

## Conference Paper

# Formation of the Management System of the Mechanism for Implementing Energy Service Contracts in the Republic of Sakha (Yakutia)

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## Abstract

The article is devoted to the actual problem of the northern regions of Russia, which have an extreme climate for life in their territory with a long period of negative temperatures during the year. The mechanism of public-private partnership is of particular relevance in the conditions of budgetary deficit, acting as an effective tool for attracting innovative energy-saving technologies to the housing and utilities sector, which allows achieving substantial financial savings, regardless of the number of energy consumers. Due to the fact that the Northern regions of Russia are characterized by low population density and a small number of energy consumers. The article reveals a system of principles, the observance of which, when implementing the energy saving policy of the Republic of Sakha (Yakutia), will make it possible to increase the effectiveness of its goals of achieving it. The perspective benefit and interest of the parties is presented at interaction within the limits of state - private partnership of both parties of the state and business, at realization of energy service activity. An element of the scientific novelty of our research is the proposal of the management system of the mechanism for implementing energy service contracts for regions with climatic development limitations, with full consideration of the indicated principles of the region's energy-saving policy, which allows taking into account the specifics of the energy zones available in the territory and the application of a differentiated approach.

**Keywords:** energy saving policy; energy saving; energy efficiency; energy service contracts; management system.

## 1. Introduction

The problem of energy saving in the housing and utilities sector (hereinafter referred to as HUS) has become highly relevant in recent years. In particular, in areas with complex

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natural and climatic conditions of life. Natural and climatic conditions of the Republic of Sakha (Yakutia) are characterized as extreme, with an absolute minimum temperature in the area of "Cold Pole" to  $-70^{\circ}\text{C}$ . Most of the republic's territory is located in the permafrost zone. The region is one of the coldest regions in Russia, with a long winter period and a short summer period. The total duration of the period with negative air temperature is up to 9 months per year.

HUS industry is the only sector of the country's economy that has huge potential and inexhaustible opportunities, due to the high number of consumers, which suggests a high potential for interaction between the state and business in the field of energy saving and energy efficiency. At the same time, the industry has its own specifics, a high level of depreciation of funds, the duration of the effect of investment, in comparison with other sectors of the economy, being one of the most problematic sectors of the country.

The modern economy dictates its market conditions for doing business. The formation of conditions occurring within the framework of the current institutional environment of the state takes place with the involvement of all subjects of a market economy. One of the distinguishing features of the modern market economy is a mutually beneficial dialogue between the state and business, contributing to the emergence of further interactions between them on the basis of partnerships.

Increasing the competitiveness of domestic products, enhancing energy security, rational use of energy resources in order to implement energy conservation policies and improve energy efficiency are of particular importance under current conditions.

The increasing demand for energy-saving policy in all sectors of the economy is explained by the rational competitive policy of modern enterprises in the conditions of widespread increase in demand for energy resources.

Thus, the lack of programs and measures to improve energy efficiency of production entails such consequences as inefficiency of the economy, lack of competitiveness of products, low sales in the world and domestic markets, increased export costs, shut-downs to produce expensive products, reducing jobs and ultimately, the decline in the standard of living of citizens [3, p.70].

Energy service contract (or performance contract) can be identified as one of the most effective mechanisms of interaction between the state and business in the field of energy saving and energy efficiency of the housing sector, carried out between the state represented by state or municipal authorities and on the other side of the energy service company (ESCO). According to the author, this is a kind of Association, primarily of financial, organizational, managerial and technological resources of the state and the private sector for the construction and operation of state or municipal property, as well

as the provision of socially necessary services to the population. It should be noted that the state is primarily interested in attracting and choosing a partner offering the most effective project on socio-economic indicators.

The author notes that the mechanism of interaction between the state (customer) and business (contractor) within the framework of the energy service contract in the public sector is of the greatest interest in the framework of our research. In other words, we should examine in detail not the contract itself, which involves the development, implementation and realization of the activities reflected in the document, but directly the organizational mechanism for the implementation of effective interaction between the state and ESCO within the contract itself to achieve economic efficiency in the implementation of energy service activities.

In our view, it is necessary to clarify the initial stage of the formation of such interaction - the special interest of both sides. It is well known that most of the objects of social importance in the housing sector are not in the best condition. The state represented by state or municipal authorities is interested in the smooth and efficient activities of objects of social importance from the economic point of view, preferably minimizing the budget burden. In addition, the motivation is associated with the desire to attract highly qualified and highly specialized specialists with innovative solutions and technologies in the implementation of energy service activities. Representatives of the business side, especially small and medium-sized businesses, have a higher degree of flexibility, in the context of changing factors of the dynamic impact of the external environment.

Also, energy-saving policy is of a social nature, in terms of providing quality services to the population – consumers of energy resources, which improves the quality of their lives.

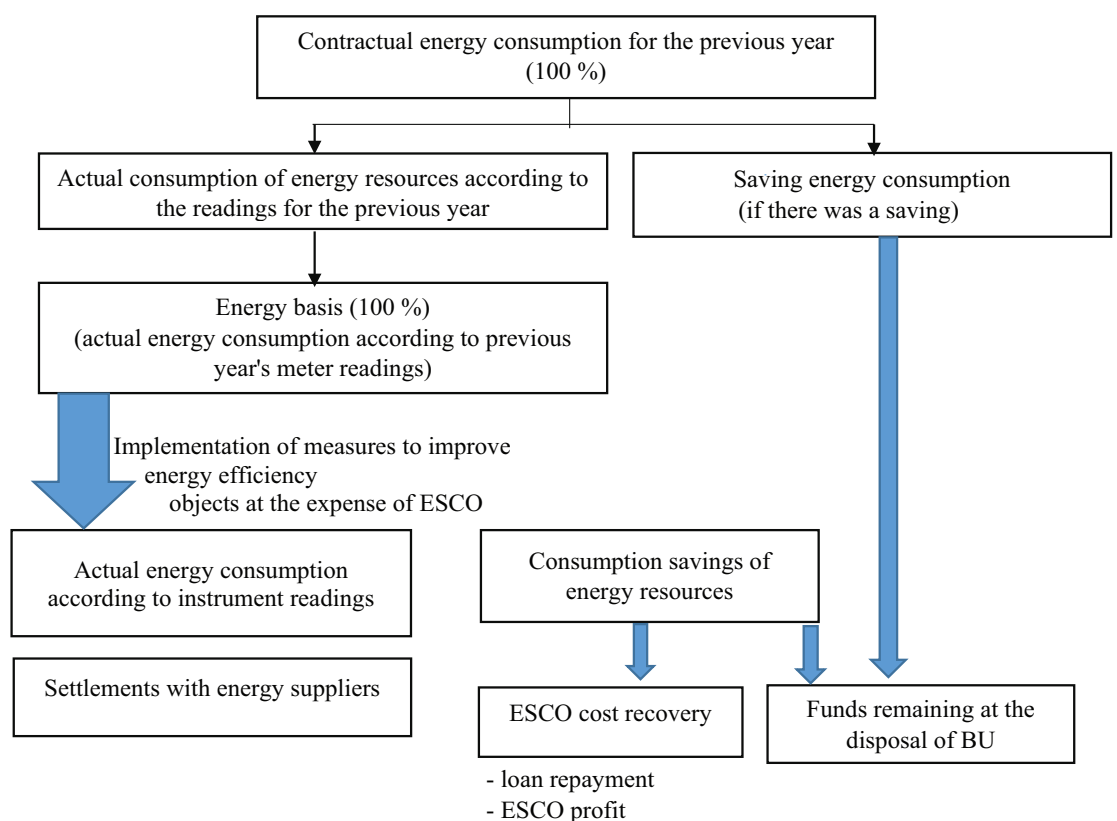
Business interest in the implementation of energy service activities is associated with the involvement of the sphere of activity to the unique type of business. In fact, the point at issue is that the fact that earlier access to the provision of energy services for private companies was closed. The provision of energy services by ESCO is currently taking place in the context of the formation of energy service business in the country. Thus, the first energy service contract in Russia was concluded in 2010 between the North – Western district of Moscow and the First national energy service company. To date, there are already several hundred ESCO in our country.

There are three existing models for financing energy service activities according to [4, p. 241], such as direct financing of ESCO in the implementation of energy services in the public sector using the RDEB loan funds (Reconstruction and Development European Bank), financing of ESCO using specialized regional funds (municipal) level and funds

from the budgets, as well as the financing of energy saving measures by opening a credit line to commercial banks of the RDEB, sharing risks of lending projects. The presented models of financing are applicable for carrying out actions for energy saving of objects of the budgetary sphere.

In addition, a number of large Russian banks, understanding the prospects of energy service activities, have included units specializing in the financing of energy-saving projects in its composition. Thus, a directorate for the management of projects in the field of energy conservation has been established in the structure of Sberbank of Russia, on behalf of the Government of the Russian Federation that solves problems in the field of energy efficiency. OAO Gazprombank is currently implementing the direction of the provision of credit and leasing products based on project financing of measures in the field of energy efficiency [6, p.133-134].

The existing and generally accepted mechanism for the implementation of the energy service contract is essentially a form of interaction and distribution of the main functions in the energy service activities:



**Figure 1: The existing mechanism for the implementation of energy service contracts in the budgetary sector of the RS (I).** [source 2]

Energy service activities have the highest potential at public sector facilities, where savings can reach 40% of energy savings with contract terms of up to 5 years. At the same time, objects of the budgetary sphere in the territory of the Republic are quite homotypic, have similar problems. Therefore, measures for the introduction of energy-saving technologies and various technical solutions can be implemented on a standardized well-functioning mechanism.

Realized energy service contracts in the area of multi-unit facilities are not widely distributed, there is potential in this area, along with implementation features.

A scheme has been introduced in the Republic of Sakha (Yakutia), in the field of support to energy service companies, to reimburse part of the budget for the payment of interest on loans and energy efficiency measures. As we noted earlier, the main reason for state support, according to some experts, is the inefficiency of the energy service contract at a loan rate above 14 %, which leads to a narrowing of the payback zone of activities to 1-2 years. At the same time, the implementation period of most energy-saving measures is longer, mainly from 5 years and above.

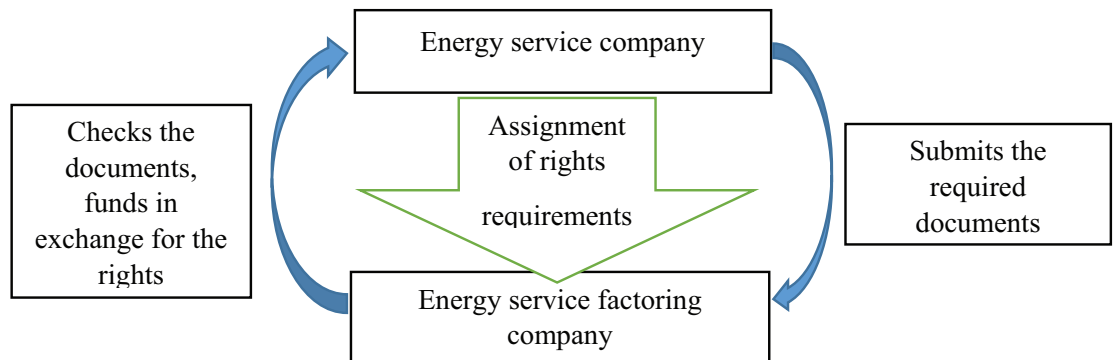
The main financial institution in the mechanism of interaction between the state and business is the largest credit and financial institution of the RS (I) joint – stock credit Bank Almazergienbank, which provides financial support since 2011 [5].

In order to reduce the debt burden of ESCO to financial institutions, RAER RS (I) proposes the creation of another entity of energy service relationships – energy service factoring company (ESFC), which redeems the right of claim under the energy service contract, transfers the amount of expected and calculated savings to ESCO. At the same time, ESCO does not relinquish its obligations to ensure further energy savings at the facilities having no more debt load. There is an opportunity for ESCO to focus their efforts on the next energy service project, which allows for continuous activities. In this context, the author highlights the duration of the process of return of savings from the introduction of energy-saving measures of the project and its gradually increasing effect.

A similar mechanism is proposed for use under the mechanism of the evolutionary approach to the implementation of energy saving measures based on a bilateral partnership using the mechanism of repayable target financing [1, p. 124].

The following is the procedure for the operation of an energy service factoring company proposed by RAER:

The main advantages of the proposed mechanism include the creation of competition among bidders, which in turn should lead to a decrease in the cost of energy services for the budget customer and the development of the energy service market. In addition, the state has the opportunity not to provide budget guarantees.



**Figure 2: Operation procedure of the energy service factoring company.** [compiled by the author on the basis of 2]

Our study showed that there is only a mechanism for the implementation of energy service contracts in the country, in the absence of a mechanism for managing partnerships in the framework of energy service activities. The study emphasizes the importance of the formation of a mechanism for managing the interaction between the state and business in the framework of energy service projects, in order to more effectively influence the whole set of factors that have a direct impact on the result of the activities of all participants in the process of introducing energy-saving technologies on a market basis.

The mechanism of interaction within the framework of energy service contracts management should include:

- Management objective, including specific future visions for improving the energy efficiency of the territory;
- Management factors on the basis of which the interaction is carried out and which are the elements of interaction within the framework of the energy service contract and their connection;
- Management resources represented by energy resources, organizational, technological and innovation potentials.

Summarizing the above, the mechanism of managing the interaction between the state and business in the implementation of energy service contracts should be achieved, with initially different interests in partnership, the common sphere of contact of the target installations. Depending on the uniqueness of the project, the purpose of energy service activities in different areas (settlements) of the region should be generalized, linked to the purpose of energy-saving policy of the region.

The mechanism of such management includes the collection of information for planning; the direct process of developing an implementation plan for the activities, including

also the technician-economic rationale for the project; the process of implementing the planned activities; accounting for the resulting savings of energy resources; energy audit and control by business and executive authorities; further analysis of the activities implemented under the energy service contract.

Various economic risks associated with the possibility of non-repayment of borrowed funds or incorrect economic calculation of the size of the expected savings during the implementation of energy saving measures have one of the decisive effects on the positive efficiency of the project under the energy service contract. In addition to this, there are risks associated with erroneous technical calculations, incorrectly carried out energy audit works.

Thus, the approach and application of energy service activities should be based on technical and economic calculations, taking into account all the features of a particular project, as well as the impact of various types of risks and constraints in the region. Each project is unique at its core and requires an exclusive approach from ESCO.

The strategic role of energy service contracts in the economy is to solve part of the socio –economic problems of the territory, namely, the implementation of energy saving and energy efficiency policy, investment policy of the state, improving the quality of life of the population, support for small and medium-sized businesses, the development of the Institute and the environment of public-private partnership.

In contrast to the existing and most common forms of public – private partnership, energy service contracts may be concluded for facilities located in remote areas with a small population and not of a strategic nature at the national or regional level. This key feature allows applying in practice energy service activities in a wide range of objects of varying degrees of importance. This is particularly important for remote and sparsely populated regions with extreme climatic conditions, such as the Northern regions. HUS in the North conditions require the use of special technologies for long-term operation in difficult conditions during the year and are in disrepair throughout.

The priority directions of development of the energy saving and energy efficiency policy of the Northern regions are formed on the basis of the peculiarities of the use of energy resources of the territory, as well as the needs of its economy. At the same time, the existing problems of the region in the field of energy and climate restrictions for the development of the territory's space should be taken into account.

In our opinion, the energy-saving policy of the Republic of Sakha (Yakutia) should be based on the following principles that require compliance in the implementation of its directions to achieve the goals:

- The principle of complexity reflects a comprehensive balance of interests of the parties and territories, taking into account factors that have a direct and indirect impact;
- The principle of transparency in the relationship of the parties means their openness to the community and the public;
- The principle of economic efficiency, reflecting the economic feasibility of the project, that is, the justification of income costs;
- The principle of social efficiency requires compliance with the General direction of socio - economic development of the territory associated with the improvement (improvement) of the quality of life of the population;
- The principle of continuity is associated with the constant and widespread formation and implementation of energy saving measures using innovative technologies;
- The principle of mutual benefit and support involves consideration of the economic and social interests of the parties to interact with the provided support, if necessary, from the public side of the business - side.

According to most researchers, the potential for the development and implementation of effective energy service contracts at housing and utilities facilities is high. Further development and implementation of the partnership between the state and business in the form of energy service contracts in energy saving measures has a number of positive aspects and will contribute to the following:

TABLE 1: Prospective benefit of the state and business community in their interaction in the form of energy service contracts.

No.	State	Business partner
1	Fast modernization and reconstruction of housing facilities in the field of energy saving	Long-term cooperation
2	Allocation of risk and responsibility	Access to the previously closed market
3	Effective cost management	The least financial risk
4	Depreciation of the budgetary stringency for the modernization and reconstruction of housing and communal facilities in the field of energy saving	Gaining experience in managing small and large projects
5	Attraction of private Russian and foreign investments	Benefits for activities related to the modernization and reconstruction of housing facilities
6	Exchange of experience in the implementation of innovative methods of modernization and reconstruction of housing facilities in the field of energy saving	The possibility of improving the public status in the form of the formation of a favorable image of the energy service company

[compiled by the author]



It is important to clarify that this activity involves a number of multifaceted problems with all the positive aspects of the energy service contract.

According to the author, all the problems in the implementation of energy service contracts should be divided into four groups:

- economic problems;
- financial problems;
- organizational problems;
- technical and economic problems.

There are problems that require finding the most profitable investment of objects in terms of recurrence to which energy conservation measures will be directed. Since the profitability of the objects in terms of return on investment for the investor plays a key role in the conclusion of contracts. This group of problems, in our opinion, should be referred to economic ones.

The next group of problems is to choose the most qualified performance in the market - the contracting of an energy service company offering the most high-quality and full-fledged services within the framework of energy saving measures. This group of problems should be attributed to the organizational one.

The next problem is related to financing the implementation of energy service projects, namely, Bank lending, which the energy service company needs. Banks that act as investors at the conclusion of contracts, play a key role in the success of energy-saving projects. At the same time, they have a rather weak representation of the energy service scheme, as a result of which there is a probability of weak trust. It should also be noted that there is no concept of material security of loans as a result of which banks perceive energy services as high-risk operations. As practice shows, lending rates for energy service projects are always higher than the market average. This type of problems in the implementation of energy services should be called financial one.

There are also technical and economic problems that arise in practice in the conditions of incorrect calculation of technical indicators of savings that ultimately affect the profit of ESCO.

An element of the scientific novelty of our research is the proposal of the management system of the mechanism for implementing energy service contracts for regions with climatic development limitations, with full consideration of the indicated principles of the region's energy saving policy.

The existing and generally accepted mechanism for implementing an energy service contract is essentially only a form of interaction and distribution of basic functions in energy service activities.

Energy service activities have high potential at public sector facilities, where savings can reach 40% of energy savings with contract terms of up to 5 years. At the same time, objects of the budgetary sphere in the territory of the Republic are quite homotypic, have similar problems. Therefore, measures for the introduction of energy-saving technologies and various technical solutions can be implemented on a standardized well-functioning mechanism.

On the basis of our study, it should be noted that the mechanism of implementation of the energy service contract should be understood as a special form of interaction between the subjects of energy service activities aimed at ensuring the feasibility of the project with an energy saving effect and assuming the possibility of measuring the economic efficiency of the project.

The presented scheme will allow for the formation of a management system for the implementation of energy service contracts, taking into account the specifics of the energy zone, to apply a differentiated approach in the territory where energy saving projects are planned. This systematic approach forms a comprehensive approach to the implementation of energy-saving policy in the region, designed to enhance the participation of business in solving socio – economic problems of the territory.

The proposed system of management of the mechanism for the effective implementation of energy service contracts should be based on conceptual approaches that have primarily such qualities as architectonics and continuity for subsequent use in the territory of the Republic, as well as similar regions with amendments to specific projects and conditions of implementation. In other words, the proposed management system can serve as a basis for further modernization in the context of various projects implemented within the framework of energy service interaction.

## 2. Conclusion

Thus, the proposed management system of the mechanism for the implementation of energy service contracts in the Republic will help to solve the existing problems in the implementation of energy saving and energy efficiency policies, as well as policies to support entrepreneurship in the region represented by energy service companies and minimize the occurrence of associated risks in energy service activities. The peculiarity of the presented scheme is the formation of solutions to the problems facing the

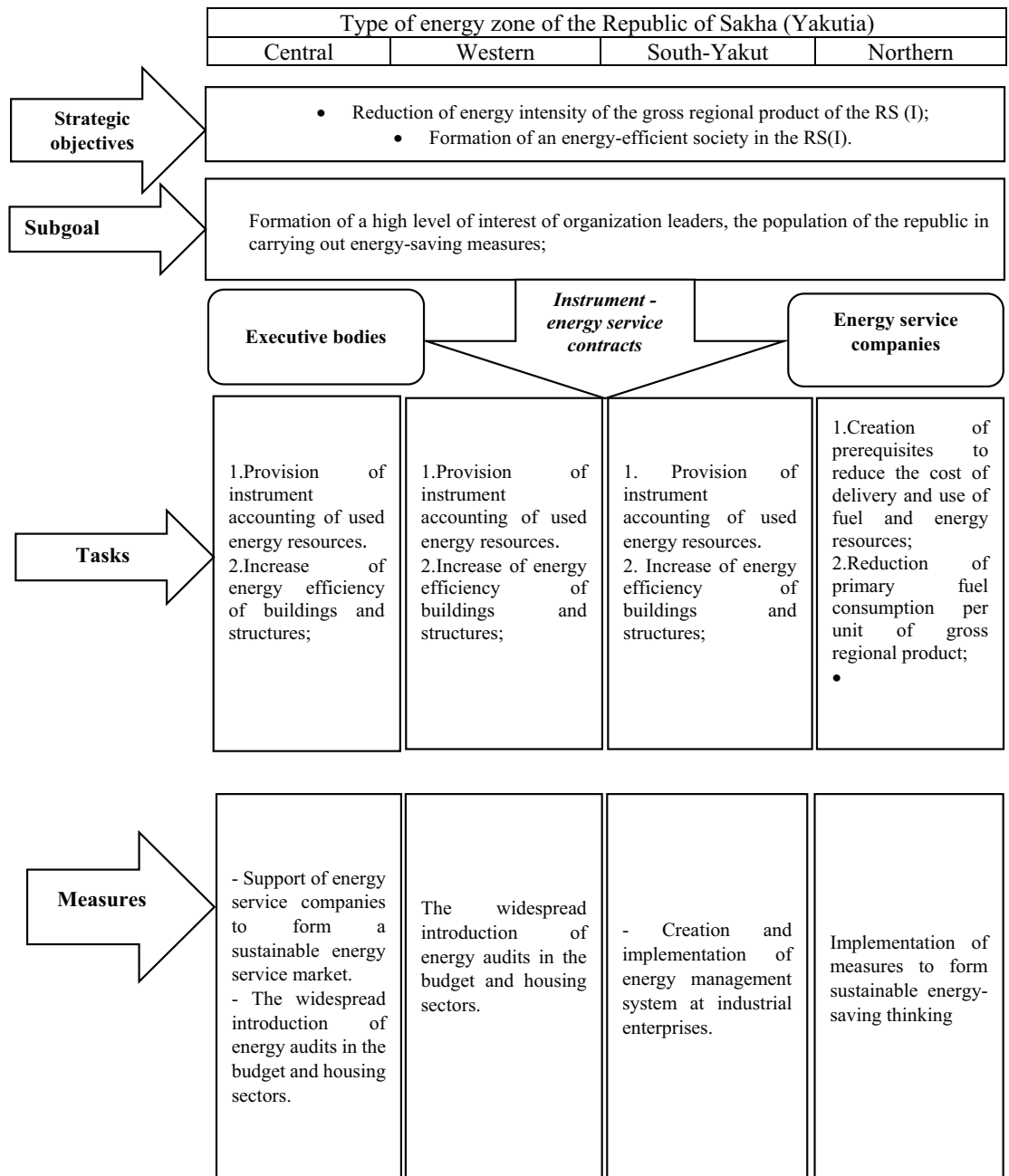


Figure 3: The control system of the mechanism for implementing energy service contracts in RS (I).

implementation of contracts and proposed measures for the implementation of energy service activities is their dependence on the corresponding energy zone dividing the region into Central, Western, South Yakut and Northern.

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