# Information Supply of Solving Functional Problems of Processes of Saving Fuel and Energy Resources

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Article Info	Abstract
Page Number: 7776-7780	Background: In the world, special attention is paid to the development of
Publication Issue:	solutions to the problems of effective management of fuel and energy
Vol. 71 No. 4 (2022)	resource consumption, reduction of costs and control of flows using information and communication technologies. "The results of scientific
Article History	research conducted by the European Energy Research Alliance showed that
Article Received: 25 March 2022	most of the losses in the distribution and consumption of fuel and energy
Revised: 30 April 2022	resources at oil and gas production enterprises (up to 90%) correspond to
Accepted: 15 June 2022	the consumption of fuel and energy resources, and the remaining 9-10% and
	losses in the transfer of fuel and energy resources". Today, one of the
	priority tasks of major oil and gas production enterprises in the world is the
	development of methods of effective management, saving and control of
	consumption of fuel and energy resources. Oil and gas producing
	enterprises in Russia, USA, Iran, Iraq, Brazil, Norway, Mexico, and other
	countries have conducted research on the creation of a management system
	model, algorithm, and software tool that allows effective management,
	saving, and control of fuel and energy resource consumption. are paying a
	lot of attention to go.

#### Keywords:

# 1. Introduction

In the world, a lot of scientific research is being conducted to solve the problems of effective management of fuel and energy resource consumption, saving and control of consumption, optimal planning of fuel and energy resource consumption, rapid monitoring of their flows, and the use of the obtained results for the purpose of economic forecasting. In this regard, one of the important issues is the development of models and algorithms of fuel and energy resources management (YoERTB) processes that combine solutions to the problems of increasing the efficiency of fuel and energy resources on a single platform, creating its information system based on them, and applying them to oil and gas production enterprises.

Information about the state of the managed object, the external environment, and the perceived management effects is needed for the rapid operation of YoERTB processes. The operation of YoERTB processes requires conditions such as the optimal volume of information coming from various control units, the distribution of information flow by time and space. This, in turn, means that the information supply should be built efficiently. The main tasks of information supply of YoERTB processes are information collection, control, change, storage, updating, distribution and transfer of information from sources to its consumers. The diagram of the

information supply structure is developed to determine the composition of the database elements of YoERTB processes, to establish their mutual relations in order to ensure the effective construction of information and calculation processes, to choose directions that provide information for the interactions of components in YoERTB processes, and to effectively organize the design process of information supply of YoERTB processes. will be released. The diagram of information supply of YoERTB processes is presented in Fig. 1. The database of information supply is designed on the basis of the relational model. The single database design process of the information supply of YoERTB processes was implemented using the SQL Developer data models program using the relational model. Its result is shown in Figure 2.



Figure 1. Information supply chart of fuel and energy resource saving management processes

Incoming data for the construction of the information supply structure of YoERTB processes (1) a generalized information model of YoERTB processes operation, (2) a diagram of the informational interaction of YoERTB processes at different levels of management, (3) information on the directions of development of systems included in YoERTB, (4) the structure of technical devices, and (5) information about programs specific to mutual mobile technical means in the information supply of YoERTB.

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Figure 2. Diagram of a single database of information supply based on a relational model designed using the SQL Developer data models program

## 2. Methods

The information model of YoERTB must satisfy the following conditions: 1) the tools of the model, that is, all objects, objects and events used in solving functional issues of YoERTB, and all relationships between them must be described; 2) All limitations of ensuring the integrity of the data available in YoERTB with model tools should be described; 3) All obvious features of the data needed to design the external, logical and physical schemes of the database with model tools should be given; 4) The logical, external and physical data model used in the database management systems should have a method and methodology that describes the general statement of YoERTB. Despite the variety of existing data models, it is almost impossible to create an information model to describe the objects of YoERTB processes that satisfies all the listed conditions. Therefore, IDEF1X methodology was used to build the information model of YoERTB in this work. The IDEF1X methodology is a method for creating a relational database, and it uses a specially designed conditional syntax for easy conceptual schema construction. The main advantage of the IDEF1X method compared to many methods used in the development of relational databases is its modeling based on a strict and rigid standard.

The construction of the information communication model of all issues of YoERTB using the IDEF1X method was carried out using the Design for Database program. The information communication model of the database of the problem of calculating the cost of gas and oil products using the Design for Database program based on the IDEF1X method is presented in Figures 3 and 4.

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Figure 3. The problem of calculating the cost of gas products using the IDEF1X method is the information communication model of the database



Figure 4. The problem of calculating the cost of oil products using the IDEF1X method is the information communication model of the database

# 3. Results

The above-mentioned information supply structure, infological model and relational model of its single database structure for solving interconnected functional issues of the fuel and energy resource saving management process allow to create a single database of fuel and energy resource saving management processes. The created unified database of fuel and energy resource saving management processes provides integrity of data on consumption of fuel and energy resources, quick execution of actions on them and prevention of excessive duplication of data.

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