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The concept and features of automated tariffs forming in the regional heat supplying complex regulation system

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Abstract

In this article presented the results of the analysis of the state of problems in activities regulation of the regional heat supply complex and the main ways to increase the efficiency of its subject's activities, as well as the main decisions of creating a program package for the automated thermal energy tariffs calculations, oriented on ICS managing of heat supply using by the region organizations. The problems of automated registration of thermal losses during thermal energy manufacturing and transferring are analyzed. There is a platform had been chosen for design of complex software products in the concept of "cloud computing" and the assessing suitability criteria for building a universal software package **PT-Q-1** automated analysis and the formation of thermal energy tariffs.

Key words: heat supply, tariff, tariffs regulation, automated information system, software package, algorithm, software.

One of the vital sources of energy and an important component of the region's economy is heat (thermal energy). There is no exaggeration when we say that the constant producing and distribution of thermal energy in regional heating systems is the most necessary components of as region safety, as country as a whole. That's why solving of the problems of generalization and comprehension of the accumulated experience in the field of management of technological resources (natural monopolies), the search for new innovative concepts and methods of thermal energy tariffs forming and tariff regulation, today get the importance in conditions of region economic reforming.

Region Institution, which regulates State tariffs and prices is «Service on state regulation of prices and tariffs» (further **SSRPT**). Its main tasks are: state pricing in heat supply spheres; excluding from regulation the rebate tariffs for especial consumers, by others overpaid; keeping interests balance between all heat supply system subjects. Among modern methods of organization of all branches and levels mentioned system the main role is paid to organization of common information field "**SSRPT – regulation subjects**". The speed and precision of taking decisions are straight depends on the conditions and effectivity of this field. These decisions depend on efficient calculation and expenses analysis, including the prime cost of produced products or services of heat-and-power market.

It is beginning clear that in a conditions of labor structure of heat supply region system using of automated managing systems, which realize special created algorithms and systems of effective information exchange between them, is the most effective decision of collecting and working out of information arrays.

The analysis of different limits from the site of regional regulated institutions and their influence on the results [1], also practical methods of heat realization regulation, show

that it can't be said that there is exist full effective market, which reflects well-known requirements.

There is enough progress experience in a production cost covering for thermal energy in many industrial developed regions by rising tariffs (cross funding) for most of consumers sector manufactures.

One of the negative effect is refusal of most manufacturing consumers from buying thermal energy or, even, building local Heat Power Plants for small manufactures [2].

Missions of designing of program complex **PT-Q-1** of automated forming and tariffs analysis in a heat supply engineering was set in accordance with requirements of its using within the framework ICS heat supply manufactures and regional services of State tariffs regulation to achieve automated solving calculation:

- 1) set and support common standards and rules for all regulated subjects, particularly in methods of prime cost definition for producing and transfer heat power;
- 2) rise of effectiveness of efficient checking (appraisal) of expense distribution accuracy on product (services) prime cost by regulating institution;
- 3) monitoring and analysis of region heat supply conditions for working up efficient task-plan and strategy of development of heat-and-power region engineering.

As methodologic basis for working up machine algorithm of complex **PT-Q-1**, was accepted Methodology, proved by Federal tariffs service [3], based on index "necessary gross profit of regulated organization" when all types of tariffs are calculating. In accordance with accepted structural organization, complex **PT-Q-1** includes two main subsystems: 1 – **FRGP-1** (Forming of all required gross profits of regulated organization); 2 – **HTC-1** (Heat tariffs calculation). Setting of volume and amount of released heat power for each type of activity, also setting the tariffs level limits on energy (power) by regulating agency, depending on availability heat supply schemes or programs of communal infrastructure development. Fig.1 shows the options of direction and suitable methods of calculation of effective volume of heat power realization during functioning of program complex **PT-Q-1**. On the Fig.1: **DB FTA** – data base of Federal tariffs agency, **DB RTA** – data base of regional tariffs agency. Agreed methods of necessary gross profit during designing of program complex **PT-Q-1** [3] cover several calculation methods:

- economically proved expenditures (**Method 1**);
- indexation of established tariffs (**Method 2**);
- procuring of income of invested capital (**Method 3**);
- analogue comparison (**Method 4**);
- for combinate regime of electrical and heat energy producing (**Method 5**).

In accordance with that, there is suggestion of the selection of calculation direction strategy for realization of heat power of each type of activity, also setting of critic power tariffs levels, depending on availability of corresponding heat supply schemes or communal infrastructure systems development programs [4]. Wherein there is tariffs separation by heat power source types and coolant parameters.

Real problems (till 15 % depending on heating system conditions) of calculation of heat losses during producing and transportation were detected in functioning heat supply systems. Benefits from realization **CHL-1**- Software package of heat losses calculating, are justified by exploring planned and actual indicators [5].

Figure 1. Calculation direction scheme

It is important fact of complexity of real regional heat supply systems. It becomes necessary to create information data base of program complex to provide true appearance of technical and technological characteristics of separated regional heat supply systems sections. In accordance with approved design strategy of program complex **PT-Q-1**, all necessary calculations are done in the framework of corresponding program modules of **CHL-1**-complex. In accordance with approved structure of **PT-Q-1**, complex **CHL-1** is functioning in the framework of subsystem **FRGP-1** (Forming of all required gross profit of regulated organization) of **PT-Q-1** program complex.

Realization of all created algorithms of **PT-Q-1** complex, including calculating algorithms of main heat losses takes designing of elaborate structure data base (DB). Data base of **PT-Q-1** consist from as information, required for realization subsystems **FRGP-1** and **CHL-1**, as operational information about acting conditions of technical characteristics of heat transfer line and structured organization of regional heat supply systems. All that are create real premises for using program complex **PT-Q-1** as ground for different computer simulation actions. Such simulation can afford to identify optimal organization of regional heat supply systems and find out their optimal characteristics. The results of such investigations can be used for forming on their basics a real suggestion of rising regional heat supply systems functioning effectivity and reduce tariffs for heat power producing and serving.

All required for calculation initial data, get with using of active tools of control and registration in organization, structured and saved in created in the framework of program complex **PT-Q-1** data base (DB) of corresponding subsystems.

The conception of construction of elaborate program complexes, took as a basis for **PT-Q-1**, defines its common system structure. There are was the decomposition of common task provided on separated interconnected and interacting fictional subsystems, in the framework of which, the complex of task, as different modules are solving. Also, under control its separate and joint collaboration within the process of task solving, taking into account its correlation.

In accordance with agreed conception and structure realization of program complex **PT-Q-1**, also, features of realization of created machine-orientated algorithm, were singled out its basic modes (Figure 2).

As main principle of providing effective work of program complex **PT-Q-1** was accept one main method of investigation and structures its information supply. This method based on using of unified address space and procedures, which realize agreed mechanisms of collaboration by created common-system and user interfaces.

Figure 2. Basic working modes of PT-Q-1

The decision was made to minimize the difficulties, connected with implementation and exploitation of designed program complex **PT-Q-1** with the aim of effective exchange

realization in information field «**SSRPT – regulation subjects**» and setting of common rules in costing methodology of producing and transportation, also monitoring and analysis of heat supply region complex state for design and realization of strategy of heat-and-power region system developing.

The feasibility of **PT-Q-1** complex with using of “cloud calculations” was justified. Such kind of method gives possibility to minimize difficulties of implementation and exploitation of elaborate program complex (as finance, as technical format). Wherein the data saving and processing realized not by the side of user, but by the side of company which represents such Internet-services [6].

Preliminary analysis of different cloud calculations categories and approach to implementation of cloud services allows to make a conclusion of feasibility to use **SaaS** model with access via WEB-browser. Practicing of **SaaS** conception is suitable for solving tasks of simplest data exchange within informational field «**SSRPT – regulation subjects**» and will speed up the implementation process, will allow to reduce services expenses of specific customer, also support of fast distribution of **PT-Q-1** complex. Wherein it is supposed to temporarily suspend its usage [7]. Figure 3 shows the principle scheme of information exchange during using **SaaS**.

Figure 3. Principle scheme of information exchange during using **SaaS**.

By result of analysis of main estimation criteria of availability of different program platforms as a tool for design of **PT-Q-1** and features overview, most popular of which are **Ruby on Rails** (version 5.0.2 and 4.2); **Zend Framework** (version 3 and 2) and **Eclipse** (version 4.6 Neon and 4.5 Mars), was shown that practically all mentioned program platforms are corresponding more-less described criteria and suitable for using as a tool for task solving of **PT-Q-1** program complex building.

At final choosing of program platform the important fact is that main emphasis of **Zend Framework** [8-10] designers was to made possible formation of reliable, well secured and modern cross-platform Web-apps. Taking into account authors knowledge of working with **php** language and data base **My SQL** [8-10], the conclusion was made, that **Zend Framework 2.0** is fully reflects all required criteria and is mostly convenient field for program platform designing during working out program complex **PT-Q-1** of automated forming tariffs in heat supply systems sphere.

By results of program complex working, reports of the established type are forming, it is used in different control, analysis levels, also in levels of tariffs approval on producing and transfer of heat power. It was also taking into account, that in the framework of **PT-Q-1** program complex have to be formed special program procedures, which provides the possibilities of providing the wide range calculation experiments with different initial data. It gives the possibility of widespread using of the complex during task solving of prognosis and training.

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Анализ DOS уязвимостей в системе управления контентом Joomla!

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Аннотация

В статье приводится описание Content Management Software (CMS), которая благополучно вытесняет традиционные технологии разработки web-сайтов. Пример одной из таких систем - Joomla!, которая является достаточно популярной в наше время. Приводится краткое описание возможностей данной системы, а также с точки зрения системы безопасности. В качестве иллюстрации одной из уязвимостей Joomla! приводится DOS-атаки, которые приводят к недоступности сервера, а для пользователя – недоступности web-сайтов.

Ключевые слова: Content Management Software, CMS, уязвимости, DOS-атака.