transport, energy and public utility infrastructure;
- Implementing activities aimed at improving personnel policy.

10 Order of the Government of the Russian Federation No.1715-r "On the Russian Federation's Energy Strategy until the Year 2030" as of 13 November 2009

The Order implies that direct government participation in further development of the energy sector will gradually diminish and will be replaced by various forms of public-private partnership, especially in the field of construction and modernization of the energy sector infrastructure and innovative development.

Strategic goal of the government's energy policy as related to ensuring energy security is continuous improvement of its major characteristics through:

- Ensuring reliable operation and predictable development of the energy infrastructure, inter alia, through the use of public-private partnership mechanisms, consistent elimination of restrictions relating to distribution of energy resources between Russian regions and between individual territorial manufacturing complexes (energy hubs) in a given region;
- Ensuring timely geologic exploration, development of new deposits (fields, basins, provinces) of traditional fuels, inter alia, through public-private partnership and a rational tax policy (meaning a growth in prospected recoverable reserves outstripping the pace of reserves' depletion), timely preparation for the use of substitution innovative energy resources and energy sources as the traditional fossil fuels are gradually depleted.

To implement mechanisms of coordination between the federal authorities, municipal authorities and business entities, the following government programmes will have to be developed:

- For consistent improvement of the following major energy security characteristics:
- Ensuring reliable operation and predictable development of the energy infrastructure, inter alia, through the use of public-private partnership mechanisms;
- Eliminating of restrictions relating to distribution of energy resources between Russian regions and between individual territorial manufacturing complexes (energy hubs) in a given region;
- Organizing geologic exploration and development of new deposits (fields, basins, provinces) of traditional fuels;
- Studying the possibility of using substitution innovative energy resources and energy sources as existing reserves of traditional fossil fuels are gradually depleted.

A draft law on amendments to the Tax Code of the Russian Federation, as related to taxation in the process of subsoil use, needs to be prepared.

Draft legal acts, aimed at replacing direct government participation in developing the energy sector by various forms of public-private partnership in the field of construction / modernization of the energy sector infrastructure and innovative development, also need to be prepared.

11 Directive of the Government of Moscow No.567-PP "On the Action Plan to Develop Public-Private Partnership in the City of Moscow in 2008-2011" as of 24 June 2008

The Directive endorses the Action Plan for the development of public-private partnership in the City of Moscow in 2008-2011, providing the legal framework for establishing the Expert Council for the development of public-private mechanisms in Moscow.

The corresponding implementation mechanism is defined by the Order of the First Deputy Mayor of the Moscow City Government "On the Expert Council for the Development of Public-Private Mechanisms in Moscow" (along with the Statute of the Expert Council for the Development of Public-Private Mechanisms in Moscow).

12 Order of the First Deputy Mayor of the Moscow City Government No.67-RZM "On the Expert Council for the Development of Public-Private Mechanisms in Moscow" (along with the "Statute of the Expert Council for the Development of Public-Private Mechanisms in Moscow) as of 16 October 2008

The Order endorses the Statute of the Expert Council for the Development of Public-Private Mechanisms in Moscow and appoints the experts sitting on the Council.

The Council's main goals and functions are as follows:

- Preparation of proposals on identifying priority areas of urban policy as related to public-private partnership;
- Exchange of experience as related to regulatory support for public-private partnership in the Russian Federation's regions;
- Formulating proposals on creating conditions and effective tools of coordination between the state and business to involve the business community in addressing the issues facing the city, financing social programmes and investment projects of special importance for Moscow;
- Monitoring the progress and assessing the efficiency of activities as provided under the Plan for the development of public-private partnership in Moscow in 2008-2011. Review, examination and approval of suggestions made with regard to the Plan for the development of public-private partnership in Moscow for subsequent years;
- Reviewing implementation practice for Moscow's projects based on the development of public-private partnership in various industries, preparation of recommendations on further development and improvement of such practice;
- Promoting dissemination in Moscow of best international and domestic practice in the field of public-private partnership development, including review of specific branches of the city's infrastructure.

13 Order of the Ministry for Economic Development of the Russian Federation No.372 "On the Expert Council for Public-Private Partnership Affiliated to the RF Ministry for Economic Development" as of 2 November 2007

The Order endorses the Statute of the Expert Council for public-private partnership, providing the legal base for the Council's activities.

The Council's main objectives are promoting formulation of a unified, coordinated economic policy as related to development of public-private partnership mechanisms and improving the legal base for operation of such mechanisms.

Table 2.3 details public-private partnership projects currently underway in the Russian Federation.

Table 2.3 Public-Private Partnership Projects Currently Underway

N o.	Project Title	Industry	PPP Type	Location	Time-Frame	Project Budget, million rubles	Sources of Funding and Project Objectives
1	Integrated development of the Lower Angara Basin	Integrated territorial development	Investment Fund of the RF	Krasnoyarsk krai	2006 – 2015	213,915	The purpose of the investment project is to strengthen industrial potential of Eastern territories of the Russian Federation (the Lower Angara Basin) through establishing and development of transport and energy infrastructure, natural resource development, construction of industrial facilities within the framework of a public-private partnership. Construction of Boguchanskaya Hydroelectric station is funded from the federal budget.
2	Construction of Kurgan-based thermal power plant -2	Housing and public utility sector	Investment Fund of the RF	Kurgan region	2008 – 2010	10,855	Government support (budget allocations from the RF Investment Fund): 843.91 million rubles (in 1 January 208 prices, inclusive of VAT).
3	Special economic zone (manufacturing) on the territory of Gryazinski district, Lipetsk region	Manufacturing	Special economic zone	Lipetsk region	2006 – 2016		
4	Special economic zone (technology introduction) within the Moscow city limits	Innovations	Special economic zone	Moscow	2006 – 2016		
5	Special economic zone (technology introduction) in Dubna, Moscow region	Innovations	Special economic zone	Moscow region	2006 – 2016		
6	Reconstruction of water supply in the city of Perm	Housing and public utility sector	Investment Fund of the RF	Perm krai	2009 – 2011	847	Budget allocations from the Investment Fund of the RF: 231.53 million rubles; funds from the regional budget: 141.9 million rubles; funds allocated by NOVOGOR-Prikamie Co.: 473.65 million rubles.
7	Elaboration of design documentation for implementing the "Integrated Development of Southern Yakutia's investment project	Integrated territorial development	Investment Fund of the RF	Republic of Sakha (Yakutia)	2008 – 2010	10,424	Government support (budget allocations from the Investment Fund of the RF): 7,788.7 million rubles (in the prices of corresponding years, inclusive of VAT).

N o.	Project Title	Industry	PPP Type	Location	Time-Frame	Project Budget, million rubles	Sources of Funding and Project Objectives
8	An oil-refining and petrochemical complex in Nizhnekamsk	Manufacturing	Investment Fund of the RF	Republic of Tatarstan	2006 – 2009	130,297	Objectives of the integrated investment project: construction in Nizhnekamsk of a high technology oil-refining and petrochemical complex with an annual capacity of 7 million tons of oil; construction of infrastructure facilities (railway, main oil line and oil-products pipeline).
9	Yelabuga special economic zone (manufacturing) on the territory of Yelabuga district, Republic of Tatarstan	Manufacturing	Special economic zone	Republic of Tatarstan	2006 – 2016		
10	An integrated programme for construction and reconstruction of water supply and sewage facilities in Rostov-on-Don and the south-west of the Rostov region	Housing and public utility sector	Investment Fund of the RF	Rostov region	2007 – 2021	33,470	
11	The <i>Clear Don</i> regional investment project	Housing and public utility sector	Investment Fund of the RF	Rostov region	2009 – 2011		Federal budget subsidy in the amount of 1,055.6 million rubles
12	Special economic zone (technology introduction) in Saint-Petersburg	Innovations	Special economic zone	Saint-Petersburg	2006 – 2016		
13	Elaboration of design documentation for implementing the <i>Southern Trans-Regional Water System</i> investment project	Integrated territorial development	Investment Fund of the RF	Stavropol krai	2008 – 2009	2,178	Fully funded by the RF Investment Fund
14	Special economic zone (technology introduction) in Tomsk	Innovations	Special economic zone	Tomsk region	2005 – 2015		

N o.	Project Title	Industry	PPP Type	Location	Time-Frame	Project Budget, million rubles	Sources of Funding and Project Objectives
15	Construction of Green Factory timber-processing plant	Manufacturing	Investment Fund of the RF	Tomsk region	2008 – 2010	1,538	Government support (budget allocations from the RF Investment Fund): 273.18 million rubles (in 1 January 2008 prices, inclusive of VAT).
16	Industrial complex in Novomoskovsk, Tula region	Manufacturing	Investment Fund of the RF	Tula region	2007 – 2016	46,269	
17	Construction of <i>Zavolzhie</i> industrial zone Phase 1	Manufacturing	Investment Fund of the RF	Ulyanovsk region	2009 – 2011	4,151	Government support (budget allocations from the RF Investment Fund): 279.56 million rubles
18	Elaboration of design documentation for implementing the <i>Industrial Urals – Polar Urals</i> investment project	Integrated territorial development	Investment Fund of the RF	Yamalo-Nenetski Autonomous district	2008 – 2009	6,512	Government support (budget allocations from the RF Investment Fund): 4,278.6 million rubles (in the prices of corresponding years, inclusive of VAT). The purpose of the investment project: elaboration of project documentation for building necessary transport infrastructure in the polar regions of the Urals.

One of the most promising examples of public-private partnership in the electric power industry relates to Kurgan-based TPP-2 being constructed within the framework of the Kurgan region's energy programme with participation of Intertechelectro – Novaya Generatsiya PLC. The project's budget exceeds 12.5 billion rubles.

On 19 September 2009, within the framework of the 8th investment forum held in Sochi, the RF Investment Fund signed an agreement, granting 990 million rubles to the Kurgan region and stipulating the procedure for co-financing the joint project "Construction of the Kurgan TPP-2". The RF Investment Fund provided some 10% of the total investment, with the remaining funds made available by a private investor. TPP-2 is one of good examples of public-private partnership in electric power industry in recent years. Construction is carried out within the framework of the Kurgan region's energy programme with participation of Intertechelectro – Novaya Generatsiya PLC. The general contractor is the Czech company PSG-International and the project's budget exceeds 12.5 billion rubles. In the end of August, 2009, the RF Government endorsed the investment project's passport. The new combined-cycle plant will comprise two 111-megawatt power generating units supplied by General Electric Co. and steam co-generation turbines manufactured by Siemens. Overall output of the power plant will be 222 megawatt, thermal output - 250 Gcal/hour. The first stage of TPP-2 is scheduled for commissioning in September 2010, the second stage – for December 2010.

2.5 Conclusions

The Russian Federation's economy is characterized by energy intensity. Efficient energy generation and rational use of energy resources are necessary for ensuring further economic growth and improving the standard of living of the Russian population. According to the Russian Federation's Energy Strategy-2020, by 2020, the nation's overall energy consumption is to be reduced by 40-48% through the use of energy efficiency measures and implementation of structural economic reforms. Development of ESCOs is viewed as one of the mechanisms for achieving this objective.

The ESCO and the customer enter into a performance contract with its purpose being introduction of energy-efficient equipment. The contract may cover all stages from development of the necessary energy efficiency measures to monitoring the project's progress. While many types of such contracts are available, their common provision is that the customer's payments to the energy service company are made from the savings obtained in the course of the project's implementation. The ESCO provides technical and economic assistance, i.e., bears responsibility for technical solutions, ensuring energy saving and the project's economic efficiency.

Serious constraints for ESCOs development in the Russian Federation are mainly associated with the lack of stability for operations of small and medium business and with the traditional economic system of centralized planning. Other constraints relate to low energy tariffs which fail to provide incentives for energy saving. At the same time, end-user prices are fairly high as compared to the average income level. With reference to the findings of this report and taking into account specific operational environment of the RF fuel and energy complex, it appears that high energy efficiency zones should be established using the principles provided under energy-supply contracts, i.e. long-term chauffage and BOOT contracts. This choice is explained by the fact that, establishing high energy efficiency zones involves the need to address the issue of creating costly fixed assets, therefore, a potential investor must have complete control over the facilities and cash-flows generated as a result of their operations.

The use of various performance contracts is justified where the energy service company is providing consultancy services to optimize the energy-supply system at a given enterprise, on the condition that the recommended activities do not involve high costs. Analysis of available contract types indicates that a guaranteed savings contract would be the optimal choice, its main advantages being that the ESCO does not have to bear high risks associated with attracting funds to finance the recommended activities.

An important aspect for ESCO projects' implementation relates to ensuring payback guarantees as risk control would be problematic at all phases of project implementation. Such guarantees may be ensured by financial institutions or Russian government authorities. ESCO operations in the Russian Federation need to be supported by a corresponding clearly-defined legislation and predictable taxes. Improving public awareness of the energy saving issue and ESCOs as an energy saving tool is to become a priority task.

Public-private partnership implies the use of lease and concession mechanisms, financing (by attracting private funds) of social programmes and investment projects of strategic importance. The institute now being created will promote influx of investments into the manufacturing sector, transport and the housing / public utility sector. An important role will be played by the institute of concession agreements and the Investment Fund.

The use of public-private partnership mechanisms will encourage the development of innovations, including through the mechanisms of special economic zones, technoparks, development banks, etc. that are currently being established.

The use of public-private partnership mechanisms can primarily ensure the possibility of implementing socially-significant projects within a short time-frame, that would otherwise be unappealing under traditional private funding schemes. Secondly, participation of private business, normally characterized by a more efficient performance in comparison to government institutions, may

improve overall projects' efficiency. Other advantages are ensuring reduced budget load by attracting private funds and passing some costs on to the users (commercializing the provision of services), a higher possibility of attracting the best personnel, equipment and technologies, improving the quality of end-user services. Finally, the use of PPP provides an opportunity for concentrating the authority's attention on their intended administrative functions and reduce government risks via their distribution between the authorities and the private partner.

3 The Main Trends of Development and Implementation of Energy Efficiency Projects in the Public Utility Sector of Municipal Entities

3.1 Evaluation of Investment Projects Economic Efficiency

3.1.1 Main terms and definitions of investment analysis

Pursuant to Federal Law “On Capital Investment Activity in the Russian Federation” No.39-FZ as of 25 February 1999 [32]:

Investments are monetary resources, securities, other property, including property rights, other rights which have cash value that are invested in objects of entrepreneurial and/or other activities with the aim of generating profits and/or achieving other useful results.

Direct investments are investments made by natural persons and legal entities eligible to participate in the management of investment object.

Portfolio investments mean purchase of shares or participatory interest that provides investor with no opportunity to influence the management of enterprise.

Other investments mean provision of credit facilities of different types that do not envisage the creditor’s participation in the management.

Investment activity is the act of making investments and pursuance of practical measures with the aim of generating profits and and/or achieving other useful results.

Capital investments are investments in fixed capital (fixed assets), including the outlays for new construction projects, enlargement, reconstruction and technical re-equipment of operating enterprises, purchase of machinery, equipment, tools, accessories, survey and prospecting projects and other expenses.

Investment Project is the process of justifying the economic feasibility, volume and time framework for carrying out Capital investments, including the required design plans and specifications and cost estimates drafted in accordance with the legislation of the Russian Federation and the standards (norms and rules) approved in an established manner as well as the description of practical measures to implement investments.

Objects of capital investment in the Russian Federation shall be various kinds of new property being created, and other property undergoing modernization which are in private, state, municipal and other ownership, with exceptions stipulated by federal statutes. And Subjects of Investment Activities are the following participators of Investment Project:

- Investors shall make Capital investments on the territory of the Russian Federation using their own and/or attracted resources in accordance with the legislation of the Russian Federation. Investors may be both natural persons and legal entities which are created on the basis of a joint operations contract, and also associations of legal entities, the former having no legal entity status, State bodies, bodies of the local government, as well as foreign subjects of entrepreneurial activity.
- Customers are properly authorized natural persons and legal entities engaged in the realization of investment projects. In so doing they shall not interfere in the entrepreneurial and/or other kind of activities pursued by other subjects of investment activities unless otherwise follows from an agreement existing between them. Investors can be customers. A customer who is not an investor shall have the rights of ownership, use and disposal of Capital investments for the period and within the competence which are stipulated by a contract and/or State agreement in accordance with the legislation of the Russian Federation.

- Contractors are natural persons and legal entities performing works under a work contract and/or State contract concluded with customers pursuant to the Civil Code of the Russian Federation. Contractors must hold a license to pursue the kind of activities which are to be licensed in accordance with the Federal Law.
- Users of capital investment objects are natural persons and legal entities, including foreign ones, as well as State agencies, bodies of the local government, foreign states, International associations and organizations for which the said objects are created. Investors can be the users of capital investment objects.

There are three basic sources (groups) of financing of investment activities:

- Equity Capital of enterprises and organizations,
- Borrowed and attracted non-budgetary sources,
- Borrowed and attracted budgetary sources.

In these groups, the following sources of investments are distinguished:

- Funds originating in the course the project implementation. They may be used as investments (in cases when investment continues after the facilities have been put into operation) and in general case they include profit and depreciation of production facilities. The use of these funds is called project self-financing;
- Funds that are external in relation to project, among them are:
 - Funds of investors (including Equity Capital of operating enterprise – project participant) comprising the share capital of the project. These funds are not subject to return: natural persons and/or legal entities that provided them are co-owners of established production facilities production assets and consumers of net income obtained because of use thereof;
 - Subsidies - the funds provided on a non-repayable basis: allocations from budgets of different levels, entrepreneur supporting funds, charity or other contributions of organizations of all forms of ownership and natural persons including international organizations and financial institutions;
 - Borrowed cash funds (credits, loans) that are subject to repayment under pre-determined terms (repayment schedule, interest rate);
 - Funds in form of leased (leasing) property. Repayment conditions for these funds are determined by Lease Agreement (leasing agreement).

Subsidies, borrowed cash funds, leased (leasing) property funds are not included into share capital of the project and they also give no right to participation in project income.

Thus, investment activity is a process of concentration and use of economic resources (from material to intellectual) for the purpose of achievement of certain benefits in a quite remote future.

3.1.2 Investment Project Implementation Stages

Investment projects have a significant duration in time. For the development and implementation, it is reasonable to divide the whole lifetime of Investment Project from the concept to the entire completion (liquidation) into stages. Thus, one more term appears - Project Life Cycle (Project Cycle) – as a period of time between the moment of the project appearance and its liquidation.

The Project, no matter how complicated it is or what scope of works it requires to be accomplished, passes the statuses in its development that are used to be called Phases (steps, or stages). The content of

Project Life Cycle Phases for the purposes of the Russian Federation applicable regulatory documents includes:

- Pre-investment Phase,
- Investment Phase,
- Operating Phase.

A Project Phase is a set of logically interconnected works (investor's concept, problem analysis, concept development, real design, and project implementation), processes after completion of which one of project results is achieved. In turn, each highlighted Phase (stage) may be divided into phases (steps) of succeeding level (sub-phases, substeps) etc.

Pre-investment Phase

Pre-investment Phase is the first Phase of the Project Life Cycle at which the following is performed: initial identification of possible ways of implementation and feasibility of the project, analysis of investment opportunities on the basis of development of pre-project documentation.

At the Pre-investment Phase, pre-project documentation is developed – the totality of documents on which basis the preliminary project feasibility study, demonstration and validation of technical and economic characteristics of the project is performed.

The pre-project documentation is developed to include:

- Investment Concept,
- Declaration of Intent,
- Investment Feasibility Study together with the analysis of forms of financing,
- Business Plan (if required).

Generally, the works and services at the Pre-investment Phase are executed by outside of performers – design, R&D and engineering organizations, project management consultants and experts on specialized issues that perform their work and services on a contractual basis at the investor's expense.

Investment Concept is a pre-project documentation development cycle which includes:

- Preconception negotiations,
- Concept Development of (feasibility assumptions for) the project within the framework of which the investment objectives are stated, analysis and selection of primary ways for the implementation of the project, its feasibility for investor is performed, and sources of project financing are determined.

Development of Investment Concept (Offer) provides:

- Preliminary elaboration of objective and tasks of the project and expertise of evolved ideas that meet the project's objective in order to exclude admittedly unacceptable ones from further consideration;
- Evolvement of basic project characteristics based on the pre-project study of investment opportunities and analysis of the project feasibility according to the following main characteristics: availability of alternative of technical solutions; demand for the project's products; project duration, including its Investment Phase; evaluation of levels of basic current prices for the project's products; export perspectives of the project's products; project complexity; initial permit documentation; investment climate in the region in which the project will be implemented; and project cost-result ratio;
- Expert evaluation of investment solution options including identification of efficiency criteria or factors that can have a material impact on a successful implementation of the project;

- Innovation, patent and ecological analysis of the technical solution the production organization of which is provided by the intended project; and verification of necessity of fulfillment of certification requirements;
- Preliminary matching of the Investment Concept with federal, regional and industry priorities;
- Preliminary selection of enterprise, organization capable to implement the project (at Customer's discretion).

Work results at the stage of evolvement of the Investment Concept are finalized in the form of analytical note indicating aim, basic particularities and alternatives of the project; organizational, financial, political and other issues that must be further considered; specific programme of the project development; evaluation of required investments and characteristics and results to meet acceptability criteria. The following project acceptability criteria must be used: technological feasibility, long-term viability and cost effectiveness, political, social and economic acceptability, resource and organizational and administrative endowment.

Investment Concept (Offer), as a rule, is subject to expertise by investor.

Declaration of Intent (Application) is the ground for obtainment of approval from the local body of executive power by Customer for possible construction of the intended project in the given region. Based on the positive consideration of the Declaration of Intent by the body of executive power, the Customer makes a decision on the development of Feasibility Study of Investment in construction of enterprises, buildings and facilities.

Declaration of Intent (Application) must contain the following information:

- Investor (Customer): address, location of enterprise, facility to be constructed;
- Name of enterprise, its technical and technological data (industrial products output (scope of rendering services)) in terms of value as a whole and by main activities in terms of volume;
- Period of construction and putting the project into operation;
- Substantiation of social and economic necessity of intended activity; estimated number of workers and officers, and sources to satisfy the need in workforce;
- Requirements of the enterprise in raw and other materials (in relevant units);
- Requirements of the enterprise in water resources (volume, quantity, source of water supply);
- Requirements of the enterprise in energy resources (electric energy, heat, steam, fuels), source of supply;
- Transport support;
- Provision of housing and communal and social facilities to employees;
- Requirements of the enterprise in land resources;
- Sewage disposal; treatment methods, quality of sewage waters, discharge conditions, use of existing or construction of new sewage disposal plants;
- Possible impact of the enterprise/facility on natural environment – types of impact on environmental components, possible emergency situations (probability, scale, duration of impact), production waste (types, volumes, toxicity level), and waste utilization methods;
- Sources of financing of intended activity (incorporators, shareholders, financial institutions, government, commercial banks, credits from suppliers; use (distribution) of finished products.

Feasibility Study of Investments in Construction of the Project is a document which contains principal, generalized approaches, requirements and recommendations in the scope sufficient for the

Customer (Investor) to make a decision on expediency of further investment and development of project design documentation.

At this stage, a resolution on expediency of further investment and designing is taken based on the Investment Feasibility Study (IFS).

Decision on development of the IFS must be reasonably made by investor in case of approval of the Declaration of Intent (Application) by the body of government authorities (agency of local government).

IFSs of projects are subject to the State Expertise pursuant to procedures established in the Russian Federation, as well as to the investor's expertise.

The expertise ensures a detailed survey of all the aspects of the plan and consequences of the project. At this stage, confidence in feasibility of the project is laid down. The task of the expertise is to verify the justification of the project's value, confirmation or rejection of it based on all of its positive and negative consequences.

The expertise provides a detailed analysis of benefits and costs of the project with the account taken of:

- Its technical plan and degree of completeness;
- Its impact on both natural and social environments;
- Its commercial perspectives including market attractiveness and demand for the project's products;
- Economic analysis of general consequences of the project for the national development and well-being;
- Financial analysis of the project and assessment of its impact on financial position of the enterprise which implements the project;
- Social impact – to what extent local milieu, culture and fairness of distribution of benefits from its implementation are reflected in the project; and
- Institutional (legal, and administrative and managerial) analysis.

The expertise results are the grounds for adjustment and enhancement of the project and representation of it for commercial and legal approval.

Following the results of the expertise, a decision on expediency of further investment and development of the project is to be made which contains one of the following conclusions:

- Approval of the IFS and transfer of the project to the investment stage;
- Rejection of the project, recommendations on inexpediency of further investment and development of D&ED (Design and Estimate Documentation); or
- Making enhancement of IFS with further submission for repeated expertise.

The following facts identified during the expertise of the IFS can be the grounds for rejection of the project: inexpediency of the project construction (due to economic, market, resource or other reasons) or/and impossibility of implementation of the project solutions in compliance with requirements of applicable standards, regulations and rules.

A business plan is to be constructed for technical and economic description of the Investment Project, structure, methods of its implementation and expected result.

The business plan must contain information on solvency and financial sustainability of the enterprise or other object of investment and is to be developed, as a rule, in the event that borrowed funds are attracted for the project financing.

The business plan development is performed based on the materials of the Declaration of Intent and the Investment Feasibility Study.

Investment Phase

Investment Phase is the second Phase of the Project Life Cycle at which negotiations are held and contracts are concluded, project design and construction works are performed, and marketing analysis and staff training is conducted.

At the Investment Phase the following cycle of the project design documentation is developed:

- Advance Construction Stage Projects – “Project”,
- Current Construction Stage Projects – “Detail Documentation”.

Development of the project design documentation is to be performed if the following documents are available: a resolution on preliminary approval of the project site location based on the approved Feasibility Study of Investment in Construction or any other pre-project materials, approved Design Brief and engineering survey materials.

Design Works means design and technical as well as engineering and exploratory developments that envisage the issuance, adoption, expertise and approval of the project design documentation; and a resolution on seizure of land for construction based on it. Design of construction projects must be performed by legal entities or natural persons duly eligible (licensed) to carry out respective activities.

Design means a project design document in which the following solutions are to be determined: technological, space and layout design, structural, environmental, and technical and economic solutions; and in which the following aspects are to be reliably assessed environmental, sanitary and epidemiological and operational safety of the project as well as its cost effectiveness and social consequences.

Current Construction Stage Projects means the projects set forth in the current year investment programme with respect to which development of Detail Documentation, purchase, supply, equipment mounting, Construction and Installation Works are performed.

Detail Documentation means the totality of drawings, estimates and specifications required for the project construction. Detail Documentation is to be developed on the basis of approved Construction Project.

Tender Documentation means a set of documents containing the input information of technical, commercial, organizational and other characteristics of construction projects and the subject of bidding as well as bidding terms and procedures of the auction.

Procedure of development, composition and content of the project documentation shall be established in accordance with legal and regulatory acts of the Russian Federation and Russian Federation subjects, Procedural Guidelines for the Development, Examination, Approval, and Scope of Design Documentation for the Construction of Buildings, Structures, and Industrial Facilities (SNiP 11-01-95, Ministry of the RF, 1995), and corporate regulatory documents.

Operating Phase

After the completion of the Investment Phase and putting of construction project into operation, the Operating Phase starts.

At the operating stage, management of the enterprise is most important which purpose is to provide accomplishment of the project objectives.

3.1.3 Investment Projects Cost-Effectiveness Assessment Methods

Theoretical basis of the IP cost-effectiveness assessment methods has the following basic principles that apply to any types of projects regardless of their technical, technological, financial, industry or regional particularities [33; 34]:

- Consideration of the project during its entire life cycle (calculation period) – from pre-investment studies to discontinuation of the project;
- Cash flow modeling which includes all cash inflows and expenses for the calculation period that are associated with the implementation of the project;
- Compatibility of comparison conditions of different projects (alternatives of project);
- Positivity and maximum effect principle. In order that an IP can be regarded as effective in terms of investor, it is necessary that the implementation effect generated by the project must be positive; if two alternative IPs are compared, the project with maximum effect must be preferred;
- Consideration of time factor. When assessing the project effectiveness, various aspects of time factor must be taken into account, including project agility parameters (change in time) and its economic environment; gaps in time (lags) between products production and inflow of resources and their payment; unequal value of costs and/or results that are heterogeneous in time (preference of earlier results and later costs);
- Consideration of only oncoming costs and inflows. When calculating indicators of effectiveness, only the costs to be incurred and the inflows to be received in the process of project implementation must be taken into account, including costs connected with the attraction of earlier established production assets, and the losses to be incurred directly caused by the implementation of the project. Earlier established resources employed in the project are to be evaluated not by the costs for their establishment but by the alternative value which reflects the highest value of lost profits connected with their best possible alternative use. The previous already made costs that cannot provide obtainment of alternative income in the future cash flows are not to be taken into account and have no influence on the effectiveness indicators;
- “With project” and “without project” analysis. Assessment of the IP effectiveness must be made through the comparison of the situations not “before project” and “after project” but “without project” and “with project”. The difference in the approaches comes down to understanding that in the process of production – even without project – significant changes occur in their structure and amount of Capital investments that cannot be identified in case of the first approach which leads to distortions in the calculations of benefits and costs attributable to the project;
- Consideration of all most significant consequences of the project. When determining the IP effectiveness, the consequences of its implementation must be taken into account including both economic and non-economic ones. In the cases when their influence on effectiveness allows a quantitative assessment, the latter should be performed. In other cases, consideration of such influence is subject to expertise;
- Consideration of availability of various project participants, divergence of their interests and different assessments of the cost of capital cost expressed individually through a discount rate;
- Multistage assessment. At different stages of development and implementation of the project (justification of investments, selection of financial package, and economic monitoring), its effectiveness must be determined anew with a different depth of elaboration;
- Consideration of influence of the need in working capital required for the operation of production assets established in the process of the project implementation on the IP effectiveness;

- Consideration of inflation effect (consideration of change in prices for different type of products and resources during the period of project implementation) and possibility of the use of several currencies upon the project implementation;
- Consideration of (in quantitative form) influence of uncertainties and risks accompanying the project implementation.

General effectiveness assessment scheme

Prior to effectiveness assessment, the social significance of the project must be determined by experts. Large-scale, national and global projects are deemed socially significant. After that, the assessment is made in two stages.

At the first stage, project effectiveness indicators are calculated in general. The purpose of this stage is an aggregate economic assessment of project solutions and creation of conditions required for investor search. In case of local projects, only their commercial effectiveness is to be assessed; and if it happens to be acceptable, it is recommended that they would directly pass to the second stage of the assessment. In case of socially significant projects, their social effectiveness is to be assessed in the first place. In case of unsatisfactory social effectiveness, such projects shall not be recommended for implementation and cannot claim for the State support. If their social effectiveness is acceptable, their commercial effectiveness should be assessed then.

In case of insufficient commercial effectiveness of a socially significant IP, it is recommended that a possibility of application of different forms of its support would be considered that will enable to improve the IP's commercial effectiveness to acceptable level.

In the event that the sources and conditions of financing are already determined, assessment of the project's commercial effectiveness will not be made.

The second stage of assessment is to be made after the financing scheme has been developed. At this stage, the composition of participants must be clarified and financial feasibility and effectiveness of the participation in the project of each of them must be determined.

In case of local projects, at this stage, effectiveness of the participation in the project of separate enterprises – participants, effectiveness of investment in shares of such incorporated enterprise and effectiveness of budget participation in the project implementation (budgetary effectiveness) is to be determined. In case of socially significant projects, at this stage, regional effectiveness is to be determined in the first place and in the event that it is satisfactory, further calculations will be made according to the same procedure as used for the local projects.

Assessment of the IP effectiveness must be made at the following stages:

- At the stage of development of investment offer and declaration of intent (express - assessment of the investment offer),
- At the stage of development of the Investment Feasibility Study,
- At the stage of the IP implementation (economic monitoring).

The IP effectiveness assessment principles are the same for all the stages. Assessment may differ with respect to effectiveness in question and with respect to the set of input data and their level of description detail.

The calculation of the IP commercial effectiveness indicators is based on the following principles:

- Either (market) current prices set forth in the project or projected prices for products, services and material resources are used;
- Cash flows are calculated in the same currencies (specified in the project) in which resources will be purchased and payment of products will be made;

- Wages are included in operating costs in the amount specified in the project (including deductions);
- If the project concurrently envisages production and consumption of certain products (for example production and consumption of components and equipment), only costs for their production but not expenses for their purchase will be considered in calculations;
- Taxes, fees, deductions etc. will be considered in calculations as set forth in applicable laws including but not limited to VAT refund for employed resources, tax benefits specified by law etc.;
- If the project envisages full or partial cash tie-up (depositing, acquisition of securities etc.), investment of respective amounts will be considered (in the form of outflow) in cash flows from investment activity, and receipt (in the form of inflows) in cash flows from operating activity;
- If the project concurrently envisages performance of several operating activities, the cost with respect to each of them will be indicated in calculations.

Project cash flow generation principles

These principles differ by activities: operating, investment, and financial activities.

The IP effectiveness is assessed during the calculation period which covers the time interval from the project beginning till its discontinuation.

The calculation period must cover the entire life cycle of the development and implementation of the project up to its discontinuation. The project implementation may be discontinued due to:

- Depletion of raw and other resources;
- Discontinuation of production in connection with change in requirements (norms, standards) for manufactured products, production technology or labor conditions at this production;
- End of market demand for products in connection with its obsolescence or loss of competitiveness;
- Depreciation of the main (determinative) part of production assets etc.

If required, liquidation of erected objects will be envisaged in the end of each calculation period.

When dividing the calculation period into steps, the following should be taken into consideration:

- Purpose of calculations;
- Duration of different Project Life Cycle phases. In particular, it is reasonable that the moments of projects construction completion or basic stages of such construction, the moments of production capacities development completion, the moments of beginning of basic products production, the moments of fixed assets replacement etc. will coincide with the ends of respective steps which will enable to verify the project financial feasibility at separate stages of its implementation;
- Irregularity of cash inflows and costs (including production seasonality);
- Periodic financing of the project;
- Financing conditions. In particular, the moments of receipt of different credit tranches, repayments of principal debt and interest on it must be preferably with the ends of steps.

The calculation period is divided into steps-intervals within the limits of which aggregation of data is performed that are used for the assessment of financial indicators.

Like any financial operation, the project generates cash flows. An IP cash flow is the time dependence of cash inflows and payments upon implementation of the project which generates it and is determined for the entire calculation period.

Cash flow value is denoted by $F(t)$ if it relates to the moment of time t , or by $F(m)$ if it relates to the m^{th} step.

At each step, cash flow value is characterized by:

- Inflow which is equal to the amount of cash inflows (or results in terms of value) at this step,
- Outflow which is equal to payment at this step,
- Balance which is equal to difference between the inflow and the outflow.

Cash flow $F(t)$ normally consists of (partial) flows from separate types of activities.

- Cash flow from investment activity $F_i(t)$,
- Cash flow from operating activity $F_o(t)$,
- Cash flow from financial operations $F_f(t)$.

Cash flow from investment activity

In the first place, the costs distributed by steps of the calculation period with respect to creation and putting into operation of new fixed assets and liquidation, replacement or compensation of retired fixed assets are included in the cash flow from investment activity as an outflow. Non-capitalizable costs are also included here. In addition, changes in working capital are included in the cash flow from investment activity (the increase is regarded as cash outflow, and the decrease – as cash inflow). Deposited Equity Capital and expenditures for acquisition of securities of other subjects that are intended for financing of the given IP are also included as an outflow.

Incomes from disposal of retired assets are included in the cash flow from investment activity as an inflow. In this case payment of appropriate taxes must be envisaged.

Data on investment costs must include information classified by types of costs.

Assessment of costs for acquisition of separate types of fixed assets may also be made based on the results of assessment of respective properties. Allocation of investment costs for the period of construction must be matched with the construction schedule.

Cash flow from operating activity

Main result of operating activity is the return on invested funds. Therefore, all types of incomes and expenses associated with production of products and taxes paid on those incomes are taken into account in cash flows. In particular, here, cash inflows from own property lease, placing equity capital on deposit, incomes from securities of other entities.

Production output is recommended to be indicated in terms of volume and in terms of value.

Prices for produced products specified in the project must take into account the influence of the project implementation on overall supplies of the given products (and hence, on prices of these products) in the relevant market.

Incomes and expenses from non-sale operations which are not associated directly with the production of products are to be taken into consideration in the real cash inflows and outflows in addition to the proceeds from sales.

Cash flow from financial operations

Financial operations are operations with funds that are external in relation to IP, i.e. that are incoming not from the project implementation. They consist of equity (share) capital of the company and attracted funds.

As for the cash flow from financial operations:

- Inflows include investments of equity (share) capital of the company and attracted funds: subsidies and grants, borrowed funds, including for the account of own debt securities emitted by the enterprise;
- Outflows include expenditures for repayment and service of loans and debt securities emitted by the enterprise (in full, no matter if they have been included in the inflows or in additional funds), and, if required, – for payment of dividends on shares of the enterprise.

Cash flows can be expressed in current, projected or deflated prices depending on in which prices their inflows and outflows are expressed at each step.

Current prices are the prices set forth in the project excluding inflation.

Projected prices are expected prices (including inflation) at the future steps of the calculations.

Deflated prices are the projected prices reduced to the price level of a fixed moment of time through division by overall base index of inflation.

Like with the cash flow, cumulative cash flow is also used upon the IP assessment; cumulative cash flow has the following characteristics: cumulative inflow, cumulative outflow and cumulative balance (cumulative effect) that are determined at each step of the calculation period as a sum of respective characteristics of cash flow for the given step and all preceding steps.

Discounting of cash flows

Discounting of cash flows means discounting of their values that are different in time (relating to different steps of calculations) to their present value at a certain moment of time which is called a discounting moment and denoted by t^0 . A discounting moment may not necessarily coincide with the base moment. Discounting applies to the cash flows expressed in current or deflated prices and in single currency.

The basic prudential standard used for discounting is a discount rate (E) expressed in unit fractions or in percent per year.

Discounting of cash flow at the m^{th} step is made by multiplication of its value F_m by discount factor A_m , calculated according to the following formula:

Formula 3.1

$$A_m = \frac{1}{(1 + E)^{t_m - t^0}}$$

where t_m – moment of completion of the m^{th} step, (E is expressed in unit fractions per year, and $t_m - t^0$ – in years).

Discount rate (E) is an exogenously prescribed basic prudential standard used upon assessment of the IP effectiveness.

The following discount rates are distinguished: commercial, project participants, social and budget discount rates.

A commercial discount rate is used upon assessment of the project commercial effectiveness; it is determined with account taken of alternative effectiveness of employed capital.

A project participant's discount rate reflects effectiveness of enterprises' (or other participants) participation the project. It is selected by the participants. In the absence of clear preferences, commercial discount rate may be used instead.

A social (public) discount rate is used in calculations of social effectiveness indicators and characterizes minimal requirements of society to social effectiveness of projects.

It is considered as a national parameter and must be centrally established by the Russian national economy supervisory authorities in connection with forecast of economic and social development of the country.

In the calculations of regional effectiveness, a social discount rate can be adjusted by national economy regional supervisory authorities.

Budget discount rate is used in the calculations of budget effectiveness indicators and reflects alternative cost of budget funds. It is determined by the authorities (federal or regional) by whose assignment the IP budget effectiveness is assessed.

Investment project cost- effectiveness indicators

The following indicators used for calculations of IP effectiveness are recommended:

- Net Income (NI),
- Net Present Value (NPV),
- Internal Rate of Return (IRR),
- Additional financing requirement (other names – FR, cost of project, capital of risk),
- Cost and investments profitability indexes,
- Payback period,
- Group of indicators that characterize the financial position of enterprise–participant of the project.

Conditions of financial feasibility and effectiveness indicators are calculated based on cash flow F_m , specific components of which depend on assessed type of effectiveness.

At different stages of the calculations in accordance with their purposes and specificity, financial indicators of FR and conditions of financial feasibility of the IP are assessed in current or projected prices. Remaining indicators are determined in current or deflated prices.

Net income¹¹⁵ is a cumulative effect (cash flow balance) for the calculation period:

Formula 3.2

$$NI = \sum_m \phi_m ,$$

where the summation is taken over all the steps of the calculation period.

The most important project effectiveness indicator is **Net Present Value**¹¹⁶ which is a discounted cumulative effect for the calculation period. NPV is calculated by formula:

Formula 3.3

$$NPV = \sum_m \phi_m \alpha_m (E)$$

NI and NPV characterize an excess of aggregate cash inflows over aggregate costs for the given project correspondingly without and with account taken of inequality of effects (as well as of costs, results) relating to different moments of time.

The difference ‘NI – NPV’ is frequently called a project discount.

¹¹⁵ Net income(NI) - Net Value (NV)

¹¹⁶ Net discounted income (NDIV, integral effect) - Net Present Value (NPV)

In order that the project can be regarded effective in terms of investor, it is necessary that NPV of the project must be positive; when alternative projects are compared, the most preferred project must be the one with a higher NPV (provided that it is positive).

Internal Rate of Return¹¹⁷

In the most commonly encountered case of IP beginning with (investment) costs and having a positive NI, a positive number E_B is called internal rate of return, if:

- At a discount rate $E = E_B$ the Project Net Present Value turns to 0,
- If it is the only number.

In a more general case, the positive number E_B is called internal rate of return, which at a discount rate $E = E_B$ the Project Net Present Value turns to 0; at all higher values, E is negative, at all lower values, E is positive.

If at least one of these conditions is not met, it is regarded that IRR does not exist.

For the assessment of IP effectiveness, IRR must be related to discount rate E . Investment projects that have $IRR > E$ have a positive NPV and, therefore, they are effective. Projects that have $IRR < E$ have a negative NPV and, thus, they are ineffective.

IRR may also be used for:

- Economic assessment of project solutions, provided that acceptable IRR values (depending on application area) are known for the projects of the given type;
- Assessment of the IP degree of stability based on the difference ‘ $IRR - E$ ’,
- Determination of discount rates E by the project participants based on the data about internal rate of return of alternative directions of equity investment.

Payback period¹¹⁸ is duration of the period from inception till the break-even point. Inception is specified in the Design Brief.

Break-even point is the earliest moment of time in the calculation period after which the current net income NI_k becomes and from this point on remains non-negative.

Upon assessment of effectiveness, the payback period acts only as a limitation, as a rule.

Discounted Payback Period¹¹⁹ is duration of the period from inception till “discounted break-even point”. Discounted break-even point is the earliest moment of time in the calculation period, after which net present value NPV_k becomes and from this point on remains non-negative.

Additional financing requirement (FR) is a maximal value of negative cumulative balance from investment and operating activity. FR value indicates a minimum volume of the project's external financing required to ensure its financial feasibility. Therefore, the FR is also called ‘capital of risk’. It is well to bear in mind that the actual volume of financing requirement must not necessarily coincide with the FR and, as a rule, exceeds it because of necessity to serve the debt.

Additional discounted financing requirement (DFR) is a maximal value of negative discounted cumulative balance from investment and operating activity. The DFR value indicates a minimum discounted volume of the project's external financing required to ensure its financial feasibility.

¹¹⁷ Internal Rate of Return - (IRR, internal rate of discount, internal rate of profitability)

¹¹⁸ Payback Period (PP)

¹¹⁹ Discounted Payback Period (DPP)

Profitability indexes characterize a (relative) “return on project” – return on funds invested in the project. They can be calculated both for discounted and non-discounted cash flows. Upon assessment of effectiveness, the following indexes are often used:

- Cost profitability index (CPI) is the ratio of the sum of cash inflows (cumulative inflows) to the sum of cash outflows (cumulative payments).
- Discounted cost profitability index (DCPI) is the ratio of the sum of discounted cash inflows to the sum of discounted cash outflows.
- Net Present Value of Returns (NPVR) is the ratio of the sum of cash flow elements from operating activity to absolute value of the sum of cash flow elements from investment activity. It is equal to the ratio (increased by one) of NI to aggregate volume of investments.
- Discounted Net Present Value of Returns (DNPVR) is the ratio of the sum of discounted cash flow elements from operating activity to absolute value of the discounted sum of cash flow elements from investment activity. The DNPVR is equal to the ratio (increased by one) of NPV to discounted aggregate volume of investments.

When calculating the NPVR and DNPVR, either all Capital investments for the calculation period (including investments in replacement of retired fixed assets) or only initial Capital investments made prior to putting the enterprise into operation may be considered.

Cost and investment profitability indexes are > 1 if and only if the NI is positive for this flow.

Discounted cost profitability indexes are > 1 if and only if the NPV is positive for this flow.

Consideration of risk and uncertainty in investment projects. Methods of their assessment. Consideration of inflation upon assessment of IP effectiveness

In many cases, inflation significantly influences the IP effectiveness, financial feasibility conditions, financing requirements and effectiveness of equity employed in the project. This influence is particularly notable for the projects that have lengthy investment cycles or (and) that require a highly geared capital etc.

In addition, inflation must be taken into account when studying the influence of uncertainty and risk on implementation and effectiveness of projects.

The following is used to consider inflation:

- General internal inflation index with respect to rubles which is determined with account taken of systematically adjusted working forecast of the process of inflation;
- Forecast of the ruble rate of exchange;
- Forecast of external inflation;
- Forecast of change of prices for products and resources in time;
- Forecast of taxes, duties rates, base rates of the Russian Federation's Central Bank and other financial norms of governmental regulation.

The following indicators are used for the description of inflation impact on the IP effectiveness:

- General inflation index for the period from initial point till the end of the m^{th} step of calculation $GJ(t_m, 0)$ or GJ_m (Base general inflation index). It reflects the ratio of average price level in the end of the m^{th} step to the average price level at the initial moment of time. If the end of the zero step is taken as the initial point, then $GJ_0 = 1$.

- General inflation index for the m^{th} step J_m which reflects the ratio of average price level in the end of the m^{th} step to the average price level in the end of step $m-1$ (general chain inflation index). If the beginning of the zero step is taken as the initial point, then $GJ_0 = J_0$.
- General inflation rate (level, norm) for this step i_m which is normally expressed in percent per year (or per month).
- Average base inflation index at the m^{th} step MJ_m which reflects the ratio of average price level in the middle of the m^{th} step to the average price level at the initial moment.

An alternative of price indexes is a fixed assets revaluation index which reflects change in book value and residual value of assets upon revaluation of the assets from time to time.

The following indexes are distinguished: chain index of revaluation which reflects increase of assets value at given revaluation; and base index which reflects the similar change compared to the value at the initial point.

Consideration of inflation influence. Deflation

To consider the influence of inflation on the project effectiveness indicators “in general”, cash flows must be constructed using projected prices.

Based on the constructed flow in projected prices, the cash flow in deflated prices must be constructed by formula as below:

Formula 3.4

$$\varphi(m) = \frac{\varphi^c(m)}{GJ_m}$$

Reduction to deflated prices is called deflation.

Inflation influence types

It is reasonable to classify the following inflation influence types:

- Influence on price indicators,
- Influence on financing requirement,
- Influence on need in working capital.

The first type of inflation influence does not practically depend on its size, but it depends on heterogeneity coefficient values and on internal inflation of foreign currency.

The second type of influence depends on unevenness of inflation (its change in time). A situation when in the beginning of the project the inflation is high and then it falls is the least profitable for the project.

The third type of inflation influence depends on both its heterogeneity and its level. In relation to this type of influence, all projects are divided into two categories (mainly depending on the ratio of receivables and payables).

Based on the foregoing, the following inflation forecast procedure may be recommended:

- It should be determined the project of which category (the first or the second category) this is.
- If measures for mitigation of the inflation influence on the financing requirement have been taken, as-low-as-practicable level of inflation should be used for the projects of the second category. As for the first category projects, the maximum forecast should be selected from all justified forecasts of inflation.

- If such measures have not been taken, in addition to the described forecast marginal levels of inflation, the scenarios should be considered associated with the quickest (from the actually forecast ones) reduction of inflation from accepted maximum value to accepted minimum value.
- There must be assessed the lowest limit of possible changes of one of the characteristics of currency rate change including considerations of correlations of dollar prices for products of the project and existing prices.

Consideration of uncertainty

In the calculations of effectiveness it is recommended that uncertainty must be taken into account, i.e. incompleteness and inaccuracy of information about conditions of the project implementation, and risk i.e. possibility of occurrence of the conditions that will lead to negative consequences for all or separate participants of the project. The project effectiveness indicators calculated with account taken of risk and uncertainty factors are known as expected.

In this case, the project implementation scenario for which the calculations of effectiveness have been made is considered as the main (basic) one, all possible remaining scenarios – as the ones that cause one or the other positive or negative departures from (project) effectiveness indicator values that are in compliance with the basic scenario. Presence or absence of risk associated with the implementation of one scenario or another is determined by each participant by the size and the symbol of respective departures. The risk associated with the occurrence of one or other conditions of the project implementation depends on the viewpoint of whose interests it is assessed.

Separate factors of uncertainty are subject to consideration in the calculation of effectiveness if at different values of these factors the costs and results of the project differ significantly.

Project is deemed sustainable, if for all the scenarios it appears to be effective and financially feasible, and possible unfavorable consequences are removed by measures provided by the organizational and economic mechanism of the project.

For the purposes of assessment of the project's sustainability and effectiveness under conditions of uncertainty, it is recommended that the following should be used:

- Aggregate assessment of sustainability,
- Calculation of break-even levels,
- Method of variation of parameters,
- Assessment of expected effect of the project considering the quantitative characteristics of uncertainty.

All the methods except for the first one envisage the development of scenarios of the project implementation under the most probable or the most dangerous conditions for any participants, and assessment financial consequences of the implementation of such scenarios. This gives an opportunity to provide for measures, if required, to prevent or redistribute occurring losses in the project.

When unsustainability of the project has been detected, it is recommended that necessary adjustments should be introduced to the organizational and economic mechanism of its implementation, including:

- Change of sizes and / or conditions of loan provision,
- Provision of inventories, reserves of cash funds, and contributions to supplement fund,
- Adjustment of settlement conditions among the project participants, and, if required, hedging of transactions or
- Indexing of prices for goods and services supplied to each other must be provided,

- Provision of insurance to the project's participants for one or other occurrences.

In cases when even after such adjustments the project remains unsustainable, its implementation is regarded as inexpedient provided that additional information sufficient to apply the fourth of the foregoing methods is absent. Otherwise, decision on the project implementation will be made based on the fourth method excluding the results of all the preceding ones.

Aggregate assessment of sustainability of investment project in general

When using this method to ensure sustainability of the project, it is recommended that:

- The moderate pessimistic forecast for the following should be used: project's technical and economic parameters, prices, tax rates, currency exchange rates and other parameters of the project economic environment, production output and prices for products, deadlines and cost of separate types of works etc. (in which case, deviations from said parameters will be more likely positive than negative);
- Contingent reserves should be provide for investment and operating expenses conditioned by possible errors of project design organization, revision of project solutions in the process of construction, contingent delays of payments for supplied products etc;
- A discount rate should be increased by correction to risk.

If these conditions are met, it is recommended that the project should be considered as sustainable in general provided that it has sufficiently high values of integral indicators, in particular positive value of expected NPV.

The IP sustainability from the viewpoint of the project's enterprise - participant under possible changes of its implementation conditions can be aggregately verified based on the results of the calculations of commercial effectiveness for the main (basic) scenarios of the project implementation through analysis of real cash flow dynamics. The real cash flows included in the calculation are calculated with respect to all activities of participant with account taken of conditions of provision and repayment of loans.

If an accident is likely to occur at one or another step of the calculation period liquidation of which consequences including indemnification of damage requires additional expenditures, the respective expected losses are to be included into the cash outflows. They are determined as the product of the expenditures for the liquidation of the accident consequences by the probability of accident occurrence at this step.

Indicators of commercial internal rate of return and profitability index of discounted costs may be used sometimes for the aggregate assessment of the project sustainability. In this case, the IP is deemed sustainable provided that the IRR value is sufficiently high (not less that 25 - 30 percent), discount rates do not exceed the level for small and middle risks (from 15 percent) and there will be no loans at real rates exceeding the IRR and profitability index of discounted costs exceeds 1.2.

The project is deemed sustainable provided that the financial reserves meet the requirements under the foregoing conditions.

At each step of the calculation period, the sum of cumulative balance of cash flow from all activities (cumulative effect) and financial reserves must be non-negative. It is recommended that it should be not less than 5 percent of the sum of net operating expenses and investments implemented at this step.

To execute this recommendation, the following may be required: change of the reserve ratios specified in the project for financial funds, provision of contribution to reserve capital or rectification of the project financial package. If these measures do not ensure the execution of said requirement, a more detailed study of uncertainty influence of the IP feasibility and effectiveness will be required.

Calculation of break-even thresholds

Degree of sustainability of the project in relation to possible changes of implementation may be characterized by the indicators of break-even thresholds and maximum values of such parameters of the project as production output, prices of manufactured products etc. These indicators are used only for assessment of influence of possible change of the project parameters on its financial feasibility and effectiveness, but they do not relate to the indicators of the IP effectiveness and their calculation does not replace the calculation of integral indicators of effectiveness.

A break-even threshold for a project parameter for a certain step of the calculation period is determined as the coefficient to the value of such parameter at this step upon which application the net profit gained in the project at this step becomes zero. One of the most wide-spread indicators of that type is a break-even level. Usually, it is determined for the project in general in compliance with the formula as below (Formula 3.5).

Break-even level (BL_m) at step 'm' is the ratio of "break-even" sales volume (production output) to the projected one at this step. The "break-even" sales volume means the sales volume at which profit becomes equal to zero. When determining this indicator it is taken that at the step 'm':

- Production output is equal to the sales volume,
- Proceeds volume changes in proportion to the sales volume,
- Incomes and expenses from non-core activities do not depend on the sales volumes,
- Full current costs of production may be divided into semi-fixed costs and semi-variable costs that change in direct proportion to the production output.

Calculation of break-even level is made by formula:

Formula 3.5

$$BL_m = \frac{C_m - CV_m - DC_m}{S_m - CV_m},$$

where

S_m – proceeds volume at the m^{th} step,

C_m – full current costs of product production (production costs plus depreciation, taxes and other deductions attributable to cost and financial results except for profit tax) at the m^{th} step,

CV_m – semi-variable part of full current costs of production (including depreciation of taxes and, perhaps, other deductions in addition to semi-variable part of production costs) at the m^{th} step,

DC_m – income from non-core activity less non-core activity expenses at the m^{th} step.

If the project provides the production of several types of products, the foregoing formula does not change and all variables included by it are taken with respect to the entire project (without division by types of products). In the calculation, all prices and costs should be considered without VAT.

Usually, the project is deemed sustainable if in the calculations with respect to the project in general, the break-even level does not exceed 0.6 – 0.7 after the project capacities have been developed. When the break-even level is close to 1 (100 percent), as a rule, it is indicative of insufficient project sustainability to fluctuations of demand for the products at this step. Even the satisfactory values of the break-even level at each step do not guarantee the project effectiveness (or that NPV will be positive). At the same time, even the high values of the break-even level at separate steps cannot be regarded as a sign of the project's non-feasibility.

Alongside with the calculations of break-even levels, the break-even thresholds for other parameters of the project can be evaluated for the project sustainability assessment; among such other parameters are maximum prices for products and basic types of raw materials, a maximum share of sales without

advance payment, maximum shares of compensatory production and investor's shares in profit production.

The influence of change of the respective parameter on different components of cash inflows and expenses must be considered for those calculations. The closeness of project values of parameters to the break-even thresholds may be indicative of the insufficient sustainability of the project at the respective step.

Break-even thresholds can also be determined for each participant of the project (The criterion for achievement of threshold is transformation of the participant's net profit to zero). For doing so it must be determined how income and expenses of this participant change at the changing values of the parameter for which the values of threshold are determined.

3.2 Particularities of Implementation of Energy Efficiency Projects in the Public Utility Sector of the Russian Federation

Federal Law "On the Fundamental Principles of Tariff Regulation of Public Utility Complex Organizations" No.210-FZ as of 25 December 2004 sets forth the obligation for the public utility sector organizations to develop a production programme. The investment programmes are developed within the framework of implementation of the public utility infrastructure systems.

The procedures of development and approval of the investment and production programmes of the public utility sector organizations are also governed by:

- Directive of the Government of the Russian Federation No.109 of 26 February 2004 "On pricing with respect to electricity and heat in the Russian Federation",
- Directive of the Government of the Russian Federation No.464 of 23 July 2007 "On approval of rules for financing of investment programmes of municipal utility organizations – manufacturers of goods and services in the sphere of electric and/or heat supply",
- Directive of the Government of the Russian Federation No.520 of 14 July 2008 "On the bases of price formation and the procedure for regulating tariffs, surcharges and limit indices, with regard to the activities of organization of public utility complex",
- Order of the Ministry for Regional Development of the Russian Federation No.99 of 10 October 2007 "On approval of recommended practices for development of investment programmes of organization of public utility complex",
- Order of the Ministry for Regional Development of the Russian Federation No.100 of 10 October 2007 "On approval of recommended practices for preparation of technical briefs for development of investment programmes of municipal development organizations",
- Municipal regulatory legal acts.

3.2.1 Production Programme of the Public Utility Sector Organizations

Production programme of the public utility sector organization is a programme of activities of said organization to ensure its production of goods in the sphere of heat and water supply, water disposal and sewage water treatment, utilization of municipal solid waste including activities on modernization of the public utility infrastructure operated by this organization and (or) facilities used for the utilization of municipal solid waste.

Pursuant to Federal Law “On the Fundamental Principles of Tariff Regulation of Public Utility Complex Organizations”¹²⁰, regulation of tariffs and services of the public utility sector organizations includes approval of production programmes with the Regional Energy Commission. The organization shall independently develop the production programme for the subsequent regulatory period, determine financial requirement for its implementation, and make a preliminary calculation of tariffs. The production programme shall include¹²¹:

- Justification of provision of projected output and quality of rendered services,
- Plan of action on improvement of effectiveness of the organization’s activities,
- Plan of action on energy-saving and energy efficiency.

Upon implementation of the Plan of action on energy-saving and improvement of energy efficiency, a reservation period for additional funds received due to cost reduction shall be not less than five years¹²².

The programme shall be submitted to the regulatory body at least three months prior to the date of the end of the current regulatory period. The regulatory body shall verify the justification of the production programme, whereafter it shall approve the production programme and establish the tariffs in compliance with this programme.

To establish a tariff and surcharges to the tariff for rendered services, the public utility sector organization shall submit the following documents to the regulatory body by the 1st May of the current year (Pursuant to RF Government’s Directive No.520 of 14 July 2008 “On the bases of price formation and the procedure for regulating tariffs, surcharges and limit indices, with regard to the activities of organization of public utility complex”):

- Application on establishment of tariffs for goods and services of the public utility sector organization accompanied by a proposal on selection of the regulatory method and justification of expediency of its application,
- Production programme,
- Calculation of financial requirements for implementation of the production programme with a breakdown of costs by activities,
- Accounting and tax reporting according to the established form for 2 preceding years or for the period during which the organization was performing the regulated activities if such period is less than 2 years,
- Report on revenues from sales of the goods and services according to the established tariffs for goods and services of the public utility sector organization and on expenses for implementation of the production programme for 2 preceding years or for the period during which the organization was performing the regulated activities if such period is less than 2 years (by types of activities).

In addition, pursuant to general rules of governmental regulation and application of tariffs for electric and heat energy in the Russian Federation (Pursuant to RF Government’s Directive No.109 of 26 February 2004 “On pricing with respect to electricity and heat in the Russian Federation”), organizations that perform regulated activities shall submit the following materials to the relevant regulatory body:

- 14 Balance of electric energy,

¹²⁰ Ch. 3

¹²¹ Cl. 2. Art. 7

¹²² Cl. 4 Art. 7

- 15 Balance of electric capacity, including information about installed, maximum available and operational generating capacity,
- 16 Balance of demand and supply in relation to heat energy,
- 17 Balance of heat capacity,
- 18 Calculation of productive supply of electric and heat energy with justification of amount of consumption of electric energy for auxiliary supply and production needs and grid transmission (loss),
- 19 Data about structure and prices of consumed fuel including transportation,
- 20 Calculation of expenses and required gross proceeds from regulated activities accompanied by economic justification of input data (indicating applied norms and standards of calculation), developed in compliance with the guidelines approved by the Federal Tariffs Service,
- 21 Calculation of tariffs for separate services rendered in the markets of electric and heat energy, and
- 22 Assessment of shortfalls in income or additional earnings received for the preceding regulatory period that have been identified based on official statistical and accounting reporting or results of audit of business activity of the organizations' that carry out the regulated activity.

3.2.2 Investment Programme of the Public Utility Sector Organizations

An investment programme of the public utility sector organization on development of public utility infrastructure system is a programme of financing of construction and (or) modernization of public utility infrastructure system determined by local government bodies for the public utility sector organizations for the purposes of implementation of public utility infrastructure comprehensive development programme.

The procedure of development and approval of the investment programme includes the following stages¹²³:

- 1 A local government body shall design the public utility infrastructure comprehensive development programme (in accordance with the territorial planning documents of municipal entities),
- 2 A municipal entity representative body shall approve the public utility infrastructure comprehensive development programme,
- 3 Head of the local administration shall prepare and approve a technical brief for the public utility sector organization (to be developed based on the comprehensive development programme),
- 4 The public utility sector organization shall develop a project investment programme draft (in compliance with the technical brief),
- 5 A regulatory body of the municipal entity shall:
 - Consider the project investment programme (verify its being in compliance with requirements of approved technical brief for its development and justification of the calculations required for satisfaction of its financial requirements),
 - Prepare a proposal about the amount of surcharge on the tariff for the organization's products and the tariff for connection,
 - Analyze if the organization's products is available for consumer with account taken of the proposed surcharges,

¹²³ Art. 11 of Federal Law "On the Fundamental Principles of Tariff Regulation of Public Utility Complex Organizations" No.210-FZ as of 30 December 2004

– Submit the project programme to the municipal entity representative body (in the event of availability for consumer),

6 The municipal entity representative body shall consider and approve the programme, establish surcharges on tariffs for consumers.

7 The Regional Energy Committee shall establish surcharges on tariffs for the organization's products and the tariff for connection to public utility infrastructure systems.

8 The local government bodies shall conclude a contract with the public utility sector organization under which the terms and conditions for the implementation of the approved investment programme are determined.

The local government bodies may adopt municipal regulatory legal acts that determine the procedure and requirements for the development of the investment programme. A recommended list of activities and documents for the implementation of investment projects are shown below by an example of Tomsk Region.

Table 3.1. list of activities and documents for the implementation of investment projects in the public utility sector of Tomsk Region¹²⁴

№	Description of activity	Performer	Documents
1	Development of public utility infrastructure comprehensive development programme of municipal entity.	Authorized local government body (as agreed)	Project programme
2	Approval of the public utility infrastructure comprehensive development programme of municipal entity.	Representative local government body (as agreed)	Municipal regulatory legal act on approval of programme
3	Conclusion of contact with the public utility sector organization in accordance with established procedure to ensure the use and operation of municipal public utility infrastructure systems for production of goods (rendering services) for the purposes of heat and water supply, water disposal and sewage water treatment and (or) use and operation utilization (disposal) of municipal solid waste facilities	Authorized local government body (as agreed)	Lease agreement, gratuitous use agreement, concession agreement or other.
4	Preparation and approval of technical brief for the development investment programme of the public utility sector organization.	Head of Administration of Municipal entity (by 01.01.2010 if public utility infrastructure comprehensive development programme is absent then - Municipal Entity Representative Body) (as agreed)	Municipal regulatory legal act on approval of technical brief for development the public utility sector organization investment programme.
5	Verifying if the project investment programme draft designed and submitted by the public utility sector organization is in compliance with requirements of approved technical brief	Regulatory body of municipal entity (as agreed).	Conclusion.
6	Verification of the justification of the calculations provided by the public utility sector organization required for the implementation of investment programme financial requirements.	Regulatory body of municipal entity (as agreed)	Conclusion
7	Analysis of availability of the public utility sector organization's goods and services for consumer.	Regulatory body of municipal entity (as agreed)	Conclusion
8	Verification of the project investment programme and calculations of the public utility sector organization submitted to the regulatory body of municipal entity with account taken of proposals on partial provision of financial requirements of the public utility sector organization for the account of local budgetary funds when taking a decision on availability of the public utility sector organization's goods and services for consumer.	Regulatory body of Tomsk Region	Conclusion
9	Consideration and approval of the investment programme of the public utility sector organization submitted to the regulatory body of municipal entity.	Representative local government body (as agreed)	Municipal regulatory legal act on approval of the investment programme of

¹²⁴ Directive of the Tomsk Region Administration of 12 October 2009 No.714-ra "On approval of recommended list of activities"

№	Description of activity	Performer	Documents
			the public utility sector organization
10	Establishment of surcharge on prices (tariffs) for consumers for the period of the investment programme implementation	Representative local government body (as agreed)	Municipal regulatory legal act on establishment of surcharge on prices (tariffs) for consumers
11	Establishment of: <ul style="list-style-type: none"> – Surcharge on tariffs for goods and service of the public utility sector organization the validity period of which may not be less than three years, – Tariff for connection to public utility infrastructure systems for the period which may not be less than one year, – Tariff of the public utility sector organization for connection for not less than three years. 	Regulatory body of municipal entity (as agreed)	Municipal regulatory legal acts on establishment of: <ul style="list-style-type: none"> – Surcharge on tariffs for goods and service of the public utility sector organization, – Tariff for connection to public utility infrastructure systems, – Tariff of the public utility sector organization for connection.
12	Conclusion of contract (within the period prior to the implementation of the investment programme) with the public utility sector organization which determines the terms and conditions for the implementation of the approved programme for the purposes of development of the public utility infrastructure.	Authorized local government body (as agreed)	The contract for the purposes of development of the public utility infrastructure system
13	Investment programme monitoring.	Regulatory body of municipal entity (as agreed); Representative local government body (as agreed)	Information about fulfillment of the investment programme

Distribution of powers of local government bodies upon development, approval and implementation of the comprehensive development programme are described below by an example of municipal entity “The City of Tomsk”¹²⁵.

The Mayor of the City shall take a decision on the programme development and approve a list of powers for management of the programme implementation that shall be delegated to the structural units of the municipal entity administration or to an outside organization. The powers of the Tomsk City Duma include consideration and approval of the programme. The municipal entity administration shall deal with the competitive tender of investment projects of public utility subjects in order that expertise, implementation and monitoring of the programme shall be included by the organization into the programme.

Development of the technical brief and investment programme should be governed by Orders of the Ministry for Regional Development of the Russian Federation No.100 of 10 October 2007 “On approval of recommended practices for preparation of technical briefs for development of investment programmes of municipal development organizations” and No.99 “On approval of recommended practices for development of investment programmes of organization of public utility complex”¹²⁶.

The technical brief shall be developed based on (pursuant to Orders of the Ministry for Regional Development of the Russian Federation No. 100 of 10 October 2007):

- Urban planning complex of the Russian Federation,
- Federal Law "On the Fundamental Principles of Regulation of the Tariffs of Organization of Public Utility Complex " No.210-FZ as of 30 December 2004,
- The public utility infrastructure comprehensive development programme of municipal entity,
- Other municipal regulatory legal acts of municipal entity that determine the procedure and requirements (if any) for the development technical brief.

It is recommended that the technical brief should be developed individually for each public utility sector organization.

It is recommended that the technical brief should include:

- Objectives (target indicators¹²⁷) and tasks of development and implementation of the investment programme (it is recommended that they should be stated based on common objectives specified in the comprehensive development programme),
- Requirements for investment programme,
- Investment programme development deadlines,
- Procedure and form for submission, consideration and approval of the investment programme in the event that the appropriate municipal regulatory legal act is absent at the Municipal entity.

It is recommended that for the development of the technical brief, the local government bodies should request the needed information from the public utility sector organizations in writing indicating the list, form and deadlines for its submission.

¹²⁵ Communal infrastructure system comprehensive development programme of municipal entity “The City of Tomsk” for the period from 2007 till 2011 for the period up to 2025

¹²⁶ Developed and adopted pursuant to Federal Law "On the Fundamental Principles of Regulation of the Tariffs of Organization of Public Utility Complex" as of December 30, 2004 and RF Government’s Directive No.115 of 20 February 2004 "On adoption of regulatory acts on separate issues of public utility organizations’ tariff regulation".

¹²⁷ Main criteria for determination of the target indicators are: unambiguousness, measurability, availability, and feasibility.

In the event of the absence of the comprehensive development programme, it is recommended that the target indicators of the investment programme should be developed based on:

1 Land use planning documents including general lay-out of the municipal entity,

2 Forecast of social and economic development of the municipal entity,

3 Volumes of housing and industrial construction projects put into operation as well as characteristics of such projects that are planned for the period of the implementation of the developing investment programme :

- List of construction sites and list of buildings, structures and facilities to be connected to public utility infrastructure systems indicating the planned address,
- Permitted number of storeys and (or) maximum permitted height of each building, structure, and facility within the boundaries of construction sites,
- Maximum planned load at the point of connection of each site, building, structure, and facility by each type of provided communal resources,
- Red lines of respective territories,
- Coverage boundaries of established public and private easements,
- Planned connection deadlines for each plot, site, building, structure, and facility,

4 List and characteristics of land plots to be provided with engineering infrastructure for the purposes of connection of construction (reconstruction) projects during the period of the implementation of the developing investment programme,

5 Information on current state of the public utility infrastructure systems determined through the calculation of values of indicators at the moment of technical brief development:

- Degree of depreciation,
- Size of resource loss,
- Number and duration of breakdowns,
- Characteristics of the quality of the organizations' goods and services,

6 The information which reflects:

- Financial position of the public utility sector organization (including payables and receivables, planed and actual proceeds),
- Production programme indicators of the public utility sector organization;
- Indicators specified within the framework of federal state statistical monitoring.

The investment programme of the public utility sector organization shall be developed based on the technical brief requirements approved by head of local administration. Pursuant to the guidelines on development investment programmes of the public utility sector organizations (Order of the Ministry for Regional Development of the Russian Federation No.99 of 10 October 2007), it is recommended that investment programme should include:

- Objectives and tasks of the investment programme;
- Analysis of current position of the public utility infrastructure systems;
- Activities on construction of public utility infrastructure systems and facilities; activities targeted at improvement of technical and economic characteristics (capacity, performance, reliability, lifetime, effectiveness, reparability, service and safety requirements and other characteristics) of public utility infrastructure systems; and activities on modernization of public utility infrastructure systems;

- Volume of financial requirements for implementation of the investment programme;
- Investment programme financing plan indicating the sources of its financing; and
- Other information.

It is recommended that the investment programme must consider and interlink all possible sources of financing of its implementation. The investment programme financing sources may be as follows:

1 Equity capital of the public utility sector organization, including:

- Profit allocated to investments (profit of the public utility sector organization allocated to the investment programme implementation; financial funds received by the organizations from application of established surcharges on tariffs and tariffs for connection and allocated to immediate financing of implementation investment programme activities (excluding funds allocated to repayment and service of attracted (borrowed) funds))¹²⁸,
- Amortization charges ;

2 Attracted funds;

3 Budgetary funds;

4 Non-budgetary funds; and

5 Other sources.

The public utility sector organization shall submit the following documents to the authorized regulatory body by the 1st May of current year for consideration and approval of the investment programme and approval of surcharges on tariffs (Pursuant to the Directive of the Government of the Russian Federation No. 520 of 14 July 2008 “On the bases of price formation and the procedure for regulating tariffs, surcharges and limit indices, with regard to the activities of organization of public utility complex”):

- Application on establishment of surcharges on tariffs and tariffs for connection,
- Draft investment programme,
- Calculation of financial requirements for implementation of the investment programme with a breakdown of expenses by activities as well as with a breakdown of expenses by expenses financed for the account of surcharges on tariffs and expenses financed for the account of payment for connection,
- Calculation surcharges on tariffs and tariffs for connection by types of activities,
- Accounting and tax reporting according to the established form for 2 preceding years or for the period during which the organization was performing the regulated activities if such period is less than 2 years,
- Report on revenues occurred as a result of application of the surcharges on tariffs and tariffs for connection, and expenses for the implementation of the investment programme for 2 preceding years or for the period during which the organization was performing the regulated activities if such period is less than 2 years (by types of activities).
- And other documents set forth in the “Rules of State Regulation and Application of Tariffs for Electric and Heat Energy in the Russian Federation” (Page 103 Cl. 14- 22).

¹²⁸ It must be noted that pursuant to RF Government’s Directive No.464 of 23 July 2007, financing of investment programmes in heat supply sector shall be performed through establishment of tariffs on the basis of long-term regulatory parameters, establishment of surcharges on tariffs for heat energy, surcharges on tariffs for connection to public utility infrastructure system.

Pursuant to the Order of the Ministry for Regional Development of the Russian Federation No.99 of 10 October 2007, the local government bodies may adopt a municipal regulatory legal act which determines procedure and requirements for the investment programme development. The municipal entity of the city of Ulan-Ude (Republic of Buryatia) may serve as an example in the Siberian Federal District: “The rules of procedure for submission, consideration and approval of investment programmes of the public utility sector organizations on development of public utility infrastructure systems” are approved by Directive of the Ulan-Ude City Administration No. 224 as of 5 May 2008. Pursuant to said document, the public utility sector organization submits the following documents to the Municipal Economy Committee and Department for Tariff Regulation for consideration of project investment programme draft:

- 1 A covering letter indicating the list of provided documents,
- 2 Project investment programme draft including:
 - Investment programme passport (Table 0.1),
 - Analysis of technical state of the public utility infrastructure systems and necessity of performance of activities on construction, reconstruction and modernization of facilities,
 - Objectives and tasks of the investment programme,
 - List investment programme projects indicating the deadlines for the implementation and investment costs of facilities including:
 - Activities reconstruction and modernization of the public utility infrastructure,
 - Activities on development and new construction of the public utility infrastructure,
 - Volume of financing of the investment programme (Table 0.2), including:
 - Tariff sources of financing in the form of surcharge on tariffs for goods and services of the organizations and tariff for connection to the public utility infrastructure,
 - Amount and structure budgetary sources of financing,
 - Amount of borrowed funds attracted for financing of the investment programme,
 - Expected results from the investment programme implementation (Table 0.3),
 - Assessment social and economic influence of surcharges on tariffs on utilities cost;
 - Draft investment contract;
 - Other sections.
- 3 Calculation of surcharge on tariffs for goods and services of the public utility sector organization (Table 0.4) accompanied by substantiation of the data;
- 4 Calculation of tariff for connection to the public utility infrastructure (Table 0.5) accompanied by substantiation of the data.

After the approval of the investment programme, the local government body and the public utility sector organization shall conclude a contract in which they must include without limitation (Russian Federation Government’s Directive No.464 of 23 July 2007 “On approval of rules for financing of investment programmes of municipal utility organizations – manufacturers of goods and services in the sphere of electric and/or heat supply”):

- Schedule of receipt of funds for financing of the investment programme,
- Maximum permissible departures from amounts of received funds which shall not exceed 10 percent of amounts specified in said schedule as for respective date,

- The right of the public utility sector organization to suspend the implementation of the investment programme in the event that the maximum permissible departures have been exceeded; and procedure for such suspension of the implementation.

The REC shall be entitled to perform monitoring in relation to agreed and approved production and investment programmes.

3.3 Analysis of Financial Schemes and Mechanisms of Improvement of Commercial Attractiveness of Energy Efficiency Projects in Public Utility Sector

The main sources of financing of energy-saving and energy efficiency improvement projects may be:

1 Equity capital:

- Profit allocated to investments (including profit from established surcharges on tariffs, tariffs for connection, and tariffs established on the basis of long-term regulatory parameters),
- Amortization charges.

2 Budgetary funds:

- Subsidies, subventions,
- Soft credits,
- Budgetary investments (including in the form of subsidies and subventions)¹²⁹.

The State economic incentives in relation to energy-saving projects include the following mechanisms:

- Differential taxation,
- Accelerated depreciation.

Municipal entities shall be entitled to provide credit guarantee to attract private investments; a special guarantee fund may be established for these purposes. A revolving fund can be a possible mechanism for financing of energy efficiency improvement projects package.

3 Attracted funds:

- Bank credits and loans,
- Municipal bonds,
- Leasing,
- Credit by equipment supplier,
- Participation in investment in energy-saving projects of energy service companies (ESCO) on the basis of guaranteed-result contracts.

4 Non-budgetary funds

Pursuant to the Federal Law "On the Fundamental Principles of Tariff Regulation of Public Utility Complex Organizations" No.210-FZ as of 30 December 2004, payback of investments (financing of investment programmes) in the public utility sector shall be made by means of¹³⁰:

¹²⁹ Investment credits, acquisition of securities for state and municipal ownership, investment of budgetary funds in fixed assets of legal entities, acquisition of real estate property, machinery and other production assets for municipal ownership.

¹³⁰ Cl. 2 Art. 15

- Tariff establishment based on long-term regulatory parameters,
- Establishment of surcharges on tariffs,
- Tariffs for connection to public utility infrastructure system.

However, said tariff surcharges shall not be set in case of establishment of the tariffs using rate of return on invested capital (tariffs based on long-term regulatory parameters).

3.3.1 Equity Capital

Internal financing (self-financing) shall be provided for the account of the enterprise which plans to implement investment project. It envisages the use of equity capital — authorized (share) capital, and cash flow evolving in the course enterprise business activity: net profit and amortization charges, damage indemnification, immobilized surplus of fixed and current assets, intangible assets and others. At the same time, the formation of funds intended for the Investment Project implementation must be strictly goal-oriented which shall be achieved, in particular, by the provision of independent budget of the Investment Project.

3.3.2 Budgetary Financing

Budgetary financing of investments is the provision of funds from the State Budget to legal entities for the purposes of investment.

Direct budgetary support may be provided in the form of guarantees or budgetary investments and budgetary credits. Budgetary allocations have limited sizes and apply mainly in relation to the State-owned enterprises and organizations that are of strategic importance. ‘Budgetary investments’ mean the participation of the State in the organization’s capital. ‘Budget credits’ (provided on a repayment basis) mean the tool of the State incentives for capital investment.

Budgetary financing is a conventional source of investments in the public utility sector.

Upon implementation of energy efficiency improvement project, direct budgetary financing and joint financing with the attraction of private investments may be provided for the public utility sector. Provision of budgetary funds may be provided for the account of current budget revenues and for the account of budgetary borrowings. At the same time, the amount of funds that can be attracted by the municipality (for the account of bonds emission, attracted credits of commercial banks) is limited because pursuant to the Budget Code of the Russian Federation, a maximum amount of municipal debt must not exceed the amount of revenues without account taken of financial assistance from budgets of other levels of the budgetary system of the Russian Federation. Besides, the emission of municipal bonds shall be reasonable only in the event that the size of the municipal entity is significant enough to attract investors for financing of its projects.

Establishment of an energy-saving revolving fund is one of the mechanisms for accumulation of funds for the implementation of energy-saving and energy efficiency improvement projects.

Energy-saving revolving fund

The essence of this mechanism is that after the implementation of the energy-saving project, the municipal entity administration begins to receive energy costs savings. The savings are accumulated on a separate account and then they are allocated for financing of further energy-saving projects thereby improving the effectiveness of invested funds. We must note that all energy consuming subjects must be equipped by accounting meters in order that said mechanism can be implemented.

The municipality may establish its own revolving fund or announce about its intention to participate in existing revolving fund the owners of which may be most different structures such as a private company, a non-commercial organization or an agency of State administration. Often, revolving funds also have an operating body to perform management of the project financed for the account of revolving fund. If the municipality attracts borrowed funds from the revolving fund established by another structure,

the municipality may act as a direct borrower provided that it implements the project independently, or it may appoint the contractor (e.g. ESCO) to attract the borrowings and implement the project. If the municipality decides to establish its own energy efficiency revolving fund it should take into consideration the particularities of local legislation which governs the establishment of revolving funds with different banks [35].

A certain experience of establishment of energy-saving revolving funds has been accumulated in the Russian Federation by now. Within the framework of the project “Cost Effective Energy Efficiency Measures in the Russian Educational Sector” (United Nations Development Programme /Global Ecology Fund), pilot projects for establishment of energy-saving revolving funds have been implemented in four regions and cities of the Russian Federation: Petrozavodsk, Archangelsk, Murmansk and Tver [36].

The experience of application of this method of financing of the energy-saving projects has shown that the following advantages are achieved when using it [37]:

- An additional source of financing of energy-saving projects has been created;
- The process of implementation of long-term energy-saving programmes has been accelerated; and
- An opportunity of attraction of investors has been appeared.

Tax privileges

Pursuant to the Tax Code of the Russian Federation¹³¹, an enterprise shall have the right to apply special depreciation coefficient (which shall not be higher than 3) to the depreciated fixed assets that are the subject of a leasing contract.

As it has been mentioned before, the new law “On Energy Saving and Improvement of Energy Efficiency” has made amendments to the Tax Code that envisages the provision of investment tax credits and accelerated depreciation upon implementation of energy efficiency project:

- 1 An investment tax credit may be granted to an organization if said organization makes¹³²:
 - Improvement of energy efficiency of production of goods, works, and rendering services,
 - Investments in creation of projects having the highest class of energy efficiency, including multifamily buildings, and (or) relating to renewable sources of energy, and (or) relating to facilities for production of heat energy, electric energy that have efficiency factor of more than 57 percent.
- 2 Taxpayers shall have the right to apply to the basic depreciation norm a special coefficient which shall not be higher than 2 with respect to the fixed assets relating to the projects that have a high, energy efficiency¹³³.

3.3.3 Attracted Funds

Credits of commercial banks

Analysis of the situation in Tomsk Region has shown that 10 commercial banks provide enterprises with credits for the purposes of replenishment of current assets and investment in fixed assets (Appendix 6. Credit Terms Offered by Tomsk-Based Banks

¹³¹ Cl. 2 Art. 259.3 Ch. 25 of the Tax Code of the Russian Federation

¹³² Art. 67 Ch. 9

¹³³,Art. 259.3 Ch. 25

Table 0.1). It must be noted that because of the frequent turnover of public utility operators in municipal entities, banks are very cautious about private enterprises-lessees of municipal property and about municipal unitary enterprises in particular.

To attract private investments, municipal entity may provide credit guarantees to private investors; in particular, upon implementation of investment projects by the public utility sector organizations with attraction of commercial banks' credits. For this purpose, special guaranty funds may be established that are formed for the account of budgetary funds and funds of private investors. Altai Krai and Novosibirsk Region may serve as an example:

- Altai Krai Law “On energy saving, improvement of effectiveness of use of fuel and energy resources in Altai Krai” No.1-ZS as of 4 January 2001 as amended on 10 June 2009 sets forth participation of the Altai Krai Administration in provision budgetary guaranties of repayment of investments with respect to energy contracts concluded within the framework of energy-saving programmes.
- Resolution has been taken in Novosibirsk Region (Directive No.351-pa of 28 September 2009) about establishment of Modernization Fund and of development housing and the public utility sector of Novosibirsk Region municipal entities¹³⁴. Resources of the Fund will be allocated for the compensation of part of the costs of entities and local government bodies for construction, reconstruction and modernization engineering utilities and critical infrastructure; provision of financial guaranties upon credit financing of housing and the public utility sector entities by banks that implement project of development of housing and the public utility sector; for partial subsidy of interest rates on bank credits received by the entities of housing and the public utility sector; and for implementation of advanced energy-saving technologies.

Russian Sustainable Energy Financing Facility (RUSEFF) ¹³⁵ is a programme developed by the European Bank for Reconstruction and Development (EBRD) on improvement of efficiency and renewable sources of energy.

Credit lines provided by the EBRD to the local partner banks participating in the RUSEFF are intended to issue credits to industrial and other commercial enterprises of private sector that are willing to implement investment projects on improvement of energy efficiency and use of renewable sources of energy at their production enterprises. Each partner bank shall propose its own credit conditions for each project and client that mainly depend on market interest rates, size of project, financial sustainability of the company, collateral for obligations etc.

Promsvyazbank has been the first Russian bank participating in the programme targeted at the projects that improve the effectiveness of energy use in the territory of the Russian Federation. In the territory of the Siberian Federal District, the Bank Branches are represented in the cities of Tomsk, Novosibirsk, and Omsk.

Basic programme requirements:

- Eligible borrowers are private companies or other legal entities (not more than 49 percent state-owned) operating in the Russian Federation.
- Financed projects should save more than 10 per cent of energy (aggregate or gross average rate).
- Minimum internal rate of return (IRR) calculated on the basis of expected savings of energy resources must not exceed 10 percent.

¹³⁴ The Fund's property shall be formed for the account of the Novosibirsk Region budgetary funds, properties and assets that are in ownership of Novosibirsk Region, voluntary contributions of legal entities and natural persons and other sources in accordance with the Russian Federation laws.

¹³⁵ Year of programme launch: 2009; total investment volume: 300 million US dollars.

- Investments directed to improvement of energy efficiency, must be used, first of all, for the replacement of energy consuming equipment of production facilities. Investments in new industrial sites shall not be considered by RUSEFF.

Credit conditions:

- Each borrower/project may be eligible for up to US\$ 6.5 million and 500 thousand US dollars of total credit from EBRD funds,
- Interest rate shall be a Libor interest rate (which is 0.393 per cent as of 01.03.2010) plus 10 percent annual interest,
- Commission for organization of financing shall be 1.5 per cent (in a lump sum by advance payment),
- Credit period shall be up to 5 years,
- Repayment by semi-annual installments,
- Deferment of repayment up to 2 years,
- Borrower's own participation shall be 30 per cent of the total project (already incurred expenses are considered).

Programme advantage:

- Long-term credit,
- Grace period before beginning of repayment of principal debt,
- Beneficial competitive cost of financing,
- Provision of expert consulting,
- Improvement of technical solutions quality.

The EBRD provides funds for the financing of major projects in private sector. Cost volumes of projects in private sector are from 5 million to 250 million Euros, an average volume is 25 million Euros.

In addition, the EBRD provides support for the financial intermediaries such as local commercial banks, microfinancing banks, equity funds and leasing companies.

In 2008, the EBRD financed 69 projects for total amount of 1.89 billion Euros in the Russian Federation, of which for establishment of infrastructure and energy facilities - 777 million Euros.

Issuance of municipal bonds

Municipal entities may attract the funds of private of investors for financing projects in the public utility sector. However, issuance of municipal bonds requires a long-term and expensive preparatory work which consists in analysis and positioning of financial resources of the municipality and the implementation of credit rating procedure by an international rating agency. The municipality has also to determine the parameters of emission of bonds and prepare an investment memorandum. The bond financing is beneficial in the event that tax privileges or tax exemptions can be obtained in relation to revenues from placement of the bonds. Usually, interest on bonds is paid out semi-annually; interest on short-term bonds is paid out prior to maturity date of the bonds, interest on long-term bonds is paid out as part of annual payments for the account of repayment of principal sum of debt. Disadvantage of financing of municipal energy efficiency projects using the issuance of bonds is that the economic effect from project is achieved after a lapse of time; usually during 5-10 years, repayment of principal sum of debt must be made in a lump sum when they are due for redemption. This may cause problems for the municipalities with respect to formation of cash sources if the bonds redemption date does not correlate with the moment of receipt of financial economy from the implementation of the energy efficiency

improvement project. Similar forms of the issuance of debt obligations are participation certificates or lease buy-back agreement; however, few of municipalities may have advantage of these alternatives. [35].

Finance Lease (Leasing)

Leasing means a complex of economic and legal relationships, emerging in connection with implementation the leasing agreement including purchase of the subject of leasing (Federal Law “On Finance Lease (Leasing)” No.164-FZ as of 29 October 1998).

Legal regulation of leasing performed pursuant to:

- The Civil Code of the Russian Federation (Part 1),
- The Civil Code of the Russian Federation (Part 2),
- Federal Law “On Finance Lease (Leasing)” No.164-FZ as of 29 October 1998,
- The Tax Code of the Russian Federation, Part 2 (with respect to taxation of parties to a leasing contract).

Lessor and lessee shall conclude a leasing agreement pursuant to which the lessor shall undertake to purchase the leasing subject from the seller according to purchase and sale contract with its further transfer to the lessee for temporary possession and with an opportunity of further repurchase.

Some Articles of Federal Law “On Finance Lease (Leasing)” No.164-FZ as of 29 October 1998 are provided below:

- The leasing subject transferred to the possession and use of the lessee remains the property of the lessor¹³⁶.
- Under a leasing agreement, the lessee shall be obligated as follows¹³⁷:
 - To accept the leasing subject according to procedure set forth in said leasing agreement,
 - To pay the lessor the leasing payments according to procedure and terms set forth in the leasing agreement,
 - Upon expiration of the effective term of the leasing agreement, to return the leasing subject except as otherwise provided in said leasing agreement or to acquire the leasing subject into ownership pursuant to a purchase and sale contract.
- The lessee shall at its expense perform maintenance service of the leasing subject and provide safe-keeping thereof as well as medium and current repairs of the leasing subject except as otherwise provided¹³⁸.
- Upon termination of the leasing agreement the lessee shall return to the lessor the leasing subject in the same condition in which it received it with due account taken of normal wear and tear or such wear and tear as stipulated by the leasing agreement¹³⁹.
- It may be stipulated in the leasing agreement that the leasing subject shall be transferred to the ownership of the lessee upon termination of the leasing agreement or prior to it under terms specified by agreement of the parties¹⁴⁰.

¹³⁶ Cl. 1 Art. 11 of Federal Law “On Finance Lease (Leasing)” No.164-FZ as of 29 October 1998

¹³⁷ Cl. 5 Art. 15

¹³⁸ Cl. 3 Art. 17

¹³⁹ Cl. 4 Art. 17 of Federal Law “On Finance Lease (Leasing)” No.164-FZ as of 29 October 1998

¹⁴⁰ Cl. 1 Art.19

- Leasing payments shall be understood to mean the total amount of payments in accordance with the leasing agreement covered by the effective term of the agreement, which shall comprise reimbursement of the lessor's expenses incurred in connection with the purchase and transfer of the leasing subject to the lessee, reimbursement of expenses incurred in connection with other services specified in the leasing agreement, and the lessor's income. In the event that transfer of right of ownership for the leasing subject to the lessee is set forth in the leasing agreement, the total sum of the leasing agreement may include the repurchase price of the leasing subject¹⁴¹.

When performing the leasing operations, leasing payments shall be increased for the amount of Value Added Tax at the appropriate rate pursuant to the following provisions.

Upon transfer of the leasing subject to the lessee by the lessor, the rendering of a fee-based service occurs (Articles 4 of Federal Law "On Finance Lease (Leasing)" No.164-FZ as of 29 October 1998 sets forth that the lessor shall be an individual or legal entity which shall, using borrowed funds or funds of its own, acquire property into its ownership in the course of performance of a Lease Agreement and make it available to the lessee as the leasing subject for a certain fee, for a certain term and on certain conditions for temporary possession and use with or without subsequent transfer to the lessee of the right of ownership to the subject matter of leasing) which is subject of taxation pursuant to the Tax Code of the Russian Federation¹⁴².

Payment of said services shall be made by the lessee in the form of leasing payments the amount of which (without inclusion of the tax in them) shall be the tax base pursuant to the Tax Code of the Russian Federation¹⁴³.

In terms of formation of the profit tax, a leasing payment shall be regarded as other outlays; hence, it reduces the taxable profit¹⁴⁴.

Pursuant to the Tax Code of the Russian Federation¹⁴⁵, when defining the tax base for profit tax, the outlays on the acquisition and (or) on the creation of the depreciated property shall not be recorded for the purpose of taxation.

For the purpose of taxation of profit, the lessee's outlays in the form of leasing subject repurchase prices paid upon transfer of the right of ownership for the leasing subject to the lessee are deemed to be the outlays on the acquisition of the depreciated property and based on the foregoing¹⁴⁶ shall not be recorded for the purpose tax base computation with respect to profit tax.

The property transferred in accordance with the leasing agreement pursuant to the Federal Law "On Finance Lease (Leasing)" No.164-FZ as of 29 October 1998: ¹⁴⁷ may be shown either on lessee's or on lessor's balance-sheet. Consequently, the party on which balance the property is shown shall bear responsibility to pay the tax.

The list of leasing companies running their business in the territory of the Siberian Federal District is provided in Appendix 7.

¹⁴¹ Cl. 1 Art. 28

¹⁴² Cl. 1 Art. 146 of the Tax Code of the Russian Federation

¹⁴³ Cl. 2 Art. 153 and Cl. 1 Art. 154

¹⁴⁴ Subcl. 10 Cl. 1 Art. 264 of the Tax Code of the Russian Federation

¹⁴⁵ Cl. 5 Art. 270 of the Tax Code of the Russian Federation

¹⁴⁶ Cl. 5 Art. 270 of the Tax Code of the Russian Federation

¹⁴⁷ Cl. 1, Art. 31 of Federal Law "On Finance Lease (Leasing)" No.164-FZ as of 29 October 1998

Credit for acquisition of equipment

Supplier sells equipment public to utility sector organizations in combination with the credit provide on a repayment basis. The credit is provided on security of acquired equipment. Credit period are agreed between the municipality and the supplier; however, usually, such credits are short-term credit.

Usually, in the countries of the Commonwealth of Independent States, the mechanism of credit issuance by supplier when it is used by the municipality envisages the participation of four parties: creditor, sponsor, borrower and guarantor. A manufacturer of energy efficient equipment acts as a creditor; it may be either a domestic or a foreign one. The supplier's credit envisages, as a rule, the beneficial rates of financing, and the cost of credit attraction is relatively low. A private national company may be the sponsor which has a participating interest in the project. The sponsor develops the project, holds negotiations on conclusion of agreements and contracts, arranges financing and accomplishes other tasks associated with the project development.

The sponsor may have an agreement with the supplier of the equipment about joint provision of financing, and it may render assistance to the supplier through offering to the clients the credits for the purchase of equipment or an opportunity of equipment leasing under specific credit conditions acceptable for the borrower. A municipality acts as a borrower which buys energy efficient equipment. In some cases, when the municipality needs a guarantee for the credit, the fourth party participate in this relationship – the guarantor. The guarantor (e.g., a local commercial bank or city council) joins by request of the supplier or sponsor of the projects in order to secure the credit [35].

Energy service contract

The new Federal Law “On Energy Saving and Improvement of Energy Efficiency” No. 261-FZ as of 23 November 2009 has set forth the basic principles¹⁴⁸ for the regulation energy performance contract (energy service contracts) in the Russian Federation. By present time, an experience of implementation of such contracts has been absent in the Russian Federation. The types of ESCO have been provided in Section 2.2.

3.3.4 Specialized Funds, Credits of International Financial Institutions

Investment Fund of the Russian Federation

Pursuant to the Federal Law “On Energy Saving and Improvement of Energy Efficiency”¹⁴⁹, the Russian Federation shall be entitled to perform co-financing (in the form of subsidies) of expenditure obligations of the Russian Federation subjects, municipal entities in the field of energy-saving and improvement of energy efficiency.

In the end of 2005, the Investment Fund of the Russian Federation was established which, the Budget Code of the Russian Federation¹⁵⁰ is a part of federal budget funds which is subject to use for the purposes of implementation of investment projects performed on the principles of private-public partnership.

The Directive of the Government of the Russian Federation of 1 March 2008 No.134 has approved “Rules for the Formation and Use of Budgetary Allocations of the Investment Fund of the Russian Federation”. Budgetary allocations of the Fund may be provided for the of regional investment projects targeted at social and economic development of the Russian Federation subjects with respect to

¹⁴⁸ Basic principles are provided above in Chapter 1.1.2.2 page 12.

¹⁴⁹ Cl. 3 Art. 27 of Federal Law “On Energy Saving and Improvement of Energy Efficiency”

¹⁵⁰ Art. 179.2 Ch. 20 of the Budget Code of the Russian Federation

establishment and (or) development state-owned and (or) municipal owned transport, public utility and energy infrastructure facilities of¹⁵¹, while:

- Responsible performers of the regional investment projects shall be the supreme bodies of executive power of the Russian Federation subjects or a municipal entity executive-administrative body,
- Budgetary allocations of the Fund shall be provided under condition that the share of financing of the regional Investment Project on the part of investors shall comprise not less than 50 % of the project cost,
- Remaining unused amount of the budgetary allocation of the Fund for the regional investment projects implementation is subject to use in the subsequent financial year.

Selection of the projects is made based on the following criteria¹⁵²:

- There must be an investor which confirmed its readiness for the participation in the project,
- The task to be accomplished upon the project implementation must be in compliance with the aims of social and economic development of the Russian Federation, in case of the regional Investment Project the task must be in compliance with the strategy of the subject of the Russian Federation,
- Positive social effects associated with the project implementation must be achieved,
- Impossibility of the project implementation without budgetary allocations of the Fund must be well-grounded,
- In order to obtain budgetary allocations of the Fund, the cost of the projects (comprehensive investment projects) must be at least 5 billion rubles and at least 500 million rubles for the regional Investment Project.

Below are some projects, in relation to which the decision on provision of resources of the Investment Fund of the Russian Federation was taken on 1 October 2009 (total: 18 projects):

- Comprehensive Development of the Lower Angara region (2006-2015),
- Development of project design documentation for the implementation of the Investment Project “Comprehensive Development of South Yakutia” (2008-2010),
- Construction of Kurgan TPP-2 (2008-2010).

However, most of the projects implemented with support of the Fund resources are road construction.

In 2008, the Directive of the Government of the Russian Federation No. 608 approved the rules of grant provision to the subjects of the Russian Federation for facilitating the achievement and (or) encouragement of the achievement of the best values of indicators of activities of executive power bodies of the Russian Federation subjects. A grant amount shall be determined through the calculation formulas specified in this Directive.

¹⁵¹ Chapter 10 of the Budget Code of the Russian Federation

¹⁵² Chapter 10 of the Budget Code of the Russian Federation

Programme of development of municipal entities in the territory of the Russian Federation¹⁵³

The Fund for Sustainable Development¹⁵⁴ (hereafter - FSD) is an independent non-government and non-commercial Russian fund established for facilitating sustainable development of territories and local communities through implementation of specific projects dedicated to solution of ecological, social and economic issues of municipal entities in the entire territory of the Russian Federation (small grants from 20 to 40 thousand US dollars may be provided). Within the Fund's framework, a municipal entities development support programme of municipal entities development is being implemented in the territory The Russian Federation (hereafter – MED programme), the programme is financed by the U.S. Agency for International Development (hereafter – USAID)¹⁵⁵. The key tasks of the MED programme include the development, implementation of energy and resource saving tools, as well as the mechanisms enabling the local communities to re-invest the saved funds in the development programmes. Thanks to the programme implementation, the resources saved for the account of the energy-saving funds are re-invested into social programmes, as well as into education and information campaigns for the population in the field of local government. Among the projects implemented within the framework of the MED programme:

- Complex of projects “From Energy Saving to Solution of Social Issues of the City” – performance of energy-saving activities and accomplishment of the task decision health care issues of children in the kindergartens of the city (the City of Shelekhov, Irkutsk Region, 2008-2009). The amount of provided funds is 36.6 thousand US dollars, recipient's contribution -13.8 thousand US dollars, budget – 50.4 thousand US dollars.
- Project “From Energy Saving to Improvement of Condition in the municipal entity TB dispensary in urban settlement Selenginskoye (Republic of Buryatia) – improvement of patients' health care conditions and quality of anti-tuberculosis care of the population (2009). The amount of provided funds is 19.98 thousand US dollars, recipient's contribution – 5.59 thousand US dollars, budget – 25.57 thousand US dollars.
- Project “Modernization of Heat Supply System in the Kindergarten of the city of Svirsk, Irkutsk Region for Children with Tuberculosis Intoxication and Fading Forms of Tuberculosis” (2009). The amount of provided funds is 17.99 thousand US dollars, recipient's contribution – 11.59 thousand US dollars, budget – 29.58 thousand US dollars.

Project “Reform in Housing and The public utility sector in the Russian Federation”¹⁵⁶

Under the project framework, the International Bank for Reconstruction and Development provides the Russian Federation with a credit in the amount of 200 million US dollars for 15 years for the purposes of facilitating the Russian Federation reform in the housing and the public utility sector (Federal Law “On the Federal Budget for 2009 and the Plan Period 2010 and 2011” No.308-FZ 2 December 2009). A five-year grace period is envisaged according to credit conditions.

The purpose of the project is improvement of effectiveness, quality of services and financial sustainability of housing and the public utility sector enterprises in pilot municipal entities selected on a competitive basis.

Under the project framework, reform of institutional links in the entire housing and the public utility sector - from of housing management and maintenance enterprises to enterprises that provide public

¹⁵³ Implemented by the Fund for Sustainable Development jointly with the U.S. Agency for International Development

¹⁵⁴ <http://www.fund-sd.ru>

¹⁵⁵ <http://russia.usaid.gov/ru>

¹⁵⁶ Housing and Communal Services Project № 4888-O-RU. The project is implemented by the International Bank for Reconstruction and Development.

utility services, as well as attraction of investments targeted for reconstruction, modernization and re-equipment of existing infrastructure.

Programme on Encouragement of Investments in Energy Saving¹⁵⁷

In 2005, the International Financial Corporation move forward with the Programme Encouragement of Investments in Energy Saving. The purpose of the Programme is to facilitate financing of energy efficiency improvement projects. The Programme consists of two parts: investment direction and counselling support (Figure 3-1).

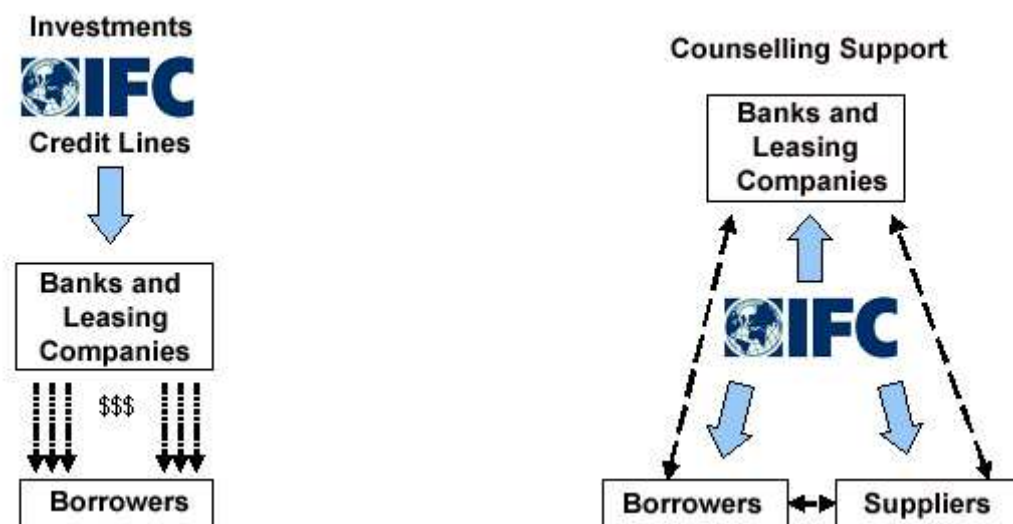


Figure 3-1 International Financial Corporation Programme on Encouragement of Investments in Energy Saving

Within the framework of investment component, the IFC provides the credit lines to banks and leasing companies that in turn finance specific projects in the field of energy saving. The amount of financing shall be determined by the financial institution, and, as a rule, it does not exceed 2 mln US dollars. Payback period of projects is up to 5 years.

Counseling support and education support include individual consulting on financial, legal and technical issues as well as practical workshops on the issues of investment in energy efficient technologies.

Brief comparative characteristics of existing energy efficiency projects financing mechanisms are provided in the end of this Section (Table 3.2).

¹⁵⁷ <http://www.ifc.org/russia/energyefficiency>. The Programme is implemented by the International Financial Corporation (IFC).

Table 3.2 Financing mechanisms of energy efficiency projects [35]

Financial mechanism	Use	Availability	Advantages	Disadvantages
Common funds of Municipal/ State budget	All types of municipal projects	Municipal/State authorities	Independence in decision-making	Funds are limited; may not be available for large-scale projects
Soft credits	They use an interest rate which is lower than a market interest rate in order to reduce the cost of attracted (borrowed) funds	Municipalities, State, banks (sometimes - under programme framework with IFOs ¹⁵⁸), credit facilities supported by international and multilateral organizations	Grace period for payment of interest Longer period of redemption	
Credits of commercial banks	They are provide by banks, credit unions and financial companies at market interest rates	Local and foreign commercial banks	May be obtained quicker than the financing tied to government or donor programmes	Expensive and inaccessible for capital-intensive projects with a long payback period
Grants	Provided by IFOs usually through local and international NGO ¹⁵⁹ , agencies of international development agencies that are responsible for the implementation	Government (central and municipal); donors (usually as part of specific facilitation development programmes); state-owned banks (for promotion of commercial financing and opening of EE financing market ¹⁶⁰)	No repayment is required. Less severe project selection criteria	May delay commercialization of EE financing
Partial guarantees for credit	Credit on security, in case of non-fulfillment of financial obligations by borrower	Special guarantee mechanism. Sovereign guarantees provided by the State.	There appears an opportunity to obtain a credit from a financial organization, which otherwise might not be available	Burdensome work on preparation of financial documentation
Performance contracts	There are enough savings from the projects that provide energy cost reduction to pay the project costs.	Contract signed between Customer and ESCO Financing may be attracted through municipality, supplier of services or through a third party.	In this case, the Customer needs no initial capital for the project financing at initial stage.	Savings for the account of the project must be shared with supplier of services. Sufficient number of accounting meters shall be required to determine the basis and to trace the savings based on comparison with the basis.

¹⁵⁸ IFOs - International Finance Organizations

¹⁵⁹ Non-government organizations

¹⁶⁰ EE – Energy Efficiency

Financial mechanism	Use	Availability	Advantages	Disadvantages
Leasing	Enables the firms to acquire assets through leasing scheme with further buy back thereof without use of credit	Private companies that wish to lease out heat supply facilities. Manufacturers and sellers of equipment that wish to enter the market.	For a period from 3 to 20 years; the equipment may start to be used immediately, and the payment for it can be made later; thus financial funds are released for other purposes.	In addition to charges for the use of the equipment, additional payments shall be charged within the framework of the leasing payment.
Municipal bonds	Attraction of internal funds by municipality for the account of issuance of bonds	Specialized investment institution	Interest payments are most likely to be tax exempt	A continuous and expensive preparatory work shall be required.
Revolving fund	Accumulates savings for the account of energy efficient projects for self-financing of future investments in other energy efficiency projects	NGO, State authorities, international donors, and municipalities	Self-sufficiency after the first capitalization	Legislative and institutional barriers hinder the accumulation of savings

3.4 Conclusions

Investment is one of the most important aspects of activities of the public utility sector subjects; it is targeted at timely upgrade and modernization of the fixed assets. Analysis of cost-effectiveness of investment projects is performed through construction of the cash flow model for the cash flows generated by the project during the analyzed period. Based on the cash flow balance determined for each step, the calculation of cost-effectiveness indicators is performed. The cost-effectiveness indicators obtained in the result of the assessment are to be compared with the indicators of other projects so that an investment decision can be taken.

The uncertainty factor must be considered upon the analysis; to do so, the analysis of project risks must be conducted enabling to analyze the impact of the changing factors of the project internal and external environments on the values of cost-effectiveness indicators.

Because of the fact that investment budget of the series of enterprises is limited upon managerial decision-making relating to the investment activity, a system approach to selection of investment solutions shall be required in which the cost-effectiveness indicators do not play a decisive role but they are a tool enabling to compare potential economic benefits from one project or another.

The public utility sector organizations shall develop and implement a production programme which must include: justification of provision of forecast of output and quality of rendered services, plan of activities on improvement of organization's performance effectiveness, plan of activities on energy saving and energy efficiency improvement. The regulatory body is entitled to establish a surcharge on tariff for the organizations based on estimated financial requirements for the production programme implementation provided that said organization has provided the specified list of documents.

Within the framework of comprehensive development of public utility infrastructure systems, the public utility sector enterprises shall implement the investment programme on public utility infrastructure system development. Procedure for development and approval of the investment programme includes a set of certain actions and coordination on the part of authorized local government bodies etc.

In the Russian Federation, budgetary financing is the traditional source of financing in the heat supply sector. However, as experience shows, budgetary funds of municipal entities and own funds of public utility sector enterprises are not enough for the timely upgrade of the fixed assets. The attraction of private investments in the public utility sector will reduce the load on the budgets of municipal entities. In particular, municipal entity may provide credit guarantees for the attraction of commercial banks credits upon the implementation of energy efficiency projects.

Private financing of energy efficiency projects include: credits and loans of commercial banks and financial organizations, issuance of bonds, and leasing. Leasing is a quite spread and effective mechanism for the upgrade of the fixed assets of public utility sector enterprises. Leasing enables to allocate expenses in time when purchasing the equipment and requires no initial investments.

There is an opportunity to use the funds of international financial institutions (International Bank for Reconstruction and Development, International Financial Corporation); however, the attraction of said funds is often hindered by the necessity of passing through complicated bureaucratic procedures.

4 Analysis of Organizational and Economic Models for the Implementation of Energy Efficiency and Energy-Saving Projects in the Public Utility Sector in the Russian Federation Regions

4.1 Principles of Formation of Alternatives

Within the framework of «Strategy study on inter-fuel substitution implemented in the Kolpashevo municipality» [38], the factors have been analyzed that hinder investments in energy saving and energy efficiency in the territory of the Russian Federation, and the ways to overcome the hindrances have been proposed (Table 4.1).

Table 4.1 Factors hindering investments in energy saving and energy efficiency and ways to overcome the hindrances

No.	Hindrance	Ways to overcome the hindrances
1.	Inadequacy of the existing energy saving legal and regulative frameworks	Reformation of legal and regulatory base of energy saving
2.	Insufficient governmental support of energy saving	State support of technical re-equipment and renovation of power equipment, development and introduction of energy efficient technologies
3.	Low prices and gas quota allocation mechanism	Differentiation of natural gas prices depending on gas use efficiency and development of a secondary regional gas market model
4.	High capital intensity and low profitability of energy-saving projects	Design of schemes ensuring investments payback and profitability
5.	Low borrowing power of the public utility sector enterprises	Setting a structure capable of attracting investments in the public utility sector Implementation of investment schemes with borrowed capital (credit, leasing)
6.	Low paying capacity of public services residential consumers	Granting of privileges and subsidies to low-income consumers
7.	Scarce public awareness of the Russian Federation's economy energy efficiency characteristics and lack of energy saving immediacy consciousness	Shaping of public opinion on energy saving necessity

Many of the proposed activities to overcome the hindrances are the subject of discussion with governmental authorities preparing and approving decisions in this field; often, these activities are outside of the field of activities of the heads of municipal entities and heat supply enterprises. Within the framework of this Section, we would like to focus attention on the aspects of investment activity management of which is within the competence and powers of the heads of municipal entities and heat supply enterprises.

Such aspects include the following circumstances that directly impact the effectiveness of investment activity:

- 1 Design of schemes ensuring investments payback and profitability,
- 2 Setting a structure capable to attract investments in the public utility services sector, and

3 Implementation of investment schemes with borrowed capital (credit, leasing).

In the foregoing chapters, there has been given a detailed analysis of organizational and legal and economic aspects of functioning of the public utility enterprises separately without account taken of the whole totality of circumstance that form the cost-effectiveness of investments, which, as a rule, is most important upon investment decision-making in the market economy.

Within the framework of this Section, it seems appropriate to conduct analysis of said parameters enabling to identify advantages and disadvantages of different alternatives of the investment projects implementation. For this purpose, variants of organizational and economic models of investment projects implementation in the heat supply sector must be constructed, assessment of their cost-effectiveness and comparative analysis of economic parameters of their implementation must be conducted.

Formation of the alternatives in question is based on the following principles:

1 Forms of organization of legal relations of entities with regard to the fixed assets of the public utility sector:

- Ownership,
- Right of economic management,
- Right of operative management,
- Lease,
- Concession.

2 Investment financing schemes:

- For the account of equity capital of the enterprise – EC,
- For the account of borrowed funds: two variants are possible – credit (C) and leasing (L).

Pursuant to the Tax Code of the Russian Federation¹⁶¹, the depreciated property received by a unitary enterprise from the owner of the property of the unitary enterprise into operative management or into economic management shall be subject to depreciation at the given unitary enterprise. Hence, the variants when the fixed assets are in the ownership on the basis of economic management and operative management are identical in terms of cash flows generation in relation to the property because the fixed assets are shown on the balance-sheet of the enterprise which implements the Investment Project; consequently, with respect to such assets, depreciation shall be accrued and property tax shall be paid.

Concession and lease are special cases of one and the same economic process when the fixed assets are transferred to economic entity for temporary possession, compensated use, consequently, generation of cash flows in case of the lease or concession is identical – the fixed assets are shown on the balance-sheet of the owner, and the subject of investment activity shall pay lease payments for the use thereof.

Thus, to form a matrix of alternatives, let us highlight two forms of arrangement of legal relations of economic entity and fixed assets:

- Fixed assets in ownership,
- Fixed assets on a leasehold basis.

Two possibilities of the enterprise's income generation are to be considered to compare cost-effectiveness and financial feasibility of different investment schemes as follows:

- For the account of tariff established by the REC based on the 5 percent return rate of production activity – (T),

¹⁶¹ Art. 256 of the Tax Code of the Russian Federation

– With addition of investment premium to the foregoing tariff – (IPr).

Based on the foregoing, the following matrix has been formed (Table 4.2).

Table 4.2 Considered alternatives of Investment Project implementation

Financing schemes	Alternative 1 - “Ownership”	Alternative 2 - “Lease Agreement”
For the account of equity capital – EC	Alternative 1 EC – T Alternative 1 EC – IPr	Alternative 2 EC – T Alternative 2 EC – IPr
For the account of credit – C	Alternative 1 C – T Alternative 1 C – IPr	Alternative 2 C – T Alternative 2 C – IPr
With assistance of leasing – L	Alternative 1 L – T Alternative 1 L – IPr	Alternative 2 L – T Alternative 2 L – IPr

4.2 Formation of Financial and Economic Parameters

Business and financial performance data of a heat supply enterprise have been used as a base for the calculations (for our purposes – let us call it Company A located in the territory of the Siberian Federal District which was connected to the gas supply network in 2009; in connection with that, it replaced the solid- and liquid fueled boiler house equipment by the natural gas-fired equipment.

Below are the basic economic and operational characteristics of the enterprise’s performance (Table 4.3).

Table 4.3 Basic economic and operational characteristics of the enterprise’s performance

Description	Measurement units	Value
Technological Characteristics		
Installed Capacity	Gcal/hr	80
Heat Production	ths Gcal/yr	120
Heat Energy Sales	ths Gcal/yr	100
Specific Power Consumption	kW-h/Gcal	20.49
Natural Gas Consumption	ths cubic m	20 000
Natural Gas Price	US dollars/ths cubic m	102.5
Expenses		
Fuel for Production Needs	ths US dollars	1 763,8
Materials	-/-	180.5
Production Works and Services	-/-	534.9
Energy for production needs	-/-	209.7
Labor Compensation Fund (operating personnel)	-/-	258.8
Other Shop Costs	-/-	172.3
General Business Expenses	-/-	432.3

4.2.1 Assessment of Capital Investments

According to information provided by Company A, the Capital investments required for replacement of boiler houses equipment to use natural gas are estimated in the amount of 7.5 million US dollars, costs for Construction and Installation Works (CIW) and Commissioning and Start up Works (CW) – 1.7 million US dollars excluding VAT; thus, total Capital investments will amount to 9.2 million US dollars excluding VAT.

In the event that the project implementation by the leasing scheme, Company A must pay 30 per cent of the equipment cost and full costs for CIW and CW for the account of its own funds; hence, the Capital investments provided for the account of own funds will amount to 3.95 million US dollars.

In case of attracted credit, Company A must pay 30 percent of the total Capital investments for the account of its own funds – 2.76 million US dollars.

4.2.2 Formation of Project Operating Expenses

In Table 4.3 above, production and general business expenses of the enterprise have been displayed, i.e. expenses dependent on technological parameters of its performance that are taken as identical for all alternatives under our study. However, some costs of the enterprise such as amount of rental and leasing payments, size of property tax etc. under our study are variable parameters depending on organizational and economic characteristics of the analyzed alternatives. Below are the cost items which have variable values depending on the alternatives:

- Lease payments,
- Amortization charges ,
- Leasing payments,
- Payments for the ease of credit (repayment of the principle sum of debt and interest)
- Property tax,
- Profit tax.

Principles of formation of each of the foregoing cost items and their values by alternatives are provided below.

Lease payments

An obligation to pay lease payments for the lease of assets of the public utility sector occurs in all subalternatives of Alternative 2 and amounts to 162 thousand US dollars (an indicator of financial and economic activity of Company A is used).

The form of organization of legal relations of entities and municipal power in relation to the assets of the public utility sector in the form of lease is used quite often in the Russian Federation.

The contract model in the Russian Federation envisages long-term lease contracts with investment obligations (additionally, an investment agreement to lease contract shall be concluded). Within the framework of investment agreement in the lease scheme:

- Amount of financial funds that investor must invest shall be specified,
- Facilities that investor must modernize shall be specified,
- Investment repayment schemes shall be determined.

Because of the fact that the assets transferred by the lessee require replacement, reconstruction and modernization, the lessor (as a rule, a municipal entity) does not pursue the objective of gaining profit from the lease contract upon determining the amount of lease payments, the main purpose of such relations is to attract funds for the organization of technical upgrading of public utility sector facilities. It is this scheme that is considered within the framework of this study.

Amortization charges

In accordance with the classification of the fixed assets included in amortization groups [39], capital equipment of boiler houses is the heating boilers that are included in the fifth group with useful life from 7 through 10 years. For the purpose of this study, the useful life of capital equipment is taken as 7 years; hence, annual amortization charge rate calculated by the straight-line method is taken to be 14 per cent excluding cases with leasing.

Pursuant to the Tax Code of the Russian Federation¹⁶² it is allowed to apply a multiplying factor with respect to the property which is the subject of leasing. For the purpose of this study, multiplying factor is taken as equal to 1.49 for the leasing variant; hence, amortization charge rate is taken as equal to 21.3 per cent.

Depreciation of fixed assets is made by the enterprise on which balance-sheet the fixed assets are shown, the only exception from considered alternatives are leasing alternatives.

Thus, the size of amortization charges will amount to 1,311.4 thousand US dollars for all alternatives except leasing (Alternative 1 EC – T, Alternative 1 EC – Ipr, Alternative 1 C – T, Alternative 1 C – Ipr, Alternative 2 EC – T, Alternative 2 EC – IPr, Alternative 2 C – T, Alternative 2 C – Ipr).

The fixed assets in the alternatives with leasing shall be shown on the balance-sheet of the lessor; as for the lessee – Company A, only expenses for CIW and CW are subject to depreciation; hence, the size of amortization charges will amount to 364.7 thousand US dollars for leasing alternatives.

Leasing payments

Pursuant to the considered scheme, the term of the leasing contract is 5 years, the size of payments including advance payment amounts to 1.8 million US dollars (excluding VAT).

Payments for use of credit

Tomsk Branch of Promsvyazbank¹⁶³ provides credits for energy efficiency projects in the Russian Federation under the Sustainable Energy Finance Programme developed by the European Bank for Reconstruction and Development.

Credit conditions are as follows:

- Credit amount shall be up to US\$ 6.5 million US dollars,
- Interest rate shall be 10 percent annual interest plus Libor (it is 0.393 per cent as of 01.03.2010),
- Commission for the organization of financing shall be 1.5 per cent (in a lump sum by advance payment),
- Credit period shall be up to 5 years,
- Repayment by semi-annual installments,
- Borrower's own participation shall be 30 percent of the total project.

We consider that within the framework of this alternative, the financing of the project is performed as follows:

- 30 per cent - Equity Capital (2.7 million US dollars),
- 70 per cent - borrowed funds (6.4 million mln US dollars),
- Interest rate – 10,393 per cent, credit period – 5 years.

Thus, the size of annual credit payments will amount to 1.9 million US dollars.

¹⁶² Cl. 2 Art. 259.3 of the Tax Code of the Russian Federation

¹⁶³ Promsvyazbank Branches also operate in Siberian Federal District in the cities of Barnaul, Irkutsk, Novosibirsk, Tomsk, and Ulan-Ude.

Tax outlays

The entities' activities are subject to taxation as follows:

- VAT – at a rate of 18 per cent from the sales volume of goods and services ¹⁶⁴,
- Profit tax – at a rate of 20 per cent from taxable profit¹⁶⁵,
- Property tax of organizations – at a rate of 2.2 per cent from annual average value of taxable property¹⁶⁶.

Pursuant to Tomsk Region Law “On provision of additional tax privileges to organizations performing investment activities in the territory of Tomsk Region” No.30-OZ as of 30 March 2003¹⁶⁷ the entities performing investment activities shall be exempted from tax on property put into operation under the Investment Project in the amount of 50 per cent of the tax sum. The property tax privilege shall be granted for the organizations for 5 years.

Thus, during the first 5 years the property tax is taken in the calculations as equal to 1.1 per cent.

4.2.3 Generation of Project Incomes

As it has been mentioned above, the generation of incomes of Company A is performed for the account of sales of heat energy to consumers; with this regard, two variants are possible:

- For the account of tariff established by the REC based on the 5 per cent return rate of production activity – (T),
- With addition of investment premium to the foregoing tariff– (IPr)

With this regard, in the cases of the model constructed for the purpose of this study, an assumption has been made that when forming the tariff by the cost plus method it is the **investment component of the project** which is not supposed to be reimbursed, i.e. the period of repayment of the investments and their yield are outside of the field of interest of the regulatory bodies. This approach has been directed by the analysis of a series of similar cases; in particular, the similar situation took place in Kolpashevo municipal entity when implementing the project re-equipment of municipal boiler houses for the use of natural gas [38]

The size of investment premium for each alternatives has been calculated on the basis that Company A will achieve the rate of return on **Equity Capital** (IRR) equal to 12 percent for the period of the project implementation equal to 6 years (selection of the rate of return and the period is based on the average ones for the industry).

4.3 Assessment of Cost-Effectiveness of Alternatives

Assessment of investment effectiveness of the alternatives in question has been performed in accordance with the “Recommended Practices of Assessment of Investment Projects Effectiveness”, basic principles and provisions of which have been presented within the framework of Section 3.1

Project Life Cycle is taken as 8 years (period of useful life of the capital equipment starting from the moment of construction commencement) for all the discussed alternatives. Calculation step: 1 year.

¹⁶⁴ Art. 164 Ch. 21 of the Tax Code of the Russian Federation. Pursuant to the Temporary Methodological Guidelines on defining commercial effectiveness of new machinery in OAO Gazprom, the project cash flows are accounted excluding VAT.

¹⁶⁵ Art. 284 Ch. 25 of the Tax Code of the Russian Federation

¹⁶⁶ Art. 380 Ch. 30 of the Tax Code of the Russian Federation

¹⁶⁷ Cl. 2 Art.3

The discount rate is taken as equal to 5 percent.

The calculation of the project cost-effectiveness has been conducted based on the assumption that prices (as well as expenses and incomes) do not change during the entire Project Life Cycle, all prices are nominated in US dollars and indicated excluding VAT.

Generated cash flows with respect to the alternatives and results of made calculations are provided below.

Current cost including taxes as a part of cost		26,8	0,9	3,7	3,7	3,7	3,7	3,7	3,7	3,7
Amortization charges	14,3%	9,2	0,3	1,3	1,3	1,3	1,3	1,3	1,3	1,0
COST		36,0	1,2	5,0	5,0	5,0	5,0	5,0	5,0	4,6
PRETAX PROFIT		2,5	0,1	0,3	0,3	0,3	0,3	0,3	0,3	0,7
Profit tax	20%	0,5	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1
NET PROFIT		2,0	0,1	0,2	0,2	0,2	0,2	0,3	0,2	0,5
Operating activity, mln US dollars										
Sales proceeds		38,4	1,3	5,3	5,3	5,3	5,3	5,3	5,3	5,3
TOTAL INFLOW		38,4	1,3	5,3	5,3	5,3	5,3	5,3	5,3	5,3
Current cost including taxes as a part of cost, including:		26,8	0,9	3,7	3,7	3,7	3,7	3,7	3,7	3,7
Taxes		0,5	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1
TOTAL OUTFLOW		27,3	0,9	3,8	3,8	3,8	3,8	3,7	3,7	3,8
CASH FLOW from operating activity		11,1	0,4	1,5	1,5	1,5	1,5	1,6	1,6	1,5
Investment activity, mln US dollars										
Cash inflows		0,0	0							
Cash outflows		9,8	9,3	0,5	0,0	0,0	0,0	0,0	0,0	0,0
- Capital investments		9,2	9,2							
- Working capital gain		0,7	0,2	0,5	0,0	0,0	0,0	0,0	0,0	0,0
CASH FLOW from investment activity		-9,8	-9,3	-0,5	0,0	0,0	0,0	0,0	0,0	0,0
PROJECT CASH FLOW		2,0	-8,9	1,0	1,5	1,5	1,5	1,6	1,6	2,2
COMMERCIAL EFFECTIVENESS ASSESSMENT (indicators)										
Cash flow, mln US dollars			-8,9	1,0	1,5	1,5	1,5	1,6	1,6	2,2
Cumulative cash flow, NI, mln US dollars		2,0	-8,9	-7,9	-6,4	-4,8	-3,3	-1,7	-0,2	2,0
Non-discounted payback period , years		8								
Discount factor	5%		1,0	1,0	0,9	0,9	0,8	0,8	0,7	0,7
Discounted cash flow, mln US dollars			-8,9	1,0	1,4	1,3	1,3	1,2	1,2	1,5
Discounted cash flow n.i.			-8,9	-8,0	-6,6	-5,2	-4,0	-2,8	-1,6	-0,1
Integral effect, NPV, mln US dollars		-0,05								
Discounted payback period , years		>8								
Internal Rate of Return (IRR)		4,9%								

Current cost including taxes as a part of cost		26,8	0,9	3,7	3,7	3,7	3,7	3,7	3,7	3,7
Amortization charges	14,3%	9,2	0,3	1,3	1,3	1,3	1,3	1,3	1,3	1,0
COST		36,0	1,2	5,0	5,0	5,0	5,0	5,0	5,0	4,6
PRETAX PROFIT		9,0	0,3	1,2	1,2	1,2	1,2	1,2	1,2	1,6
Profit tax	20%	1,8	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,3
NET PROFIT		7,2	0,3	0,9	0,9	0,9	1,0	1,0	1,0	1,3
Operating activity, mln US dollars										
Sales proceeds		45,0	1,6	6,2	6,2	6,2	6,2	6,2	6,2	6,2
TOTAL INFLOW		45,0	1,6	6,2	6,2	6,2	6,2	6,2	6,2	6,2
Current cost including taxes as a part of cost , including:		26,8	0,9	3,7	3,7	3,7	3,7	3,7	3,7	3,7
Taxes		1,8	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,3
TOTAL OUTFLOW		28,6	1,0	4,0	4,0	3,9	3,9	3,9	3,9	4,0
CASH FLOW from operating activity		16,4	0,6	2,2	2,2	2,3	2,3	2,3	2,3	2,2
Investment activity, mln US dollars										
Cash inflows		0,0	0							
Cash outflows		9,9	9,3	0,6	0,0	0,0	0,0	0,0	0,0	0,0
- Capital investments		9,2	9,2							
- Working capital gain		0,8	0,2	0,6	0,0	0,0	0,0	0,0	0,0	0,0
CASH FLOW from investment activity		-9,9	-9,3	-0,6	0,0	0,0	0,0	0,0	0,0	0,0
PROJECT CASH FLOW		7,2	-8,8	1,7	2,2	2,3	2,3	2,3	2,3	3,0
COMMERCIAL EFFECTIVENESS ASSESSMENT (indicators)										
Cash flow, mln US dollars			-8,8	1,7	2,2	2,3	2,3	2,3	2,3	3,0
Cumulative cash flow, NI, mln US dollars		7,2	-8,8	-7,1	-4,9	-2,6	-0,3	1,9	4,2	7,2
Non-discounted payback period, years		6								
Discount factor	5%		1,0	1,0	0,9	0,9	0,8	0,8	0,7	0,7
Discounted cash flow, mln US dollars			-8,8	1,6	2,0	1,9	1,9	1,8	1,7	2,1
Discounted cash flow n.i.			-8,8	-7,2	-5,2	-3,2	-1,3	0,4	2,1	4,3
Integral effect, NPV, mln US dollars		4,28								
Discounted payback period, years		6								
Internal Rate of Return (IRR)		16,4%								

Table 4.6 Generation of Project Cash Flows, Alternative 1 C_T (Ownership - Credit)

№	INDICATORS		Total for 8 years	1	2	3	4	5	6	7	8
I	INPUT DATA										
a	Capital investments (mln US dollars) including:		9,2	9,2							
	- Acquisition of equipment, mln US dollars			7,5							
	- CIW and CW, mln US dollars			1,7							
b	Production output and sales volume										
	Production output , ths Gcal		870,0	30,0	120,0	120,0	120,0	120,0	120,0	120,0	120,0
	Sales volume, ths Gcal		725,0	25,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
	Tariff for heat energy (excluding VAT), US dollars/Gcal	58,0		58,0	58,0	58,0	58,0	58,0	58,0	58,0	58,0
	- Tariff	58,0									
	- IPr	0,0		0,0							
	Proceeds from heat sales, mln US dollars		42,0	1,4	5,8	5,8	5,8	5,8	5,8	5,8	5,8
c	Annual operational costs, mln US dollars		26,8	0,9	3,7	3,7	3,7	3,7	3,7	3,7	3,7
	Natural gas supply volumes, mln m3		124,7	4,3	17,2	17,2	17,2	17,2	17,2	17,2	17,2
	Power consumption, MWh		17826	614,7	2458,8	2458,8	2458,8	2458,8	2458,8	2458,8	2458,8
	- Materials, mln US dollars		1,3	0,05	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- Production works and services, mln US dollars		3,9	0,1	0,5	0,5	0,5	0,5	0,5	0,5	0,5
	- Payment for natural gas, mln US dollars		12,8	0,4	1,8	1,8	1,8	1,8	1,8	1,8	1,8
	- Electric energy for technological needs , mln US dollars		1,5	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- Payroll, mln US dollars		1,9	0,1	0,3	0,3	0,3	0,3	0,3	0,3	0,3
	- Social and insurance contributions, mln US dollars	34%	0,6	0,02	0,1	0,1	0,1	0,1	0,1	0,1	0,1
	- Other shop costs, including water for technological needs, mln US dollars		1,2	0,04	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- General business expenses(% from technological expenses), mln US dollars	11,9%	3,1	0,1	0,4	0,4	0,4	0,4	0,4	0,4	0,4
	- Taxes as a part of cost(property tax), mln US dollars	2,2%	0,4		0,09	0,08	0,06	0,05	0,04	0,04	0,01
	- Lease payments, mln US dollars										
	- Leasing payments, mln US dollars										
d	Composition and structure of plant assets										
	- Lifetime, years	7									
	- Acquisition value, mln US dollars			9,2	9,2	9,2	9,2	9,2	9,2	9,2	9,2
	- Depreciation, mln US dollars	14,3%		0,3	1,3	1,3	1,3	1,3	1,3	1,3	1,0
	- Residual value, mln US dollars			8,8	7,5	6,2	4,9	3,6	2,3	1,0	0,0
II	PROJECT COMMERCIAL EFFECTIVENESS ASSESSMENT										
	Profit estimation report, mln US dollars										
	Proceeds		42,0	1,4	5,8	5,8	5,8	5,8	5,8	5,8	5,8
	Current cost including taxes as a part of cost		26,8	0,9	3,7	3,7	3,7	3,7	3,7	3,7	3,7
	Amortization charges	14,3%	9,2	0,3	1,3	1,3	1,3	1,3	1,3	1,3	1,0
	COST		36,0	1,2	5,0	5,0	5,0	5,0	5,0	5,0	4,6
	Interest on credit		2,4	0,0	0,7	0,6	0,5	0,3	0,2	0,0	0,0
	PRETAX PROFIT		3,7	0,2	0,0	0,1	0,3	0,4	0,6	0,8	1,2
	Profit tax	20%	0,7	0,0	0,0	0,0	0,1	0,1	0,1	0,2	0,2

NET PROFIT		2,9	0,2	0,00	0,1	0,2	0,4	0,5	0,6	0,9
Operating activity, mln US dollars										
Sales proceeds		42,0	1,4	5,8	5,8	5,8	5,8	5,8	5,8	5,8
TOTAL INFLOW		42,0	1,4	5,8	5,8	5,8	5,8	5,8	5,8	5,8
Current cost including taxes as a part of cost , including:		26,8	0,9	3,7	3,7	3,7	3,7	3,7	3,7	3,7
Taxes		0,7	0,0	0,0	0,0	0,1	0,1	0,1	0,2	0,2
TOTAL OUTFLOW		27,5	1,0	3,7	3,8	3,8	3,8	3,8	3,8	3,9
CASH FLOW from operating activity		14,5	0,5	2,1	2,0	2,0	2,0	2,0	1,9	1,9
Investment activity, mln US dollars										
Cash inflows		0,0	0							
Cash outflows		9,9	9,3	0,5	0,0	0,0	0,0	0,0	0,0	0,0
- Capital investments		9,2	9,2							
- Working capital gain		0,7	0,2	0,5	0,0	0,0	0,0	0,0	0,0	0,0
CASH FLOW from investment activity		-9,9	-9,3	-0,5	0,0	0,0	0,0	0,0	0,0	0,0
Financial activity, mln US dollars										
Share capital	30%	2,7	2,7							
Credit										
- Credits received	70%	6,4	6,4							
- Repayment of credit and interest	5	-9,6	0,0	-1,9	-1,9	-1,9	-1,9	-1,9	-1,9	-1,9
Credit amount (closing debt)			7,2	6,0	4,7	3,3	1,7	0,0		
Interest										
- accrued	10,4%		0,7	0,7	0,6	0,5	0,3	0,2		
- commission	1,5%		0,1							
- capitalized			0,8							
- paid			0,0	0,7	0,6	0,5	0,3	0,2		
CASH FLOW from financial activity			9,2	-1,9	-1,9	-1,9	-1,9	-1,9	0,0	0,0
PROJECT CASH FLOW		2,2	-2,4	-0,4	0,1	0,1	0,1	0,1	1,9	2,6
COMMERCIAL EFFECTIVENESS ASSESSMENT (indicators)										
Cash flow, mln US dollars			-2,4	-0,4	0,1	0,1	0,1	0,1	1,9	2,6
Cumulative cash flow, NI, mln US dollars		2,2	-2,4	-2,8	-2,7	-2,6	-2,5	-2,4	-0,4	2,2
Non-discounted payback period , years		8,0								
Discount factor	5%		1,0	1,0	0,9	0,9	0,8	0,8	0,7	0,7
Discounted cash flow, mln US dollars			-2,4	-0,4	0,1	0,1	0,1	0,1	1,5	1,9
Discounted cash flow n.i.			-2,4	-2,8	-2,7	-2,6	-2,5	-2,4	-1,0	0,9
Integral effect, NPV, mln US dollars		0,9								
Discounted payback period, years		8,0								
Internal Rate of Return (IRR)		9,8%								

Table 4.7 Generation of Project Cash Flows, Alternative 1 C_IPr (Ownership - Credit - Investment Premium)

№	INDICATORS		Total for 8 years	1	2	3	4	5	6	7	8
I	INPUT DATA										
a	Capital investments (mln US dollars) including:		9,2	9,2							
	- Acquisition of equipment, mln US dollars			7,5							
	- CIW and CW, mln US dollars			1,7							
b	Production output and sales volume										
	Production output , ths Gcal		870,0	30,0	120,0	120,0	120,0	120,0	120,0	120,0	120,0
	Sales volume, ths Gcal		725,0	25,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
	Tariff for heat energy (excluding VAT), US dollars/Gcal	62,4		62,4	62,4	62,4	62,4	62,4	62,4	62,4	62,4
	- Tariff	58,0									
	- IPr	4,4		0,0							
	Proceeds from heat sales, mln US dollars		45,2	1,6	6,2	6,2	6,2	6,2	6,2	6,2	6,2
c	Annual operational costs, mln US dollars		26,8	0,9	3,7	3,7	3,7	3,7	3,7	3,7	3,7
	Natural gas supply volumes, million m3		124,7	4,3	17,2	17,2	17,2	17,2	17,2	17,2	17,2
	Power consumption, MWh		17826	614,7	2458,8	2458,8	2458,8	2458,8	2458,8	2458,8	2458,8
	- Materials, mln US dollars		1,3	0,05	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- Production works and services, mln US dollars		3,9	0,1	0,5	0,5	0,5	0,5	0,5	0,5	0,5
	- Payment for natural gas, mln US dollars		12,8	0,4	1,8	1,8	1,8	1,8	1,8	1,8	1,8
	- Electric energy for technological needs , mln US dollars		1,5	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- Payroll, mln US dollars		1,9	0,1	0,3	0,3	0,3	0,3	0,3	0,3	0,3
	- Social and insurance contributions, mln US dollars	34%	0,6	0,02	0,1	0,1	0,1	0,1	0,1	0,1	0,1
	- Other shop costs, including water for technological needs, mln US dollars		1,2	0,04	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- General business expenses(% from technological expenses), mln US dollars	11,9%	3,1	0,1	0,4	0,4	0,4	0,4	0,4	0,4	0,4
	- Taxes as a part of cost(property tax), mln US dollars	2,2%	0,4		0,09	0,08	0,06	0,05	0,04	0,04	0,01
	- Lease payments, mln US dollars										
	- Leasing payments, mln US dollars										
d	Composition and structure of plant assets										
	- Lifetime, years	7									
	- Acquisition value, mln US dollars			9,2	9,2	9,2	9,2	9,2	9,2	9,2	9,2
	- Depreciation, mln US dollars	14,3%		0,3	1,3	1,3	1,3	1,3	1,3	1,3	1,0
	- Residual value, mln US dollars			8,8	7,5	6,2	4,9	3,6	2,3	1,0	0,0
II	PROJECT COMMERCIAL EFFECTIVENESS ASSESSMENT										
	Profit estimation report, mln US dollars										
	Proceeds		45,2	1,6	6,2	6,2	6,2	6,2	6,2	6,2	6,2
	Current cost including taxes as a part of cost		26,8	0,9	3,7	3,7	3,7	3,7	3,7	3,7	3,7
	Amortization charges	14,3%	9,2	0,3	1,3	1,3	1,3	1,3	1,3	1,3	1,0
	COST		36,0	1,2	5,0	5,0	5,0	5,0	5,0	5,0	4,6
	Interest on credit		2,4	0,0	0,7	0,6	0,5	0,3	0,2	0,0	0,0
	PRETAX PROFIT		6,9	0,3	0,4	0,6	0,7	0,9	1,1	1,2	1,6
	Profit tax	20%	1,4	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,3

NET PROFIT		5,5	0,3	0,36	0,5	0,6	0,7	0,9	1,0	1,3
Operating activity, mln US dollars										
Sales proceeds		45,2	1,6	6,2	6,2	6,2	6,2	6,2	6,2	6,2
TOTAL INFLOW		45,2	1,6	6,2	6,2	6,2	6,2	6,2	6,2	6,2
Current cost including taxes as a part of cost , including:		26,8	0,9	3,7	3,7	3,7	3,7	3,7	3,7	3,7
Taxes		1,4	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,3
TOTAL OUTFLOW		28,2	1,0	3,8	3,8	3,9	3,9	3,9	3,9	4,0
CASH FLOW from operating activity		17,1	0,6	2,4	2,4	2,4	2,4	2,3	2,3	2,3
Investment activity, mln US dollars										
Cash inflows		0,0	0							
Cash outflows		9,9	9,3	0,6	0,0	0,0	0,0	0,0	0,0	0,0
- Capital investments		9,2	9,2							
- Working capital gain		0,8	0,2	0,6	0,0	0,0	0,0	0,0	0,0	0,0
CASH FLOW from investment activity		-9,9	-9,3	-0,6	0,0	0,0	0,0	0,0	0,0	0,0
Financial activity, mln US dollars										
Share capital	30%	2,7	2,7							
Credit										
- Credits received	70%	6,4	6,4							
- Repayment of credit and interest	5	-9,6	0,0	-1,9	-1,9	-1,9	-1,9	-1,9	-1,9	-1,9
Credit amount (closing debt)			7,2	6,0	4,7	3,3	1,7	0,0		
Interest										
- accrued	10,4%		0,7	0,7	0,6	0,5	0,3	0,2		
- commission	1,5%		0,1							
- capitalized			0,8							
- paid			0,0	0,7	0,6	0,5	0,3	0,2		
CASH FLOW from financial activity			9,2	-1,9	-1,9	-1,9	-1,9	-1,9	0,0	0,0
PROJECT CASH FLOW		4,8	-2,4	-0,1	0,5	0,5	0,5	0,4	2,3	3,0
COMMERCIAL EFFECTIVENESS ASSESSMENT (indicators)										
Cash flow, mln US dollars			-2,4	-0,1	0,5	0,5	0,5	0,4	2,3	3,0
Cumulative cash flow, NI, mln US dollars		4,8	-2,4	-2,4	-1,9	-1,5	-1,0	-0,6	1,7	4,8
Non-discounted payback period , years		7,0								
Discount factor	5%		1,0	1,0	0,9	0,9	0,8	0,8	0,7	0,7
Discounted cash flow, mln US dollars			-2,4	-0,1	0,4	0,4	0,4	0,3	1,7	2,2
Discounted cash flow n.i.			-2,4	-2,4	-2,0	-1,6	-1,2	-0,9	0,9	3,0
Integral effect, NPV, mln US dollars		3,0								
Discounted payback period, years		7,0								
Internal Rate of Return (IRR)		21,9%								

Proceeds		30,6	1,1	4,2	4,2	4,2	4,2	4,2	4,2	4,2
Current cost including taxes as a part of cost		37,3	2,7	5,5	5,5	5,5	5,4	5,4	3,6	3,6
Amortization charges	21,3%	1,7	0,1	0,4	0,4	0,4	0,4	0,2	0,0	0,0
COST		39,0	2,8	5,8	5,8	5,8	5,8	5,6	3,6	3,6
PRETAX PROFIT		-8,3	-1,7	-1,6	-1,6	-1,6	-1,6	-1,4	0,6	0,6
Profit tax	20%	0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1
NET PROFIT		-8,5	-1,7	-1,6	-1,6	-1,6	-1,6	-1,4	0,5	0,5
Operating activity, mln US dollars										
Sales proceeds		30,6	1,1	4,2	4,2	4,2	4,2	4,2	4,2	4,2
TOTAL INFLOW		30,6	1,1	4,2	4,2	4,2	4,2	4,2	4,2	4,2
Current cost including taxes as a part of cost, including:		37,3	2,7	5,5	5,5	5,5	5,4	5,4	3,6	3,6
Taxes		0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1
TOTAL OUTFLOW		37,5	2,7	5,5	5,5	5,5	5,4	5,4	3,8	3,8
CASH FLOW from operating activity		-6,9	-1,7	-1,2	-1,2	-1,2	-1,2	-1,2	0,5	0,5
Investment activity, mln US dollars										
Cash inflows		0,0	0							
Cash outflows		2,2	1,8	0,4	0,0	0,0	0,0	0,0	0,0	0,0
- Capital investments		1,7	1,7							
- Working capital gain		0,5	0,1	0,4	0,0	0,0	0,0	0,0	0,0	0,0
CASH FLOW from investment activity		-2,2	-1,8	-0,4	0,0	0,0	0,0	0,0	0,0	0,0
PROJECT CASH FLOW		-8,5	-3,5	-1,6	-1,2	-1,2	-1,2	-1,2	0,5	1,0
COMMERCIAL EFFECTIVENESS ASSESSMENT (indicators)										
Cash flow, mln US dollars			-3,5	-1,6	-1,2	-1,2	-1,2	-1,2	0,5	1,0
Cumulative cash flow, NI, mln US dollars		-8,5	-3,5	-5,1	-6,3	-7,6	-8,8	-10,0	-9,5	-8,5
Non-discounted payback period , years		>8								
Discount factor	5%		1,0	1,0	0,9	0,9	0,8	0,8	0,7	0,7
Discounted cash flow, mln US dollars			-3,5	-1,6	-1,1	-1,1	-1,0	-1,0	0,3	0,7
Discounted cash flow n.i.			-3,5	-5,0	-6,1	-7,2	-8,2	-9,2	-8,8	-8,1
Integral effect, NPV, mln US dollars		-8,1								
Discounted payback period, years		>8								
Internal Rate of Return (IRR)		-								

Proceeds		45,3	1,6	6,2	6,2	6,2	6,2	6,2	6,2	6,2
Current cost including taxes as a part of cost		37,3	2,7	5,5	5,5	5,5	5,4	5,4	3,6	3,6
Amortization charges	21,3%	1,7	0,1	0,4	0,4	0,4	0,4	0,2	0,0	0,0
COST		39,0	2,8	5,8	5,8	5,8	5,8	5,6	3,6	3,6
PRETAX PROFIT		6,3	-1,2	0,4	0,4	0,4	0,4	0,6	2,6	2,6
Profit tax	20%	1,5	0,0	0,1	0,1	0,1	0,1	0,1	0,5	0,5
NET PROFIT		4,8	-1,2	0,3	0,3	0,3	0,3	0,5	2,1	2,1
Operating activity, mln US dollars										
Sales proceeds		45,3	1,6	6,2	6,2	6,2	6,2	6,2	6,2	6,2
TOTAL INFLOW		45,3	1,6	6,2	6,2	6,2	6,2	6,2	6,2	6,2
Current cost including taxes as a part of cost , including:		37,3	2,7	5,5	5,5	5,5	5,4	5,4	3,6	3,6
Taxes		1,5	0,0	0,1	0,1	0,1	0,1	0,1	0,5	0,5
TOTAL OUTFLOW		38,8	2,7	5,5	5,5	5,5	5,5	5,6	4,2	4,2
CASH FLOW from operating activity		6,5	-1,1	0,7	0,7	0,7	0,7	0,7	2,1	2,1
Investment activity, mln US dollars										
Cash inflows		0,0	0							
Cash outflows		2,5	1,9	0,6	0,0	0,0	0,0	0,0	0,0	0,0
- Capital investments		1,7	1,7							
- Working capital gain		0,8	0,2	0,6	0,0	0,0	0,0	0,0	0,0	0,0
CASH FLOW from investment activity		-2,5	-1,9	-0,6	0,0	0,0	0,0	0,0	0,0	0,0
PROJECT CASH FLOW		4,8	-3,0	0,1	0,7	0,7	0,7	0,7	2,1	2,9
COMMERCIAL EFFECTIVENESS ASSESSMENT (indicators)										
Cash flow, mln US dollars			-3,0	0,1	0,7	0,7	0,7	0,7	2,1	2,9
Cumulative cash flow, NI, mln US dollars		4,8	-3,0	-2,9	-2,2	-1,5	-0,8	-0,2	1,9	4,8
Non-discounted payback period , years		7,0								
Discount factor	5%		1,0	1,0	0,9	0,9	0,8	0,8	0,7	0,7
Discounted cash flow, mln US dollars			-3,0	0,1	0,6	0,6	0,6	0,5	1,6	2,0
Discounted cash flow n.i.			-3,0	-2,9	-2,3	-1,7	-1,1	-0,6	1,0	3,0
Integral effect, NPV, mln US dollars		3,0								
Discounted payback period , years		7,0								
Internal Rate of Return (IRR)		20,4%								

Proceeds		39,7	1,4	5,5	5,5	5,5	5,5	5,5	5,5	5,5
Current cost including taxes as a part of cost		28,1	1,1	3,9	3,9	3,9	3,9	3,9	3,8	3,8
Amortization charges	14,3%	9,2	0,3	1,3	1,3	1,3	1,3	1,3	1,3	1,0
COST		37,3	1,4	5,2	5,2	5,2	5,2	5,2	5,2	4,8
PRETAX PROFIT		2,4	0,0	0,3	0,3	0,3	0,3	0,3	0,3	0,7
Profit tax	20%	0,5	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1
NET PROFIT		1,9	0,0	0,2	0,2	0,2	0,2	0,2	0,3	0,5
Operating activity, mln US dollars										
Sales proceeds		39,7	1,4	5,5	5,5	5,5	5,5	5,5	5,5	5,5
TOTAL INFLOW		39,7	1,4	5,5	5,5	5,5	5,5	5,5	5,5	5,5
Current cost including taxes as a part of cost , including:		28,1	1,1	3,9	3,9	3,9	3,9	3,9	3,8	3,8
Taxes		0,5	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1
TOTAL OUTFLOW		28,6	1,1	4,0	3,9	3,9	3,9	3,9	3,9	4,0
CASH FLOW from operating activity		11,1	0,3	1,5	1,5	1,5	1,6	1,6	1,6	1,5
Investment activity, mln US dollars										
Cash inflows		0,0	0							
Cash outflows		9,8	9,3	0,5	0,0	0,0	0,0	0,0	0,0	0,0
- Capital investments		9,2	9,2							
- Working capital gain		0,7	0,2	0,5	0,0	0,0	0,0	0,0	0,0	0,0
CASH FLOW from investment activity		-9,8	-9,3	-0,5	0,0	0,0	0,0	0,0	0,0	0,0
PROJECT CASH FLOW		1,9	-9,0	1,0	1,5	1,5	1,6	1,6	1,6	2,2
COMMERCIAL EFFECTIVENESS ASSESSMENT (indicators)										
Cash flow, mln US dollars			-9,0	1,0	1,5	1,5	1,6	1,6	1,6	2,2
Cumulative cash flow, NI, mln US dollars		1,9	-9,0	-8,0	-6,5	-5,0	-3,4	-1,8	-0,3	1,9
Non-discounted payback period , years		8,0								
Discount factor	5%		1,0	1,0	0,9	0,9	0,8	0,8	0,7	0,7
Discounted cash flow, mln US dollars			-9,0	1,0	1,4	1,3	1,3	1,2	1,2	1,6
Discounted cash flow n.i.			-9,0	-8,1	-6,7	-5,4	-4,1	-2,8	-1,7	-0,1
Integral effect, NPV, mln US dollars		-0,12								
Discounted payback period, years		>8								
Internal Rate of Return (IRR)		4,7%								

Proceeds		46,4	1,6	6,4	6,4	6,4	6,4	6,4	6,4	6,4
Current cost including taxes as a part of cost		28,1	1,1	3,9	3,9	3,9	3,9	3,8	3,8	3,8
Amortization charges	14,3%	9,2	0,3	1,3	1,3	1,3	1,3	1,3	1,3	1,0
COST		37,3	1,4	5,2	5,2	5,2	5,2	5,2	5,2	4,8
PRETAX PROFIT		9,1	0,2	1,2	1,2	1,2	1,2	1,2	1,2	1,6
Profit tax	20%	1,8	0,0	0,2	0,2	0,2	0,2	0,2	0,2	0,3
NET PROFIT		7,3	0,2	1,0	1,0	1,0	1,0	1,0	1,0	1,3
Operating activity, mln US dollars										
Sales proceeds		46,4	1,6	6,4	6,4	6,4	6,4	6,4	6,4	6,4
TOTAL INFLOW		46,4	1,6	6,4	6,4	6,4	6,4	6,4	6,4	6,4
Current cost including taxes as a part of cost, including:		28,1	1,1	3,9	3,9	3,9	3,9	3,8	3,8	3,8
Taxes		1,8	0,0	0,2	0,2	0,2	0,2	0,2	0,2	0,3
TOTAL OUTFLOW		29,9	1,1	4,1	4,1	4,1	4,1	4,1	4,1	4,1
CASH FLOW from operating activity		16,5	0,5	2,3	2,3	2,3	2,3	2,3	2,3	2,3
Investment activity, mln US dollars										
Cash inflows		0,0	0							
Cash outflows		10,0	9,4	0,6	0,0	0,0	0,0	0,0	0,0	0,0
- Capital investments		9,2	9,2							
- Working capital gain		0,8	0,2	0,6	0,0	0,0	0,0	0,0	0,0	0,0
CASH FLOW from investment activity		-10,0	-9,4	-0,6	0,0	0,0	0,0	0,0	0,0	0,0
PROJECT CASH FLOW		7,3	-8,9	1,7	2,3	2,3	2,3	2,3	2,3	3,1
COMMERCIAL EFFECTIVENESS ASSESSMENT (indicators)										
Cash flow, mln US dollars			-8,9	1,7	2,3	2,3	2,3	2,3	2,3	3,1
Cumulative cash flow, NI, mln US dollars		7,3	-8,9	-7,2	-4,9	-2,6	-0,4	2,0	4,3	7,3
Non-discounted payback period, years		6,0								
Discount factor	5%		1,0	1,0	0,9	0,9	0,8	0,8	0,7	0,7
Discounted cash flow, mln US dollars			-8,9	1,6	2,1	2,0	1,9	1,8	1,7	2,2
Discounted cash flow n.i.			-8,9	-7,3	-5,2	-3,3	-1,4	0,4	2,2	4,3
Integral effect, NPV, mln US dollars		4,3								
Discounted payback period, years		6,0								
Internal Rate of Return (IRR)		16,4%								

Table 4.12 Generation of Project Cash Flows, Alternative 2 C_T (Lease Agreement - Credit)

№	INDICATORS		Total for 8 years	1	2	3	4	5	6	7	8
I	INPUT DATA										
a	Capital investments (mln US dollars) including:		9,2	9,2							
	- Acquisition of equipment, mln US dollars			7,5							
	- CIW and CW, mln US dollars			1,7							
b	Production output and sales volume										
	Production output , ths Gcal		870,0	30,0	120,0	120,0	120,0	120,0	120,0	120,0	120,0
	Sales volume, ths Gcal		725,0	25,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
	Tariff for heat energy (excluding VAT), US dollars/Gcal	59,7		59,7	59,7	59,7	59,7	59,7	59,7	59,7	59,7
	- Tariff	59,7									
	- IPr	0,0									
	Proceeds from heat sales, mln US dollars		43,3	1,5	6,0	6,0	6,0	6,0	6,0	6,0	6,0
c	Annual operational costs, mln US dollars		28,1	1,1	3,9	3,9	3,9	3,9	3,8	3,8	3,8
	Natural gas supply volumes, mln m3		124,7	4,3	17,2	17,2	17,2	17,2	17,2	17,2	17,2
	Power consumption, MWh		17826	614,7	2458,8	2458,8	2458,8	2458,8	2458,8	2458,8	2458,8
	- Materials, mln US dollars		1,3	0,05	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- Production works and services, mln US dollars		3,9	0,1	0,5	0,5	0,5	0,5	0,5	0,5	0,5
	- Payment for natural gas, mln US dollars		12,8	0,4	1,8	1,8	1,8	1,8	1,8	1,8	1,8
	- Electric energy for technological needs , mln US dollars		1,5	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- Payroll, mln US dollars		1,9	0,1	0,3	0,3	0,3	0,3	0,3	0,3	0,3
	- Social and insurance contributions, mln US dollars	34%	0,6	0,02	0,1	0,1	0,1	0,1	0,1	0,1	0,1
	- Other shop costs, including water for technological needs, mln US dollars		1,2	0,0	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- General business expenses (% from technological expenses), mln US dollars	11,9%	3,1	0,1	0,4	0,4	0,4	0,4	0,4	0,4	0,4
	- Taxes as a part of cost(property tax), mln US dollars	2,2%	0,4		0,09	0,08	0,06	0,05	0,04	0,04	0,01
	- Lease payments, mln US dollars	0,2	1,3	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- Leasing payments, mln US dollars										
d	Composition and structure of plant assets										
	- Lifetime, years	7									
	- Acquisition value, mln US dollars			9,2	9,2	9,2	9,2	9,2	9,2	9,2	9,2
	- Depreciation, mln US dollars	14,3%		0,3	1,3	1,3	1,3	1,3	1,3	1,3	1,0
	- Residual value, mln US dollars			8,8	7,5	6,2	4,9	3,6	2,3	1,0	0,0
II	PROJECT COMMERCIAL EFFECTIVENESS ASSESSMENT										
	Profit estimation report, mln US dollars										
	Proceeds		43,3	1,5	6,0	6,0	6,0	6,0	6,0	6,0	6,0
	Current cost including taxes as a part of cost		28,1	1,1	3,9	3,9	3,9	3,9	3,8	3,8	3,8
	Amortization charges	14,3%	9,2	0,3	1,3	1,3	1,3	1,3	1,3	1,3	1,0
	COST		37,3	1,4	5,2	5,2	5,2	5,2	5,2	5,2	4,8
	Interest on credit		2,4	0,0	0,7	0,6	0,5	0,3	0,2	0,0	0,0
	PRETAX PROFIT		3,6	0,1	0,0	0,1	0,3	0,5	0,6	0,8	1,2
	Profit tax	20%	0,7	0,0	0,0	0,0	0,1	0,1	0,1	0,2	0,2

NET PROFIT		2,9	0,1	0,0	0,1	0,2	0,4	0,5	0,6	0,9
Operating activity, mln US dollars										
Sales proceeds		43,3	1,5	6,0	6,0	6,0	6,0	6,0	6,0	6,0
TOTAL INFLOW		43,3	1,5	6,0	6,0	6,0	6,0	6,0	6,0	6,0
Current cost including taxes as a part of cost , including:		28,1	1,1	3,9	3,9	3,9	3,9	3,8	3,8	3,8
Taxes		0,7	0,0	0,0	0,0	0,1	0,1	0,1	0,2	0,2
TOTAL OUTFLOW		28,8	1,1	3,9	3,9	3,9	3,9	4,0	4,0	4,1
CASH FLOW from operating activity		14,4	0,4	2,1	2,1	2,0	2,0	2,0	2,0	1,9
Investment activity, mln US dollars										
Cash inflows		0,0	0							
Cash outflows		9,9	9,3	0,6	0,0	0,0	0,0	0,0	0,0	0,0
- Capital investments		9,2	9,2							
- Working capital gain		0,7	0,2	0,6	0,0	0,0	0,0	0,0	0,0	0,0
CASH FLOW from investment activity		-9,9	-9,3	-0,6	0,0	0,0	0,0	0,0	0,0	0,0
Financial activity, mln US dollars										
Share capital	30%	2,7	2,7							
Credit										
- Credits received	70%	6,4	6,4							
- Repayment of credit and interest	5	-9,6	0,0	-1,9	-1,9	-1,9	-1,9	-1,9	-1,9	-1,9
Credit amount (closing debt)			7,2	6,0	4,7	3,3	1,7	0,0		
Interest										
- accrued	10,4%		0,7	0,7	0,6	0,5	0,3	0,2		
- commission	1,5%		0,1							
- capitalized			0,8							
- paid			0,0	0,7	0,6	0,5	0,3	0,2		
CASH FLOW from financial activity		-0,4	9,2	-1,9	-1,9	-1,9	-1,9	-1,9	-1,9	-1,9
PROJECT CASH FLOW		2,1	-2,5	-0,4	0,1	0,1	0,1	0,1	2,0	2,7
COMMERCIAL EFFECTIVENESS ASSESSMENT (indicators)										
Cash flow, mln US dollars			-2,5	-0,4	0,1	0,1	0,1	0,1	2,0	2,7
Cumulative cash flow, NI, mln US dollars		2,1	-2,5	-2,9	-2,8	-2,7	-2,6	-2,5	-0,5	2,1
Non-discounted payback period, years		8,0								
Discount factor	5%		1,0	1,0	0,9	0,9	0,8	0,8	0,7	0,7
Discounted cash flow, mln US dollars			-2,5	-0,4	0,1	0,1	0,1	0,1	1,5	1,9
Discounted cash flow n.i.			-2,5	-2,9	-2,8	-2,7	-2,6	-2,5	-1,1	0,8
Integral effect, NPV, mln US dollars		0,8								
Discounted payback period, years		8,0								
Internal Rate of Return (IRR)		9,4%								

Table 4.13 Generation of Project Cash Flows, Alternative 2 C_IPr (Lease Agreement – Credit - Investment Premium)

№	INDICATORS		Total for 8 years	1	2	3	4	5	6	7	8
I	INPUT DATA										
a	Capital investments (mln US dollars) including:		9,2	9,2							
	- Acquisition of equipment, mln US dollars			7,5							
	- CIW and CW, mln US dollars			1,7							
b	Production output and sales volume										
	Production output , ths Gcal		870,0	30,0	120,0	120,0	120,0	120,0	120,0	120,0	120,0
	Sales volume, ths Gcal		725,0	25,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
	Tariff for heat energy (excluding VAT), US dollars/Gcal	64,4		64,4	64,4	64,4	64,4	64,4	64,4	64,4	64,4
	- Tariff	59,7									
	- IPr	4,7									
	Proceeds from heat sales, mln US dollars		46,7	1,6	6,4	6,4	6,4	6,4	6,4	6,4	6,4
c	Annual operational costs, mln US dollars		28,1	1,1	3,9	3,9	3,9	3,9	3,8	3,8	3,8
	Natural gas supply volumes, million m3		124,7	4,3	17,2	17,2	17,2	17,2	17,2	17,2	17,2
	Power consumption, MWh		17826	614,7	2458,8	2458,8	2458,8	2458,8	2458,8	2458,8	2458,8
	- Materials, mln US dollars		1,3	0,05	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- Production works and services, mln US dollars		3,9	0,1	0,5	0,5	0,5	0,5	0,5	0,5	0,5
	- Payment for natural gas, mln US dollars		12,8	0,4	1,8	1,8	1,8	1,8	1,8	1,8	1,8
	- Electric energy for technological needs, mln US dollars		1,5	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- Payroll, mln US dollars		1,9	0,1	0,3	0,3	0,3	0,3	0,3	0,3	0,3
	- Social and insurance contributions, mln US dollars	34%	0,6	0,02	0,1	0,1	0,1	0,1	0,1	0,1	0,1
			1,2	0,0	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- Other shop costs, including water for technological needs, mln US dollars										
	- General business expenses (% from technological expenses), mln US dollars	11,9%	3,1	0,1	0,4	0,4	0,4	0,4	0,4	0,4	0,4
	- Taxes as a part of cost(property tax), mln US dollars	2,2%	0,4		0,09	0,08	0,06	0,05	0,04	0,04	0,01
	- Lease payments, mln US dollars	0,2	1,3	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	- Leasing payments, mln US dollars										
d	Composition and structure of plant assets										
	- Lifetime, years		7								
	- Acquisition value, mln US dollars			9,2	9,2	9,2	9,2	9,2	9,2	9,2	9,2
	- Depreciation, mln US dollars	14,3%		0,3	1,3	1,3	1,3	1,3	1,3	1,3	1,0
	- Residual value, mln US dollars			8,8	7,5	6,2	4,9	3,6	2,3	1,0	0,0
II	PROJECT COMMERCIAL EFFECTIVENESS ASSESSMENT										
	Profit estimation report, mln US dollars										
	Proceeds		46,7	1,6	6,4	6,4	6,4	6,4	6,4	6,4	6,4
	Current cost including taxes as a part of cost		28,1	1,1	3,9	3,9	3,9	3,9	3,8	3,8	3,8
	Amortization charges	14,3%	9,2	0,3	1,3	1,3	1,3	1,3	1,3	1,3	1,0
	COST		37,3	1,4	5,2	5,2	5,2	5,2	5,2	5,2	4,8
	Interest on credit		2,4	0,0	0,7	0,6	0,5	0,3	0,2	0,0	0,0
	PRETAX PROFIT		7,0	0,2	0,5	0,6	0,8	0,9	1,1	1,3	1,6
	Profit tax	20%	1,4	0,0	0,1	0,1	0,2	0,2	0,2	0,3	0,3

NET PROFIT		5,6	0,2	0,4	0,5	0,6	0,7	0,9	1,0	1,3
Operating activity, mln US dollars										
Sales proceeds		46,7	1,6	6,4	6,4	6,4	6,4	6,4	6,4	6,4
TOTAL INFLOW		46,7	1,6	6,4	6,4	6,4	6,4	6,4	6,4	6,4
Current cost including taxes as a part of cost, including:		28,1	1,1	3,9	3,9	3,9	3,9	3,8	3,8	3,8
Taxes		1,4	0,0	0,1	0,1	0,2	0,2	0,2	0,3	0,3
TOTAL OUTFLOW		29,5	1,1	4,0	4,0	4,0	4,0	4,1	4,1	4,1
CASH FLOW from operating activity		17,2	0,5	2,4	2,4	2,4	2,4	2,4	2,3	2,3
Investment activity, mln US dollars										
Cash inflows		0,0	0							
Cash outflows		10,0	9,4	0,6	0,0	0,0	0,0	0,0	0,0	0,0
- Capital investments		9,2	9,2							
- Working capital gain		0,8	0,2	0,6	0,0	0,0	0,0	0,0	0,0	0,0
CASH FLOW from investment activity		-10,0	-9,4	-0,6	0,0	0,0	0,0	0,0	0,0	0,0
Financial activity, mln US dollars										
Share capital	30%	2,7	2,7							
Credit										
- Credits received	70%	6,4	6,4							
- Repayment of credit and interest	5	-9,6	0,0	-1,9	-1,9	-1,9	-1,9	-1,9		
Credit amount (closing debt)			7,2	6,0	4,7	3,3	1,7	0,0		
Interest										
- accrued	10,4%		0,7	0,7	0,6	0,5	0,3	0,2		
- commission	1,5%		0,1							
- capitalized			0,8							
- paid			0,0	0,7	0,6	0,5	0,3	0,2		
CASH FLOW from financial activity		-0,4	9,2	-1,9	-1,9	-1,9	-1,9	-1,9		
PROJECT CASH FLOW		4,9	-2,5	-0,1	0,5	0,5	0,5	0,5	2,3	3,1
COMMERCIAL EFFECTIVENESS ASSESSMENT (indicators)										
Cash flow, mln US dollars			-2,5	-0,1	0,5	0,5	0,5	0,5	2,3	3,1
Cumulative cash flow, NI, mln US dollars		4,9	-2,5	-2,5	-2,0	-1,5	-1,0	-0,6	1,8	4,9
Non-discounted payback period, years		7,0								
Discount factor	5%		1,0	1,0	0,9	0,9	0,8	0,8	0,7	0,7
Discounted cash flow, mln US dollars			-2,5	-0,1	0,5	0,4	0,4	0,4	1,7	2,2
Discounted cash flow n.i.			-2,5	-2,5	-2,1	-1,6	-1,2	-0,9	0,9	3,1
Integral effect, NPV, mln US dollars		3,1								
Discounted payback period, years		7,0								
Internal Rate of Return (IRR)		21,8%								

Current cost including taxes as a part of cost		38,6	2,9	5,6	5,6	5,6	5,6	5,6	3,8	3,8
Amortization charges		1,7	0,1	0,4	0,4	0,4	0,4	0,2	0,0	0,0
COST		40,3	3,0	6,0	6,0	6,0	6,0	5,8	3,8	3,8
PRETAX PROFIT		-8,5	-2	-1,6	-1,6	-1,6	-1,6	-1,4	0,6	0,6
Profit tax	20%	0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1
NET PROFIT		-8,7	-1,9	-1,6	-1,6	-1,6	-1,6	-1,4	0,5	0,5
Operating activity, mln US dollars										
Sales proceeds		31,8	1,1	4,4	4,4	4,4	4,4	4,4	4,4	4,4
TOTAL INFLOW		31,8	1,1	4,4	4,4	4,4	4,4	4,4	4,4	4,4
Current cost including taxes as a part of cost, including:		38,6	2,9	5,6	5,6	5,6	5,6	5,6	3,8	3,8
Taxes		0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1
TOTAL OUTFLOW		38,8	2,9	5,6	5,6	5,6	5,6	5,6	3,9	3,9
CASH FLOW from operating activity		-7,0	-1,8	-1,2	-1,2	-1,2	-1,2	-1,2	0,5	0,5
Investment activity, mln US dollars										
Cash inflows		0,0	0							
Cash outflows		2,2	1,8	0,4	0,0	0,0	0,0	0,0	0,0	0,0
- Capital investments		1,7	1,7							
- Working capital gain		0,5	0,1	0,4	0,0	0,0	0,0	0,0	0,0	0,0
CASH FLOW from investment activity		-2,2	-1,8	-0,4	0,0	0,0	0,0	0,0	0,0	0,0
PROJECT CASH FLOW		-8,7	-3,6	-1,7	-1,2	-1,2	-1,2	-1,2	0,5	1,0
COMMERCIAL EFFECTIVENESS ASSESSMENT (indicators)										
Cash flow, mln US dollars			-3,6	-1,7	-1,2	-1,2	-1,2	-1,2	0,5	1,0
Cumulative cash flow, NI, mln US dollars		-8,7	-3,6	-5,3	-6,5	-7,7	-9,0	-10,2	-9,7	-8,7
Non-discounted payback period, years		>8								
Discount factor	5%		1,0	1,0	0,9	0,9	0,8	0,8	0,7	0,7
Discounted cash flow, mln US dollars			-3,6	-1,6	-1,1	-1,1	-1,0	-1,0	0,3	0,7
Discounted cash flow n.i.			-3,6	-5,2	-6,3	-7,4	-8,4	-9,4	-9,0	-8,3
Integral effect, NPV, mln US dollars		-8,3								
Discounted payback period, years		>8								
Internal Rate of Return (IRR)	-									

Proceeds		46,7	1,6	6,4	6,4	6,4	6,4	6,4	6,4	6,4	6,4
Current cost including taxes as a part of cost		38,6	2,9	5,6	5,6	5,6	5,6	5,6	5,6	3,8	3,8
Amortization charges		1,7	0,1	0,4	0,4	0,4	0,4	0,4	0,2	0,0	0,0
COST		40,3	3,0	6,0	6,0	6,0	6,0	6,0	5,8	3,8	3,8
PRETAX PROFIT		6,5	-1	0,5	0,5	0,5	0,5	0,5	0,7	2,6	2,6
Profit tax	20%	1,6	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,5	0,5
NET PROFIT		4,9	-1,3	0,4	0,4	0,4	0,4	0,4	0,5	2,1	2,1
Operating activity, mln US dollars											
Sales proceeds		46,7	1,6	6,4	6,4	6,4	6,4	6,4	6,4	6,4	6,4
TOTAL INFLOW		46,7	1,6	6,4	6,4	6,4	6,4	6,4	6,4	6,4	6,4
Current cost including taxes as a part of cost , including:		38,6	2,9	5,6	5,6	5,6	5,6	5,6	5,6	3,8	3,8
Taxes		1,6	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,5	0,5
TOTAL OUTFLOW		40,1	2,9	5,7	5,7	5,7	5,7	5,7	5,7	4,3	4,3
CASH FLOW from operating activity		6,6	-1,3	0,7	0,7	0,7	0,7	0,7	0,7	2,1	2,1
Investment activity, mln US dollars											
Cash inflows		0,0	0								
Cash outflows		2,5	1,9	0,6	0,0	0,0	0,0	0,0	0,0	0,0	0,0
- Capital investments		1,7	1,7								
- Working capital gain		0,8	0,2	0,6	0,0	0,0	0,0	0,0	0,0	0,0	0,0
CASH FLOW from investment activity		-2,5	-1,9	-0,6	0,0	0,0	0,0	0,0	0,0	0,0	0,0
PROJECT CASH FLOW		4,9	-3,2	0,1	0,7	0,7	0,7	0,7	0,7	2,1	2,9
COMMERCIAL EFFECTIVENESS ASSESSMENT (indicators)											
Cash flow, mln US dollars			-3,2	0,1	0,7	0,7	0,7	0,7	0,7	2,1	2,9
Cumulative cash flow, NI, mln US dollars		4,9	-3,2	-3,0	-2,3	-1,6	-0,8	-0,1		2,0	4,9
Non-discounted payback period, years		7,0									
Discount factor	5%		1,0	1,0	0,9	0,9	0,8	0,8	0,8	0,7	0,7
Discounted cash flow, mln US dollars			-3,2	0,1	0,7	0,6	0,6	0,5		1,6	2,1
Discounted cash flow n.i.			-3,2	-3,0	-2,4	-1,7	-1,1	-0,6		1,0	3,1
Integral effect, NPV, mln US dollars		3,1									
Discounted payback period, years		7,0									
Internal Rate of Return (IRR)		20,3%									

Table 4.16 Cost-effectiveness indicators by alternatives

Description	NPV, mln US dollars	Simple Payback Period, years	Discounted Payback Period, years	IRR	Tariff, US dollars/Gcal	Investment Premium, US dollars/Gcal	Tariff and Investment Premium, US dollars/Gcal
Alternative 1 Ownership							
EC_T	-0,05	8	more than 8	4,9%	53,0	0	53,0
EC_IPr	4,3	6	6	16,4%	53,0	9,0	62,0
C_T	0,9	8	8	9,8%	58,0	0	58,0
C_IPr	3,0	7	7	21,9%	58,0	4,4	62,4
L_T	-8,1	more than 8	more than 8	-	42,3	0	42,3
L_IPr	3,0	6	6	20,4%	42,3	20,1	62,4
Alternative 2 Lease							
EC_T	-0,12	8	more than 8	4,7%	54,7	0	54,7
EC_IPr	4,3	6	6	16,4%	54,7	9,3	64,0
C_T	0,8	8	8	9,4%	59,7	0	59,7
C_IPr	3,1	7	7	21,8%	59,7	4,7	64,4
L_T	-8,3	more than 8	more than 8	-	43,8	0	43,8
L_IPr	3,1	6	6	20,3%	43,8	20,6	64,4

Let us arrange the following into groups for the analysis of obtained results.

23 Comparison of alternatives calculated with account taken of only Tariff and Investment Premium.

As it seen from the provided data (Table 4.16, Figure 4-1 and Figure 4-2), with respect to alternatives that envisage the generation of incomes with increasing tariff because of included Investment Premium, the Payback period decreases, the NPV and IRR of invested funds increase; that undoubtedly encourages the investment inflow in the public utility sector. It must be also noted that the cost-effectiveness indicators are negative for the following alternatives: Alternative 1 EC_T, Alternative 1 L_T, Alternative 2 EC_T, and Alternative 2 L_T within the framework of which only the tariff is charged. The NPV is positive when only the tariff is charged in the alternatives financed for the account of the credit.

Aggregate tariff rate charged from consumers: the tariff increases from 8 up to almost 50 % depending on the alternative; however, the maximum tariff rate does not exceed 65 US dollars/Gcal. Said rate is permissible under conditions of the existing level of prices for similar services for the regions connected to the gas supply network.

It must be also noted that in the alternatives that use the leasing scheme, the calculated tariff has been much lower than that of the alternatives that envisage the financing for the account of equity capital and credit, which is explained by the fact that the leased property is shown on the balance-sheet of the lessor; hence, amortization charges are not included in the tariff, on the one part. And on the other, according to the assumptions made for the model, the source of formation of the size of leasing payments is not the tariff established by the Federal Tariff Service but the Investment Premium determined by the local executive authorities.

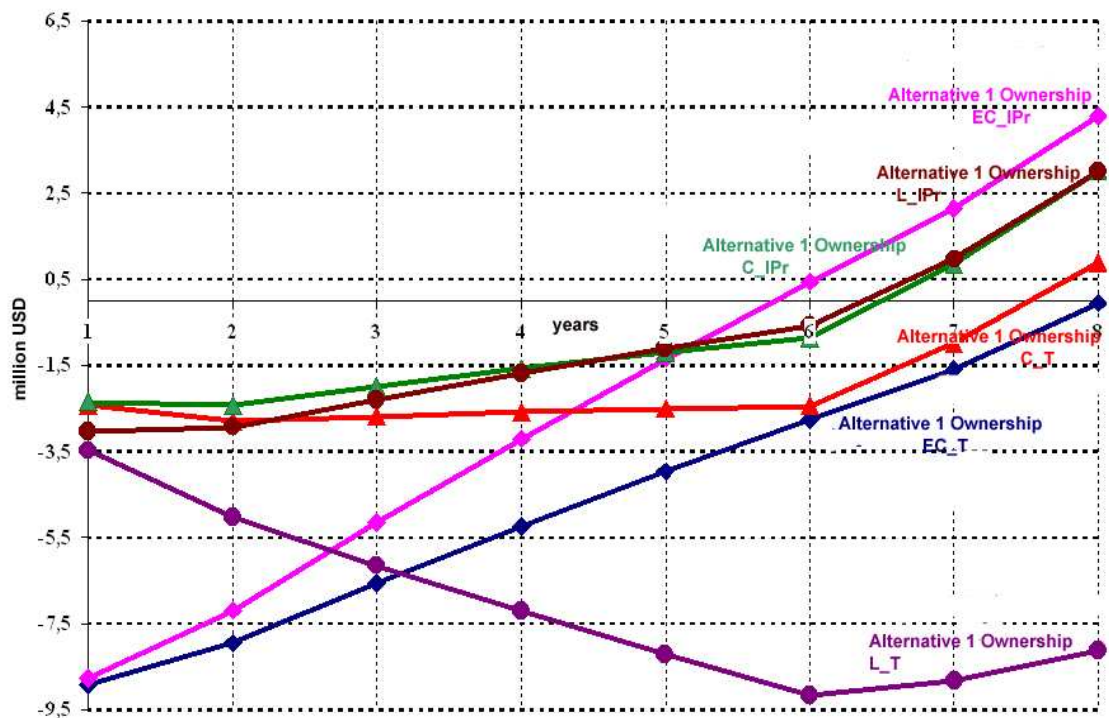


Figure 4-1 Dynamics of generation of the project's discounted cash flows of subalternatives of Alternative 1

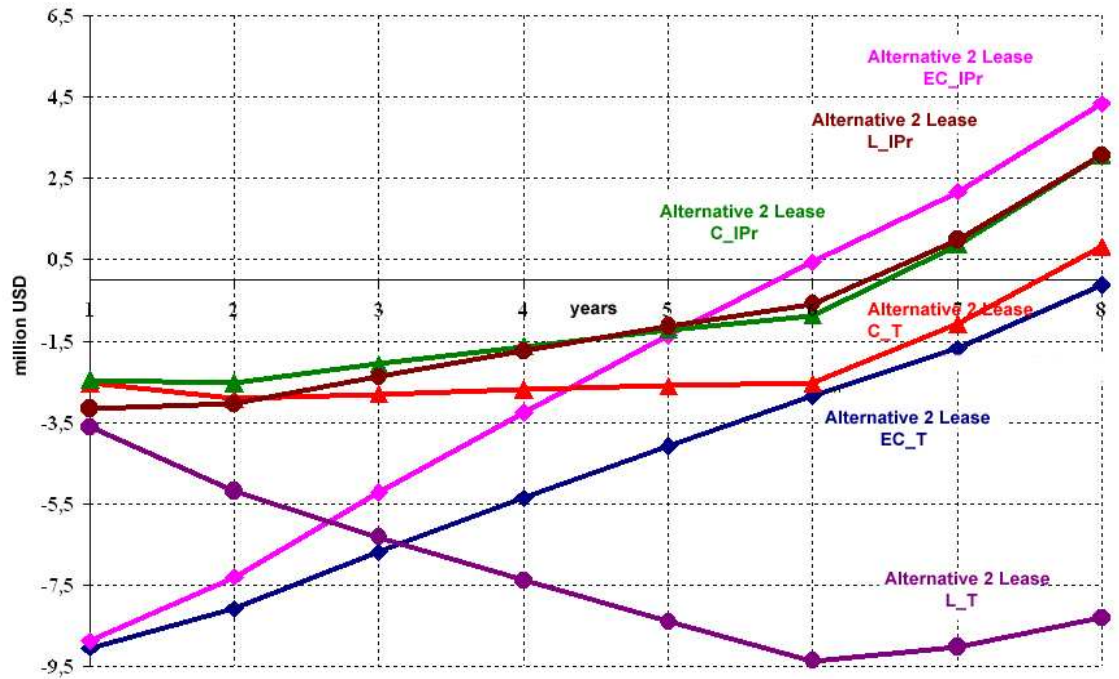


Figure 4-2 Dynamics of generation of the project's discounted cash flows of subalternatives of Alternative 2

4 Comparison of Alternatives 1 (fixed assets in ownership) and Alternatives 2 (fixed assets on a leasehold basis).

As it seen from the ongoing calculations, in terms of generation cash flows and formation of cost-effectiveness indicators, there is no principal difference for the enterprise-organizer of the project if the fixed assets are owned by it or are on a leasehold basis.

As regards the size of tariff, the tariff of alternatives 2 (lease of fixed assets) is higher than that of the similar one for alternatives 1 by 3 %. This difference is not essential either for the enterprise or for the consumers of heat energy.

Thus, it may be stated that the form of ownership of the fixed assets has no influence on the cost-effectiveness indicators, financial feasibility of the project; hence, on the attractiveness of the project for investor, and has no principal influence on the consumers of heat energy. The absence of principal differences between similar subalternatives of alternatives 1 and alternatives 2 is demonstrated by the diagrams below (Figure 4-3, Figure 4-4, Figure 4-5), the curves that characterize the dynamics of accumulation of discounted cash flow (actually, accumulation of NPV of the project) are overlapped which is indicative of identity of economic processes occurring inside the project:

- Alternative 1 EC_T and Alternative 2 EC_T,
- Alternative 1 EC_IPr and Alternative 2 EC_IPr,
- Alternative 1 C_T and Alternative 2 C_T,
- Alternative 1 C_IPr and Alternative 2 C_IPr,
- Alternative 1 L_T and Alternative 2 L_T,
- Alternative 1 L_IPr and Alternative 2 L_IPr.

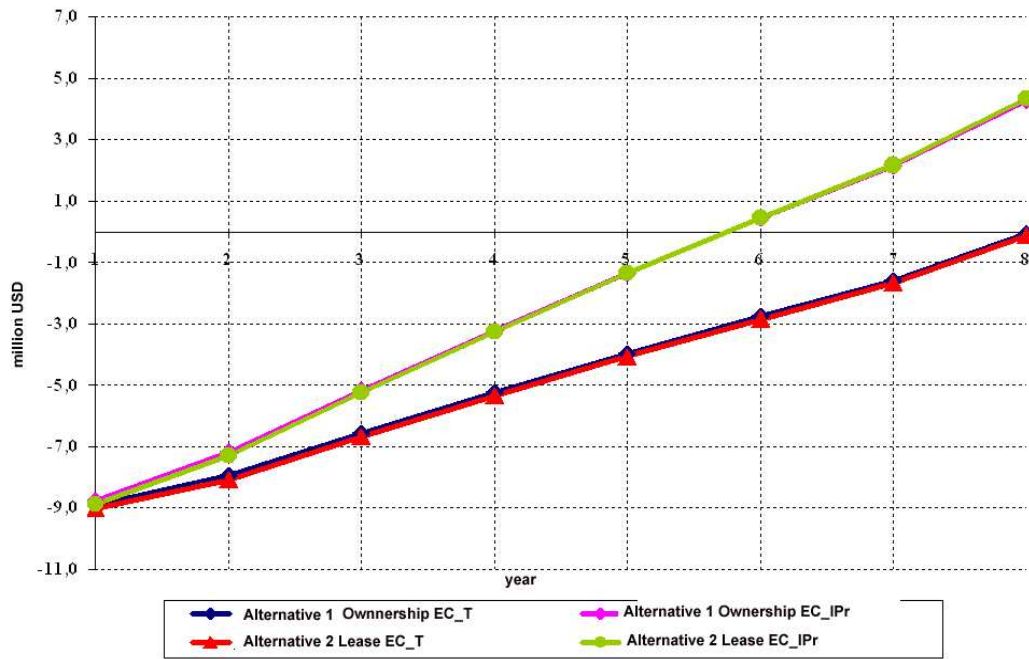


Figure 4-3 Comparison of dynamics of generation of the project's discounted cash flows when financing for the account of equity capital of Alternatives 1 and Alternatives 2

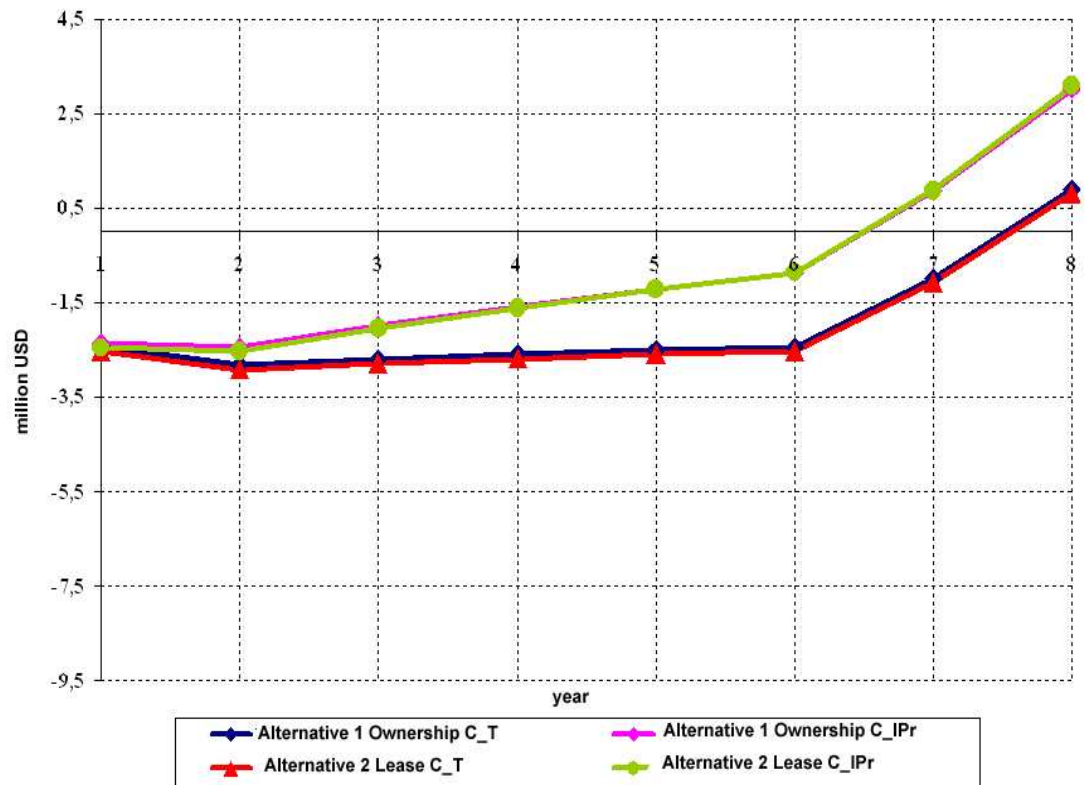


Figure 4-4 Comparison of dynamics of generation of the project's discounted cash flows when financing for the account of attracted credit of Alternatives 1 and Alternatives 2

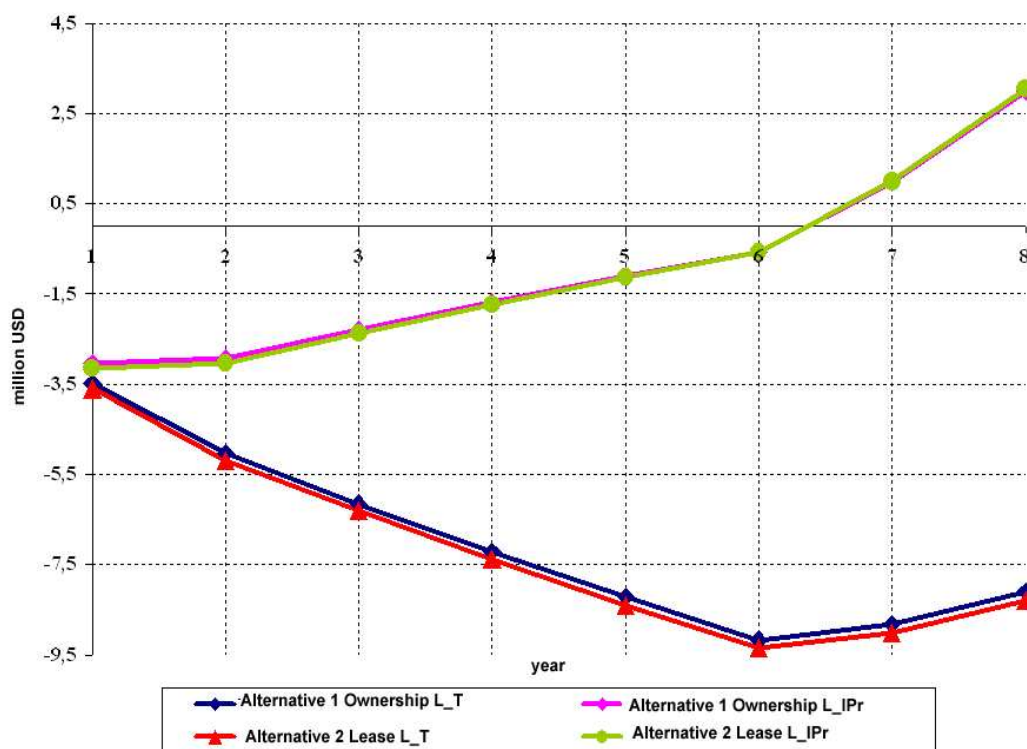


Figure 4-5 Comparison of dynamics of generation of the project's discounted cash flows with the use of leasing scheme of Alternatives 1 and Alternatives 2

5 Comparison of projects financing schemes.

Analysis of cost-effectiveness of the project's alternatives at which only the tariff is charged (Table 4.16, Figure 4-6, Figure 4-7):

- Alternative 1 EC_T, Alternative 1 C_T, Alternative 1 L_T,
- Alternative 2 EC_T, Alternative 2 C_T, Alternative 2 L_T, –

shows that under the model assumptions made:

- The highest cost-effectiveness indicators are reached when a bank credit is attracted. They are reached thanks to that the size of the tariff in this particular case exceeds the similar parameter in the subalternatives that envisage financing for the account of equity capital and leasing scheme,
- The subalternatives have the worst indicators in case of the leasing scheme; however, in the same alternative the tariff value is the lowest which is explained by the assumptions laid in the base of the calculation,
- Demand for investments for the alternatives involving borrowed funds for financing of capital investments is three times less than for the alternatives involving financing of capital investments for the account of equity capital; that is very important under conditions of the shortage of uncommitted funds.

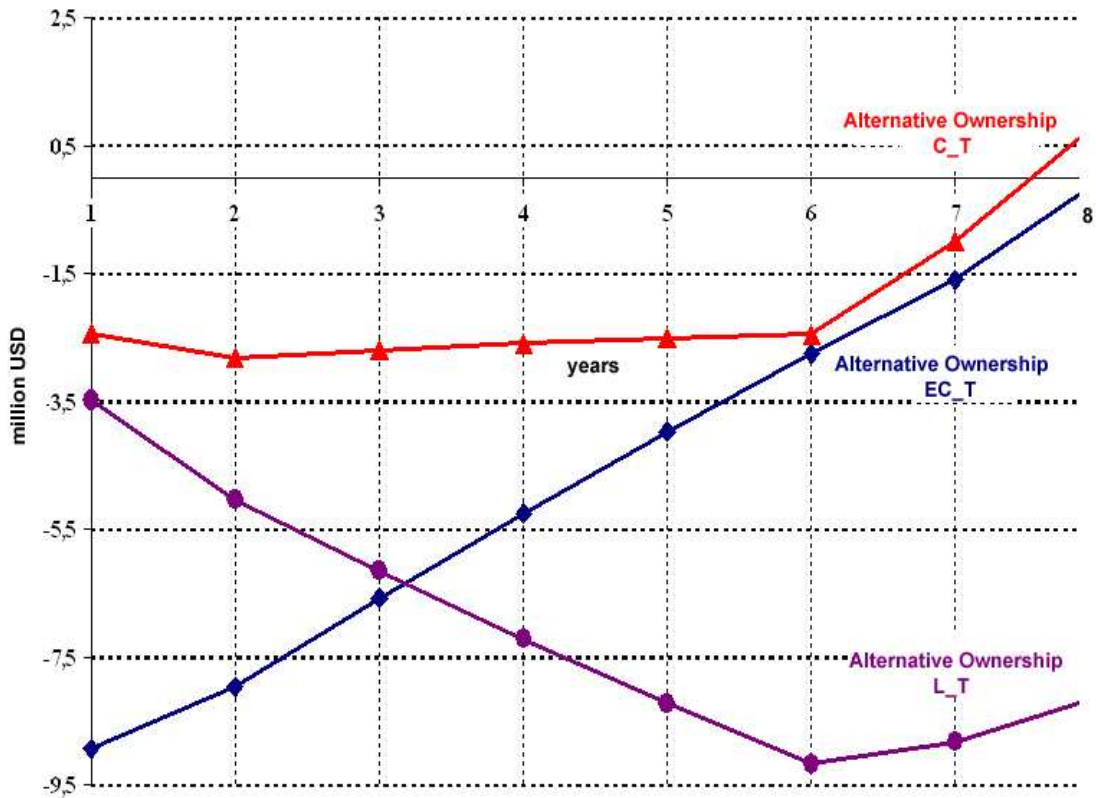


Figure 4-6 Comparison of dynamics of generation of the project’s discounted cash flows of subalternatives of Alternative 1 for different schemes of financing (only Tariff is charged)

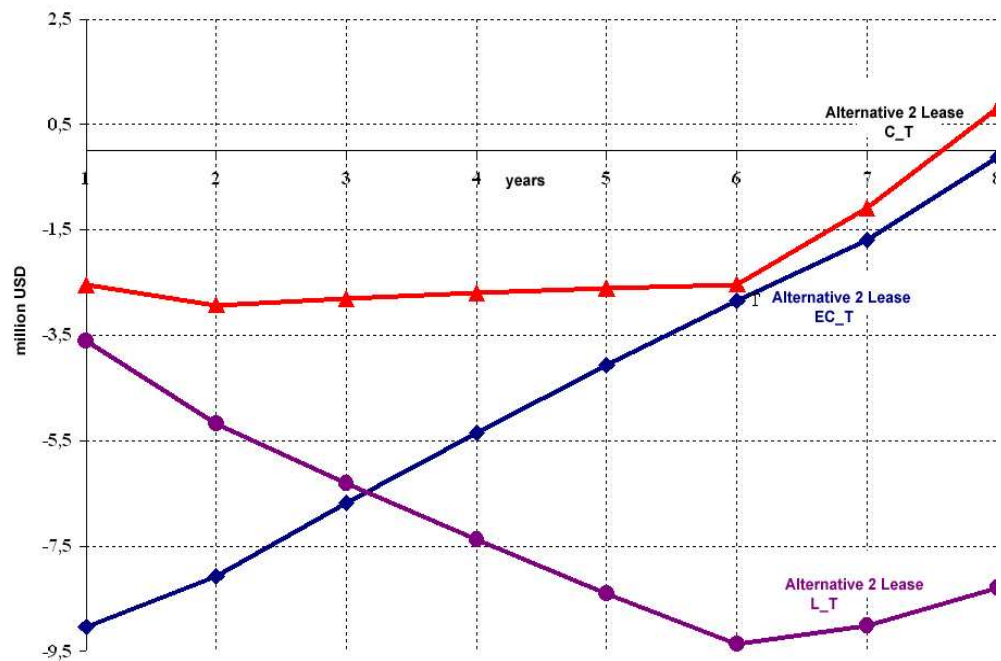


Figure 4-7 Comparison of dynamics of generation of the project’s discounted cash flows of subalternatives of Alternative 2 for different schemes of financing (only Tariff is charged)

Analysis of cost-effectiveness of the project’s alternatives when the tariff and Investment Premium are charged (Table 4.16, Figure 4-8, Figure 4-9):

- Alternative 1 EC_IPr, Alternative 1 C_IPr Alternative 1 L_IPr,
 - Alternative 2 EC_IPr, Alternative 2 C_IPr, Alternative 2 L_IPr, –
- shows that:
- Cost-effectiveness parameters of all considered alternatives are positive which is explained by the initially given rate of return when defining the size of the Investment Premium,
 - The highest IRR (a bit lower than 22 per cent) is reached in the subalternatives with the attracted bank credit; this circumstance is indicative of the most effective use of the investor's equity capital. Then, the leasing scheme subalternative follows in which the IRR exceeds 20 per cent. It must be noted that the value of the aggregate tariff charged from consumers (Tariff plus Investment Premium) is equal both in Alternative 1 (62.4 US dollars/Gcal) and in Alternative 2 (64.4 US dollars/Gcal).
 - The least effective use of the investor's equity capital can be seen in the alternatives when financing is performed completely for the account of the investor's equity capital.

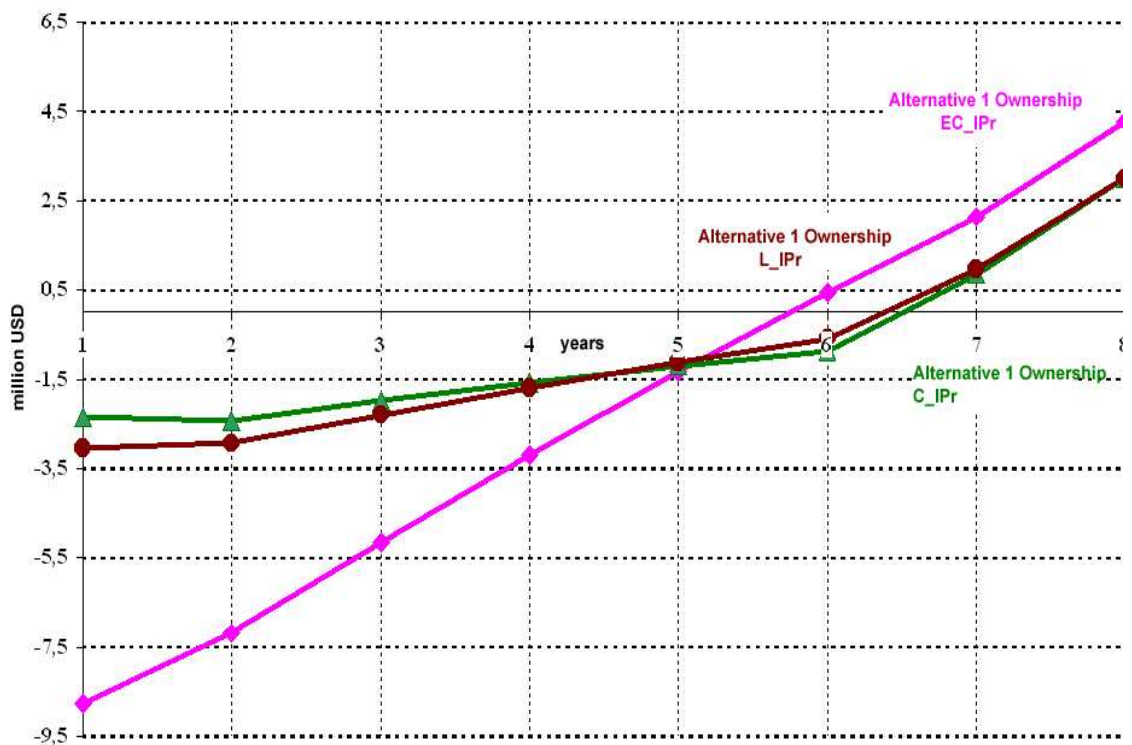


Figure 4-8 Comparison of dynamics of generation of the project's discounted cash flows of subalternatives of Alternative 1 for different schemes of financing (Tariff and Investment Premium are charged)

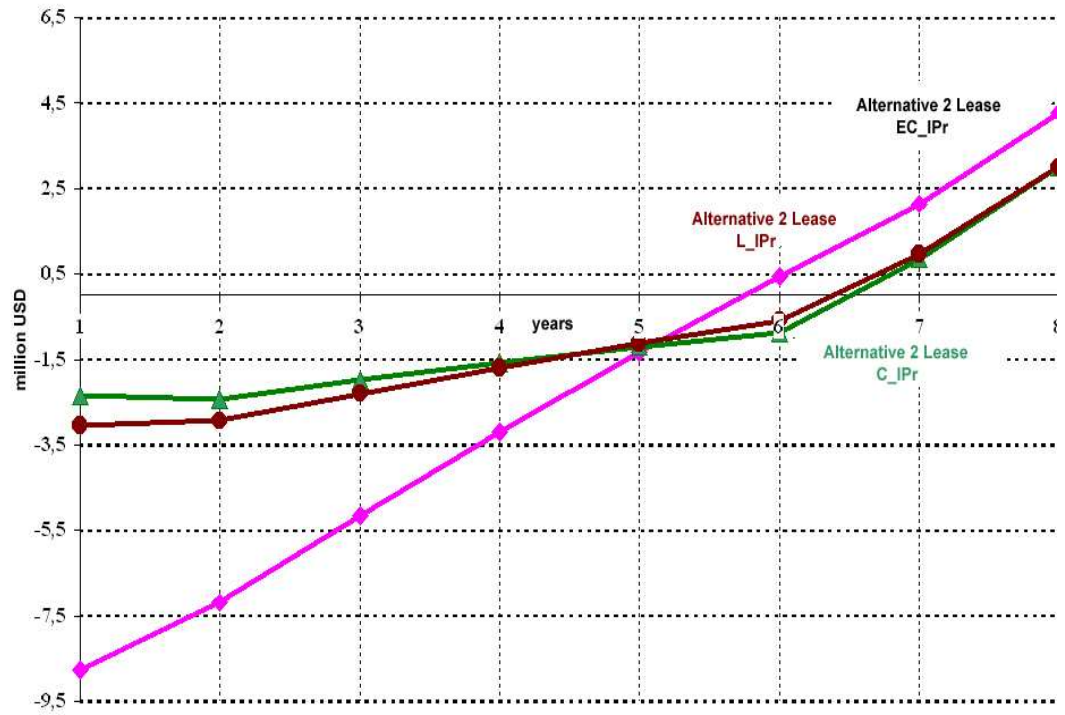


Figure 4-9 Comparison of dynamics of generation of the project's discounted cash flows of subalternatives of Alternative 2 for different schemes of financing (Tariff and Investment Premium are charged)

4.4 Conclusions

In this chapter, there has been discussed the Investment Project for replacement of the solid- and liquid fueled boiler house equipment by the natural-gas-fired equipment by the example of Company A located in the territory of the Siberian Federal District.

There have been constructed the different alternatives of organizational and economic models for implementation of said project based on the following principle (Table 4.17):

- Forms of organization of legal relations of entities with regard to the fixed assets of the public utility sector: ownership, right of economic management, right of operative management, lease, and concession,
- Investment financing schemes: for the account of equity capital of the enterprise, for the account of borrowed funds, two alternatives are possible – credit and leasing.

Note that in terms of generation of cash flows, the alternatives in which the fixed assets are owned on the basis of economic management and operative management, and the alternatives in case of lease and concession are identical.

Table 4.17 Considered alternatives of Investment Project implementation

Schemes of financing	Alternative 1 “Ownership”	Alternative 2 “Lease Agreement”
For the account of equity capital– EC	Alternative 1 EC – T Alternative 1 EC – IPr	Alternative 2 EC – T Alternative 2 EC – IPr
For the account of Credit – C	Alternative 1 C– T Alternative 1 C – IPr	Alternative 2 C – T Alternative 2 C – IPr
Using leasing scheme – L	Alternative 1 L – T Alternative 1 L – IPr	Alternative 2 L – T Alternative 2 L – IPr

Below are the results of the project cost-effectiveness assessment for all the alternatives (Table 4.18).

Table 4.18 Cost-effectiveness indicators by alternatives

Description	NPV, mln US dollars	Simple Payback Period, years	Discounted Payback Period, years	IRR	Tariff, US dollars/Gcal	Investment Premium, US dollars/Gcal	Tariff and Investment Premium, US dollars/Gcal
Alternative 1 Ownership							
EC_T	-0,05	8	more than 8	4,9%	53,0	0	53,0
EC_IPr	4,3	6	6	16,4%	53,0	9,0	62,0
C_T	0,9	8	8	9,8%	58,0	0	58,0
C_IPr	3,0	7	7	21,9%	58,0	4,4	62,4
L_T	-8,1	more than 8	more than 8	-	42,3	0	42,3
L_IPr	3,0	6	6	20,4%	42,3	20,1	62,4
Alternative 2 Lease							
EC_T	-0,12	8	more than 8	4,7%	54,7	0	54,7
EC_IPr	4,3	6	6	16,4%	54,7	9,3	64,0
C_T	0,8	8	8	9,4%	59,7	0	59,7
C_IPr	3,1	7	7	21,8%	59,7	4,7	64,4
L_T	-8,3	more than 8	more than 8	-	43,8	0	43,8
L_IPr	3,1	6	6	20,3%	43,8	20,6	64,4

Based on the foregoing information, the following conclusions can be made:

- The inclusion of the investment premium reduces the Payback period and increases the NPV and IRR of invested funds,
- In the event when only the tariff is charged, the NPV is positive only for the credit-financed alternatives,
- Aggregate tariff varies within the range from 42 to 65 US dollars/Gcal. For the alternatives using the leasing scheme, the tariff is significantly lower (42 US dollars/Gcal) which is due to that:
 - Amortization charges are not included in the tariff, because they are shown on the balance-sheet of the lessor,
 - According to the assumptions made for the model, actual amounts of lease payments are influenced by the investment premium, determined by the local executive authorities rather than the tariff specified by the Federal Tariff Service.

There has been conducted a comparative analysis of cost-effectiveness indicators of the alternatives; based on the analysis, it can be stated that:

- The form of ownership of the fixed assets has no principal influence on cost-effectiveness indicators and financial feasibility for the investor,
- Demand for investments for the alternatives involving borrowed funds for financing of capital investments is three times less than for the alternatives involving financing of capital investments for the account of equity capital; that is very important under conditions of the shortage of uncommitted funds.

Summing up

Summarizing the report, it may be concluded that attracting investments into energy efficiency and energy saving projects require a favorable investment climate which, to a considerable degree, becomes conditional on the legislative and regulatory base in the field of energy efficiency, energy saving and operations of business entities of the public utility sector. While work on the corresponding legislative base commenced in the RF in 1996, it was not always successful. As the 1996 Federal Law "On Energy Saving" (No.28-FZ) proved to be inefficient, a new Federal Law "On Energy Saving and Improving Energy Efficiency" (No.210-FZ) was adopted on 23 November 2009.

The range of tools for use when pursuing energy efficiency improvement policy has been expanding with the formulation of requirements to regional and municipal energy efficiency improvement programmes, the introduction of energy efficiency requirements to energy-consuming devices, buildings and structures, the introduction of a mandatory installation of energy metering equipment in buildings and structures, the provision of tax incentives for companies involved in energy saving projects, the introduction of energy service contracts and the possibility of tariff design on the basis of long-term regulation parameters, etc.

Developing public-private partnerships, including partnerships based on contracts with energy service companies, is one of the ways to attract private financial resources for modernizing state-owned facilities, using utility cost savings for paying back the investments.

Under the Russian legislation, the public utility sector organizations are required to devise and implement production programmes aimed at ensuring provision of quality services and improving energy efficiency of energy supply. Public utility sector enterprises are to implement their investment programmes for development of the public utility systems within the framework of an integrated development scheme for the sector's infrastructure.

As for legal relations between business entities and municipal authorities, it could be concluded that, as of today, capital assets of public utility enterprises are typically owned by municipalities, while the facilities' management is carried out by private companies (typically, JSCs or PLCs) under a lease contract or (less frequently) a concession agreement.

In the Russian Federation, the heat-supply sector has been traditionally funded from the government budget. However, experience shows that municipalities and public utility enterprises do not have enough budget funds to ensure timely modernization of fixed assets, which gives rise to the issue of attracting private investments. Private funding of energy efficiency projects may take the form of credits and loans provided by commercial banks and financial institutions, issue of debentures and equipment lease.

Using an investment project for conversion of liquid and solid fuel-fired boiler equipment to natural gas as an example, an analysis of circumstances directly influencing the efficiency of investment activity of heat supplying enterprises was conducted, in particular:

- Devising schemes to guarantee capital payback and ensure return on investments;
- Forming a public utility sector structure appealing to investors;
- Implementing investment schemes using borrowed funds (credit or lease).

The following conclusions were made with reference to the economic efficiency calculations:

- The incorporation of an investment premium reduces payback period and increases NPV and IRR for the funds invested;
- When only the tariff is applied, NPV becomes positive only for credit-financed scenarios;
- Aggregate tariff varies in the range from 42 to 65 US dollars per Gcal. The tariff is significantly lower for scenarios using a lease option (42 US dollars per Gcal) which is explained by the fact that: amortization charges are not included into the tariff as they are shown on the lessor's

balance-sheet; in accordance with the assumption made for the model, actual amounts of lease payments are influenced by the investment premium, determined by the local authorities, rather than the tariff specified by the Federal Tariff Service.

- Form of fixed assets' ownership is not critical for economic efficiency indicators and financial feasibility for the investor;
- Investment demand for scenarios involving borrowed funds is only a third of the value for scenarios where capital investments are financed by own funds, a factor of considerable importance in a situation characterized by shortage of uncommitted funds.

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Appendix 1. Some Legal and Regulatory Acts Relating to Energy Saving and Energy Efficiency

The basic directives and standards constituting the legislative base for efficient use of fuel and energy resources are detailed below:

- Directive of the Government of the Russian Federation No.239 "On Measures Aimed at Improving State Price (Tariff) Regulation" as of 7 March 1995;
- Directive of the Government of the Russian Federation No.998 "On State Support for Establishing Pilot Energy-Efficient Zones in the Russian Federation" as of 12 October 1995;
- Directive of the Government of the Russian Federation No.832 "On Efficient Use of Energy and Water Resources by State-Owned Enterprises, Institutions and Organizations" as of 8 July 1997;
- Directive of the Government of the Russian Federation No.588 "On Additional Measures to Stimulate Energy Efficiency in the Russian Federation" as of 15 June 1998;
- Directive of the Government of the Russian Federation No.1021 "On State Regulation of Gas Prices and Gas Distribution Service Tariffs on the Russian Federation Territory" as of 29 December 2000;
- Directive of the Government of the Russian Federation No.796 "On the Federal Target-Oriented Programme *Energy-Efficient Economy in 2002-2005 and until 2010*" as of 17 November 2001;
- Directive of the Government of the Russian Federation No.109 "On Pricing Policy for Electrical and Heat Energy in the Russian Federation" as of 26 February 2004;
- Directive of the Government of the Russian Federation No.653 "On Signing the Agreement between the Russian Federation and the International Bank for Reconstruction and Development Providing for a Global Environmental Facility Grant to Finance Preparation of the *Russian Renewable Energy Sources Development Programme*" as of 1 November 2005;
- Directive of the Government of the Russian Federation No.613 "On the Federal Programme *Research and Development in Priority Areas of the Russian Federation's Scientific and Technological Complex in 2007-2012*" as of 17 October 2006;
- Directive of the Government of the Russian Federation No.54 "On the Federal Programme *National Technology Base for 2007-2011*" as of 29 January 2007;
- Directive of the Government of the Russian Federation No.333 "On Improving State Regulation of Gas Prices" as of 28 May 2007;
- Directive of the Government of the Russian Federation No.464 "On Endorsing the Regulations for Financing Investment Programmes for Utility Complex Manufacturers of Products and Services Relating to Electricity and/or Heat Supply" as of 23 July 2007;
- Directive of the Government of the Russian Federation No.426 "On Qualification of Generating Facilities Based on Renewable Energy Sources" as of 3 June 2008;
- Directive of the Government of the Russian Federation No.520 "On the Basics of Pricing Policy and the Order for Regulating Tariffs, Markups and Limit Indexes as Related to the Operations of Utility Complex Organizations" as of 14 July 2008;
- Directive of the Government of the Russian Federation No.1220 "On Determining Reliability and Quality Indicators for Products and Services as Used for Calculation of Long-Term Tariffs" as of 31 December 2009;

- Directive of the Government of the Russian Federation No.1221 "On Endorsing the Rules for Determining Energy Efficiency Requirements for Products, Works and Services to Be Contracted by Municipal Authorities" as of 31 December 2009;
- Directive of the Government of the Russian Federation No.1222 "On Types and Characteristics of Goods Whose Energy Efficiency Category Is to Be Stated in the Accompanying Technical Documentation, in the Goods' Labeling and Marking, and on the Principles for Determining the Goods' Energy Efficiency Category by Manufacturers and Importers" as of 31 December 2009;
- Directive of the Government of the Russian Federation No.1225 "On Requirements to Regional and Municipal Programmes Aimed at Improving Energy Saving and Energy Efficiency" as of 31 December 2009;
- Order of the Ministry of Economic Development of the Russian Federation No.61 "On Endorsing a Tentative List of Measures Aimed at Improving Energy Saving and Energy Efficiency to Be Used for Developing Regional and Municipal Energy-Saving and Energy Efficiency Improvement Programmes" as of 17 February 2010;
- Order of the Government of the Russian Federation No.1-r "On Principal Activities Aimed at Improving Energy Efficiency of the Electrical Power Industry through the Use of Renewable Energy Sources until 2020" as of 8 January 2009;
- Russian Federation Government's Order No.1715-r "On the Russian Federation's Energy Strategy until the Year 2030" as of 13 November 2009 (to substitute Russian Federation Government's Order No.1234-r "On Endorsing the Russian Federation's Energy Strategy until the Year 2020" as of 28 August 2003);
- Order of the Government of the Russian Federation No.1830-r "On Endorsing an Action Programme Aimed at Improving Energy Saving and Energy Efficiency in the Russian Federation" as of 1 December 2009;
- SNiP 31-01-03 "Residential Apartment Buildings";
- SP 23-101-2004 "Design and Construction Regulations";
- GOST R 51379-99 "Energy Supply. Energy Data Sheet of Industrial Consumers of Fuel and Energy Resources. Basic Provisions. Standard Forms";
- GOST R 51380-99 "Energy Supply. Methods for Verifying Conformity of Energy-Consuming Products' Energy Efficiency to the Corresponding Standard Values";
- GOST R 51387-99 "Energy Supply. Regulatory and Methodological Support. Basic Provisions";
- GOST R 51388-99 "Energy Supply. Informing Consumers about Energy Efficiency of Household and Public-Use Goods. General Requirements";
- GOST R 51541-99 "Energy Supply. Energy Efficiency. List of Indicators. Basic Provisions";
- GOST R 51749-2001 "Energy Supply. Energy-Saving Equipment for General Industrial Applications. Types. Groups. Energy Efficiency Indicators. Identification";
- GOST R 51750-2001 "Energy Supply. Methodology for Determining Energy Intensity in the Production of Goods and Provision of Services in Process Energy Systems. General Provisions".

Appendix 2. Basic Provisions of Federal Law "On Energy Saving and Improving Energy Efficiency" No.261-FZ as of 23 November 2009

Table 0.1 Basic Provisions of Federal Law "On Energy Saving and Improving Energy Efficiency" No.261-FZ as of 23 November 2009

No.	Provision	Explanation
1	Introduction of requirements and restrictions on goods turnover on the territory of the RF	<p>A ban on incandescent lamps with a wattage greater than 100 watt takes effect on the RF territory on 1 January 2011. (Art. 10).</p> <p>Energy efficiency category of household energy-consuming appliances (from 1 January 2001), computers, electronic computer devices and office equipment (from 1 January 2012) must be shown in their technical documentation (Art. 10).</p>
2	Introduction of requirements relating to energy efficiency and installation of metering equipment in buildings and structures	<p>Buildings and structures must meet EE requirements, including (Art. 11):</p> <ul style="list-style-type: none"> – Indicators characterizing specific power consumption; – Requirements to architectural, functional, technological, design and engineering solutions affecting EE; – Requirements to individual elements, structures and their properties. <p>Buildings and structures that, after their completion, renovation or capital repairs, fail to meet EE requirements and are not fitted with energy resource metering equipment may not be commissioned¹⁶⁸ (Art. 11).</p> <p>The person in charge of maintenance of an apartment building, must carry out energy saving and energy efficiency improvement activities for the building's common property as provided for under the list as approved by the regional authorities. Expenses associated with such activities are to be borne by apartment owners (Art. 12)</p> <p>Owners of buildings, structures, residential houses, etc., must complete installation of water, natural gas, heat energy and electricity meters by 1 January (Art. 13).</p>
3	Implementation of energy saving and energy efficiency improvement programmes	<p>Regional and municipal energy saving and energy efficiency improvement programmes must be approved by 1 August 2010.</p> <p>Organizations with government's or municipal participation or with participation of organizations involved in activities subject to regulation must approve and implement energy saving and energy efficiency improvement programmes.</p>
4	Requirement to conduct energy audits	<p>Energy audits are mandatory for (Art. 16):</p> <ul style="list-style-type: none"> – Organizations with government's or municipal participation;

¹⁶⁸ During construction, developers must ensure conformity to the requirements of energy efficiency and provision of metering equipment.

No.	Provision	Explanation
		<ul style="list-style-type: none"> - Organizations involved in activities subject to regulation and organizations involved in production and/or transportation of water, natural gas, transmission of heat energy or electric energy, extraction of natural gas, oil, coal, oil product refining, gas processing, transportation of oil or petroleum products. <p>These organizations must conduct their first energy audit by 31 December 2012, and subsequently at least once every 5 years. Energy audits may be conducted by self-regulated entities only.</p>
5	Conclusion of energy-service contracts to ensure government and municipal needs	To ensure government or municipal needs, government or municipal clients are entitled to enter into energy service contracts (Art. 21). The basic provisions of an energy service contract are regulated by Articles 19-20.
6	Introduction of requirements to improve energy efficiency of state-owned enterprises	Beginning with 1 January 2010, state-owned institutions must ensure at least a 15% reduction in actual consumption of water, diesel and other fuel, fuel oil, natural gas, heat energy, electricity and coal for a five-year period (in similar operating conditions and as compared to the 2009 consumption of each resource), achieving an annual reduction of such consumption volume by at least 3%.
7	Transition to long-term tariffs based on long-term regulation parameters	Tariff regulation must be carried out mainly in the form of long-term tariffs based on long-term regulation parameters, inter alia, on the return on investment method.
8	A general outline for state support and funding of energy saving activities	<p>Government support may be provided in the form of:</p> <ul style="list-style-type: none"> - Assistance in investment activities as related to ES and EE improvement; - Encouraging the use of energy service contracts; - Support for regional, municipal programmes, etc. <p>Government support for investment activities may be carried out using measures of encouragement, by compensating part of the costs associated with interest rate payments for loans and credits granted by Russian credit institutions to finance implementation of investment projects in the field of ES and EE improvement.</p>

Appendix 3. Principal Activities Under the Government Programme for Energy Saving and Improving Energy Efficiency Until 2020

Table 0.1 Savings of Primary Energy To Be Achieved Through Implementing the Government Programme's Activities (Excluding RES), million TOE

Activity	Agency Responsible	2010-2015	2010-2020
Total		348.68	1145.16
Electric Power Industry			
Conclusion of target-oriented contracts in the electric power industry, including:	RF Ministry of Energy	84.50	314.88
Improving the efficiency of electric energy generation (through decommissioning of [gas, coal and diesel] power stations operating beyond their life-time, construction of new stations, and modernization)	RF Ministry of Energy	74.13	270.56
Improving the efficiency of electric energy transmission	RF Ministry of Energy	10.37	44.31
Heat Supply			
Introducing standard heat-supply designs, including:	RF Ministry for Regional Development, RF Ministry of Energy	50.02	159.04
Improving energy efficiency of heat generation by boiler houses	RF Ministry for Regional Development	22.76	62.69
Improving energy efficiency of heat energy transmission by heat networks	RF Ministry for Regional Development		
Introduction of co-generation in boiler houses	RF Ministry for Regional Development	2.43	20.00
Public utility sector			
Improving energy efficiency of the public utility sector, including:	RF Ministry for Regional Development	2.88	8.62
Introducing variable-speed drives for water-supply and water discharge	RF Ministry for Regional Development	0.83	2.60
Improving energy efficiency of street lighting	RF Ministry for Regional Development	2.05	6.03
Industry			
Improving energy efficiency in industry, including:	RF Ministry for Industry and Trade RF Ministry of Energy	114.09	337.02
Conclusion of target-oriented contracts in industry:	RF Ministry for Industry and Trade RF Ministry of Energy	92.50	272.90
– Improving energy efficiency of fuel extraction and processing (in coal mining and processing, oil extraction and refining, gas extraction)	RF Ministry of Energy	71.42	201.74
– Improving energy efficiency of energy-intensive industrial processes, inter alia, through phasing out of old equipment, commissioning of new capacity that in terms of specific costs would correspond to best international practice, and capacity modernization.	RF Ministry for Industry and Trade	21.07	71.16
Implementing standard projects in industry ("Efficient Electric Motors", "Variable-Speed Drive", "Efficient Compressed Air Systems", "Efficient Industrial Lighting Systems", "Efficient Steam-Supply Systems")	RF Ministry for Industry and Trade	21.60	64.13

Activity	Agency Responsible	2010-2015	2010-2020
Agriculture			
Implementing standard projects in agriculture ("Improving Fuel Efficiency of the Tractor Fleet", "Improving Energy Efficiency of Green Houses")	RF Ministry of Transport	2.09	7.98
Transport			
Improving energy efficiency in transport, including:	RF Ministry of Transport	22.94	100.38
Conclusion of target-oriented contracts ("Improving Energy Efficiency of Railway Service", "Improving Energy Efficiency of Gas Pipeline Transfer", "Improving Energy Efficiency of Oil Transportation")	RF Ministry of Transport	19.02	72.70
Implementing activities relating to vehicular traffic ("Introducing Fuel Standards for Cars", "Introducing Fuel Standards for Trucks", "Introducing Fuel Standards for Buses", "Efficient Driving Courses", "Encouraging the Purchase of Hybrid and Compact Cars", "Developing Urban Transport Infrastructure and Logistics")	RF Ministry of Transport	3.92	27.68
State-Owned Institutions and Services Sector			
Improving energy efficiency for state-owned institutions and services sector, including:	Federal RF agencies, regional and municipal authorities	41.90	118.29
Installation of heat meters		-	-
Introduction of a new SNiP "Energy Efficiency in Buildings":		0.00	2.37
Capital repairs of state-owned and services sector buildings		7.59	21.71
Heat insulation of buildings and heating plants		8.37	25.67
Introduction of efficient gas boilers		5.81	17.08
Introduction of efficient lighting systems		12.07	26.18
Purchase of energy-efficient equipment		8.05	25.27
Residential Buildings			
Improving energy efficiency of residential buildings, including:	RF Ministry for Regional Development, regional and municipal authorities	30.28	98.95
Installation of gas and heat meters			
Development and introduction of a new SNiP "Energy Efficiency in Buildings":		1.55	9.85
Capital repairs of residential buildings		8.07	25.79
Heat insulation of apartments and public-use areas		2.08	13.39
Introduction of efficient lighting systems		7.60	18.40
Switching to efficient refrigerators, freezers and washing machines		2.65	7.02
Switching to efficient gas boilers		8.32	24.49

Appendix 4. Potential Management Reforming Schemes for the Public Utility Sector

Table 0.1 Potential Management Reforming Schemes for the Public Utility Sector [40]

Actions	Advantages	Disadvantages
1. Establishing a Management Company		
<p>1. The municipality decides on establishing a management company in the form of an JSC (or a PLC) with more than 25% of all shares owned by the municipality.</p> <p>2. By owner's decision, the assets are recalled from the MUE and the MUE is subsequently liquidated. In the process, the owner will have to satisfy the claims of the MUE's creditors or provide them with the corresponding guarantees.</p> <p>3. The owner leases the property, needed for providing public utility services to the municipality's residents, out to the newly-established JSC (or PLC).</p>	<p>1. Keeping the municipality's title to unique items of public utility sector property as well as the blocking stake in the JSC will allow to ensure the system's manageability and control by the municipality.¹⁶⁹</p> <p>2. Economic management is replaced by new tools for state-owned asset management: management of JSC shares, lease contracts, concessions (for a PLC – lease contracts and concessions).</p> <p>3. A phased split-off of auxiliary functions from the JSC and their subsequent privatization.¹⁷⁰</p>	<p>1. The absence of legal succession between the JSC (or PLC) and the MUE requires addressing issues relating to ensuring creditors' rights, collection of accounts receivable, transfer of non-tangible assets and working capital. To that end, the MUE will have to operate until all its obligations are fully discharged.</p> <p>2. Financial losses due to transfer of the MUE personnel to the JSC (or PLC).</p> <p>3. There exists a theoretical possibility that the transaction to recall the assets from economic management by the MUE prior to deciding on its liquidation may be impeached.</p> <p>4. No objective possibility to account for the public utility sector's property by the municipality.</p> <p>5. Leasing the assets out to a JSC (or PLC) without a tender contravenes the principles of deregulation and support for competition in the field of state asset management.</p>
2. Privatization of the MUE's Property Complex on the Basis of Production Assets		
<p>1. The MUE develops a proposal for privatizing</p>	<p>1. Keeping the municipality's title to unique</p>	<p>1. The term "privatization" implies transfer of assets</p>

¹⁶⁹ For JSCs only.

¹⁷⁰ For JSCs only.

<p>the enterprise's property complex.</p> <p>2. The municipality decides on privatizing the MUE and endorses the privatization plan (The list of the property complex to be privatized is determined by the municipality at the MUE's suggestion. Such complex may not include process facilities classified as fixed assets, or non-core assets which are to be dealt with in accordance with the MUE's restructuring concept).</p> <p>3. The MUE is reorganized into a JSC in accordance with the privatization legislation and privatization plan (with more than 25% of the share owned by the municipality. To alienate these shares, the municipality will need to pass an additional resolution. The JSC becomes a legal successor of the MUE).</p> <p>4. The municipality leases the repossessed assets, not included in the enterprise's property complex, out to the JSC (without a tendering procedure).</p>	<p>items of public utility sector property.</p> <p>2. Economic management is replaced by new tools for state-owned asset management: management of JSC shares, lease contract, concessions.</p> <p>3. JSC's succession in relation to the MUE ensures a smooth reorganization (transfer of assets, including non-tangible assets, working capital and obligations) from the MUE to the JSC.</p> <p>4. Guarantees to the workforce are ensured.</p> <p>5. Non-core assets and auxiliary functions may be split-off both during the MUE privatization stage and from the JSC (with their subsequent privatization).</p>	<p>from public ownership into the ownership of individuals and legal entities. Accordingly, there exists a psychological barrier (whereby public opinion associates privatization with transfer of assets to private owners) which, for the municipality, is fraught with the loss of control over the management company's activities.</p> <p>2. No objective possibility to account for the public utility sector's property by the municipality.</p>
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3. Assets Lease from the MUE

<p>1. A management company in the form of a JSC is established (the MUE retains certain functions, for example, the customer's function).</p> <p>2. With the municipality's permission and following a tender, the MUE leases the assets out to the JSC.</p> <p>3. Once the main transition period-related issues are resolved, the municipality decides on liquidating the MUE and repossesses the leased property, retaining succession under the lease</p>	<p>1. If the JSC is founded by the MUE, its process facilities and current assets are contributed to the JSC's charter capital without the use of procedures stipulated by the privatization laws.</p> <p>2. The MUE keeps the process facilities on its balance and calculates amortization for taxation purposes. The issue of accounting for the assets by the municipality is thus eliminated.</p>	<p>1. Implementing this, and the other schemes, will require organizational, time and financial costs, while the end result cannot be recognized as corresponding to the goals of reforming.</p> <p>2. This scheme will only add to monopolization of the public utility sector. Keeping the MUE's as the lessor is an ineffective option for the municipality as it creates a buffer between the municipal budget and the assets' users, thus reducing transparency of the municipal assets' utilization, and hinders control over</p>
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<p>contract. 100% of the JSC shares are transferred to the municipality.</p>	<p>3. The rights of the MUE's creditors are not prejudiced.</p>	<p>income generated from using such assets. 3. The use of a tendering process becomes inevitable.</p>
<p>4. Privatization of the MUE's Property Complex</p>		
<p>1. The municipality decides on privatizing the MUE and endorses the privatization plan. The list of the property complex to be privatized includes all the assets held by the MUE except for non-core assets to be split-off in accordance with the enterprise's restructuring concept. As a result of privatization, the newly-established JSC (with more than 25% of the shares owned to the municipality) becomes the infrastructure's owner. The value of the JSC's assets corresponds to net assets value of the MUE; the JSC's shares, or controlling stake, are held in trust following a competitive tender.</p>	<p>1. Management of shares, rather than property makes the contract more flexible, eliminating the disadvantages of property lease. 2. The municipality retains control and influence (provided that the shares remain in its possession). 3. Creating conditions for competition as related to public utility sector management.</p>	<p>1. Loss of government's title to process facilities within the public utility sector; a theoretical possibility of the municipality alienating the JSC shares. 2. Impossibility of further use of a concession scheme for the purposes of HPU sector management.</p>

Appendix 5. Standards Forms to Be Used by Public Housing Sector Enterprises for Draft Investment Programme Applications Submitted to Regulatory Bodies

Table 0.1 Investment Programme Details

Programme title	
Justification for development	
Client	
Developer	
Prepared by	
Implementation period	
Goals and objectives	
Investment projects' details	
Amounts and sources of funding	
Expected deliverables	
Control of programme's implementation	

Reinvested profits												
Amortization												
Other own sources												
Borrowed funds												
Loans from credit institutions												
Budget funds, including:												
Federal budget												
Republican budget												
Local budget												
Funds from extra-budgetary sources												
Other funds												

Table 0.3 Investment Projects' Goals and Effect from their Implementation

No.	Project Title	Goals	Indicators (Effect from Implementation)
1	2	3	4

Table 0.4 Calculation of Markup on Price / Tariff for Products / Services of the Public Utility Sector Enterprises

No.		Amount				
		Total	Including By Implementation Years			
			20__	20__	20__	20__
1	2	3	4	5	6	7
I.	Estimate cost of the investment programme projects for calculating markup on price (tariff), total, inclusive of VAT:					
	Including by project:					
a)						
b)						
II.	Financial resources for implementing the investment programme projects, total:					
	Including:					
1.	By source:					
a)	Credit funds					
b)	Own funds					
c)	Funds provided by other organizations					
d)	Budget funds, total:					
	Including repayable					
	Including:					
	Federal budget					
	Republican budget					
	Municipal budget					
e)	Expected receipts from clients					
2.	Other expenses associated with the programme's implementation:					
a)	Debt servicing (interest for using the credit)					
b)	Production and distribution costs					
c)	Payments to the budget					
d)	Other costs (specify)					
III.	Funds received during implementation of the investment programme projects, total:					
	Including:					
1.	Compensation of taxes and charges (specify)					
2.	Savings from projects' implementation					
3.	Other receipts (specify)					
IV.	Total expenses associated with implementation of the investment programme projects (par. II - III)					
V.	Forecast consumption volume					

No.		Amount				
		Total	Including By Implementation Years			
			20__	20__	20__	20__
VI.	Markup on price / tariff for the organization's products / services					

Table 0.5 Calculation of Tariff for Connection to Public Utility Infrastructure Facilities

No.		Amount				
		Total	Including By Implementation Years			
			20__	20__	20__	20__
1	2	3	4	5	6	7
1	2					
I.	Estimate cost of the investment programme projects for calculating markup on price (tariff), total, inclusive of VAT:					
	Including by project:					
a)						
b)						
II.	Financial resources for implementing the investment programme projects, total:					
	Including:					
a)	Credit funds					
b)	Own funds					
c)	Funds provided by other organizations					
d)	Budget funds, total:					
	Including repayable					
	Including:					
	Federal budget					
	Republican budget					
	Municipal budget					
e)	Expected receipts from clients					
2.	Other expenses associated with the programme's implementation:					
a)	Debt servicing (interest for using the credit)					
b)	Production and distribution costs					
c)	Payments to the budget					
d)	Other costs (specify)					
III.	Funds received during implementation of the investment programme projects, total:					
	Including:					
1.	Compensation of taxes and charges (specify)					
2.	Savings from projects' implementation					
IV.	Total expenses associated with implementation of the investment programme projects (par. II - III)					

No.		Amount				
		Total	Including By Implementation Years			
			20__	20__	20__	20__
1	2	3	4	5	6	7
V.	Total subscribed demand for all facilities under construction and reconstruction to be connected					
VI.	Connection tariff					
VII.	Commissioning of housing, m ²					
VIII.	Appreciation of 1 m ² of housing					

Appendix 6. Credit Terms Offered by Tomsk-Based Banks

Table 0.1 Credit Terms Offered by the Tomsk-Based Banks

N o.	Bank	Product Name	Amount of Credit	Currency	Interest Rate	Term
1	Alpha Bank	Universal Credit Facility Working capital replenishment, purchase of new or modernization of existing equipment	Up to 50 million rubles (or equivalent in another currency)	RUR, \$, €, Swiss francs		3-36 months
2	VTB 24	Business Development Loan Working capital replenishment, purchase of equipment	Up to 143 million rubles (or equivalent in U.S. dollars or euro)	RUR, \$, €	Fixed (to be determined on an individual basis)	Up to 60 months
3	KIT Finance	Business Financing of working capital, fixed investment.	Up to 20 million rubles	RUR	18% per annum Commission: from 0.11% of the credit amount every month	3-36 months
		Professional Financing of working capital, fixed investment.	Up to 60 million rubles	RUR	18% per annum Commission: from 0.14% of the credit amount every month	3-36 months
4	KMB Bank	Business Credit Working capital replenishment, investments	Up to 75 million rubles; Up to 3 million Us dollars; Up to 2 million Euros	RUR, \$, €	19.5-28.5% floating rate in RUR; 12.5-17.0% floating rate in U.S. dollars or euro ¹⁷¹ Commission: 1-5% of the credit amount	Up to 7 years
5	Mosoblbank	Credit against equipment pledge	Up to 80 million rubles ¹⁷²	RUR, \$, €	22-24% per annum in RUR; 14-22% per annum in U.S. dollars or euro ¹⁷³	1-24 months

¹⁷¹ Interest rate depends on credit amount and period

¹⁷² Not more than 70% of the facility's market value.

¹⁷³ Interest rate depends on credit amount and period

N o.	Bank	Product Name	Amount of Credit	Currency	Interest Rate	Term
					Processing commission: from 1% of the credit amount Management charge: 0.25% of the remaining debt every month	
6	Promsvyazbank	Credit - Equipment Purchase of new equipment	Up to 15 million rubles	RUR	22-25% per annum depending on the credit amount and period Processing commission: 1.5% of the credit amount	3 or 4 years
7	Rosbank	Loans to small and medium business Working capital replenishment, purchase of fixed assets, investments, investment refinancing	Up to 30 million rubles (or equivalent in another currency)	RUR, \$, €	17.5-20.0% in RUR; 13.5-18.0% in U.S. dollars or euro; Processing commission: 0.3-1.5% of the credit amount	3-60 months
8	Rosprombank	Business development loans	Up to 20 million rubles	RUR	15% per annum Processing commission: 0.5-1.5% of the credit amount	From 6 months
9	Uralsib	Business Growth Financing of working capital, investment financing	Up to 15 million rubles	RUR	From 17% in RUR Processing commission: from 1% of the credit amount, but not more than 45 thousand rubles	2 years (working capital replenishment); Up to 5 years (investment)
10	Uniastrum Bank	U-PRIME Working capital replenishment, purchase of fixed assets	Up to 20 million rubles	RUR	17.7% Processing commission: 2.7% of the credit amount	3 years (working capital replenishment); Up to 10 years (investment)
		U-BUSINESS PRIME Working capital replenishment, purchase of fixed assets	Up to 250 million rubles (but not more than 6 million Euros)	RUR, \$, €	15.7% in RUR; 12.7% in U.S. dollars / euro; Processing commission: 2.7% of the credit amount	Up to 3 years (working capital replenishment); Up to 10 years (investment)
		Business development loan Working capital replenishment, purchase of fixed assets	Up to 20 million rubles	RUR	From 18% Processing commission: from 1% of the credit amount	Up to 5 years

N o.	Bank	Product Name	Amount of Credit	Currency	Interest Rate	Term
		U-Super Prime Working capital replenishment, purchase of fixed assets	Up to 100 million rubles or 3 million U.S. dollars	RUR, \$, €	13.7% in RUR; 10.7% in U.S. dollars / euro; Processing commission: 2.7% of the credit amount	Up to 5 years (working capital replenishment); Up to 10 years (investment)

Appendix 7. Leasing Companies Operating in the Siberian Federal District

Table 0.1 Leasing Companies Operating in the Siberian Federal District

	Company Name	Location / Branches in Siberian Federal District	Equipment Lease, Contract Provisions
1	Uralsib leasing company http://www.leasing.uralsib.ru	Branches: Barnaul, Irkutsk, Kemerovo, Krasnoyarsk, Novosibirsk, Omsk, Tomsk	Equipment of any complexity, customized process lines. 1 Duration of lease contract: up to 5 years; 2 Amount of financing: from 15 million rubles; 3 Advance payment: from 30%; 4 Appreciation: from 5%, 5 Payment schedule: – Linear; – Stepped; – Annuity; – Seasonal.
2	AllianceRegionLeasing http://www.arleasing.ru	Head office: Novosibirsk	Universal leasing company with clients in all branches of the economy.
3	Siberian Leasing Company http://www.siblizcom.ru	Head office: Novosibirsk, branches: Tomsk, Kemerovo, Barnaul.	6 First installment: 30% max of the equipment value; 7 Duration of lease contract: 1-5 years.
4	TransCreditLeasing http://www.tcb.ru/corporative/leasing	Branches: Barnaul, Irkutsk, Kemerovo, Krasnoyarsk, Novosibirsk, Omsk, Tomsk, Chita	Equipment for the power industry. 1 Leasing period: 2-10 years depending on equipment leased, value and amortization period; 2 Value of equipment for lease: from 10 million rubles; 3 Security: pledge of equipment for lease; 4 Advance payment by lessee: from 10% equipment's value; 5 Payment schedule: monthly or quarterly; 6 Mandatory insurance of equipment by lessor.
	Gaztekhleasing	Head office: Moscow Clients: Gazprom JSC subsidiaries	Various lease schemes are available: 1 Direct lease; 2 Indirect lease; 3 Leaseback; 4 Lease to supplier; 5 Financial lease.
6	Baltiyski Leasing Group of Companies	Branches: Irkutsk, Kemerovo, Krasnoyarsk, Novosibirsk, Omsk, Tomsk	Equipment for all branches of the economy. 1 Transaction value: from 500 thousand rubles;

	Company Name	Location / Branches in Siberian Federal District	Equipment Lease, Contract Provisions
	http://www.baltlease.ru		2 Advance payment – 30% of equipment value; 3 Security: Equipment for lease.
7	Center-Capital http://www.c-capital.ru	Branches: Novosibirsk, Omsk	Equipment for all branches of the economy. 1 Equipment appreciation: from 9% PA; 2 Standard advance payment: from 25%; 3 Lease period: 2-5 years.
8	UniCreditLeasing http://www.unicreditleasing.ru	Omsk	Equipment for all branches of the economy (with the public utility sector accounting for 8% of all operations). 1 Duration of lease contract: 3-10 years; 2 Advance payment by lessee: 5-30%; 3 Payment schedule: monthly or quarterly; 4 Fixed or floating interest rates; 5 Equipment may be shown on lessee's or lessor's balance-sheet.
9	RaiffeisenLeasing JSC http://www.raiffeisen-leasing.ru	Branch: Novosibirsk	Equipment for various branches of the economy: 1 Duration of lease contract: 2-5 years; 2 Advance lease payment: 15-30%; 3 Minimum transaction amount: €150 K; 4 Appreciation: 7-10% PA.
10	Glavleasing JSC www.glavleasing.ru	Branches: Kemerovo, Novosibirsk, Omsk, Tomsk	Equipment for all branches of the economy (with power equipment accounting for 13.41% of all operations). 1 Duration of lease contract: up to 5 years; 2 Advance payment: from 20%; 3 Annual appreciation: 7% (hard currency), from 8% (rubles).
11	Interleasing LLC http://www.ileasing.ru	Branches: Krasnoyarsk, Novosibirsk,	Equipment for various branches of the economy, including power equipment: 1 Duration of lease contract: 1-5 years; 2 Annual appreciation: 8-10% (hard currency), 10-12% (rubles).
12	RMB-Leasing PLC http://www.rmb.ru	Branches: Novosibirsk, Kemerovo, Novokuznetsk, Krasnoyarsk, Irkutsk.	Equipment for all branches of the economy. 1 Minimum value of equipment for lease: 3 million rubles 2 Advance payment: from 10%; 3 Lease period: up to 5 years; 4 Appreciation: 8-12% PA;

	Company Name	Location / Branches in Siberian Federal District	Equipment Lease, Contract Provisions
			5 Security: lessor's title to equipment being leased.
13	Medved Leasing Company http://www.lk-medved.ru	Head office: Moscow, regional operations	Equipment for various branches of the economy, including power equipment: 1 Minimum value of equipment for lease: 3 million rubles; 2 Advance payment: 5-30%; 3 Lease period: 2-5 years; 4 Appreciation: 9-12% PA.
14	Yugorskaya Leasing Company JSC http://www.ugra-leasing.ru		Equipment for various branches of the economy, including lease of equipment in the HPU sector (heat and water supply, equipment for small-scale power generation) on the following conditions: 1 Advance payment: from 30%; 2 Duration of lease contract: up to 5 years; 3 Maximum average annual project appreciation: 9%; 4 Concessionary insurance available; 5 Budget funding options may be considered.