Stable gas condensate is stored or pumped into the main oil stream. Heat recovery of stable gas takes place in heat exchanger 8, where dry gas is used as a coolant. Propane- butane fraction gets into reflux condenser 7 at temperature 50˚C where it is condensed by dry gas and at temperature 20-40˚C and then gets into the refluxed reservoir 12. Part of propane-butane mixture from the refluxed reservoir is pumped into the top part of the column 11 as a mean of irrigation.

Conclusion

Unlike the existing analogues the specified method allows obtaining three products, which quality characteristics enable to use various technological processes without further gas processing.

Dry gas obtained from the considered treatment has high methane number defining its antiknock value. The latter is the most important gas characteristic. Thus, the obtained dry gas can be successfully used to produce electrical energy which can be then utilized as fuel for gas piston power plants.

The obtained propane butane fraction can be used as fuel in transport as well as for commercial and industrial needs, e.g. stable gas condensate can be used in oil extraction as a gasoline additive.

Therefore, gas prepared for GPI as fuel in accordance with the proposed technological scheme meets all requirements for different types of gas fuel.

The method offered in this article completes the most challenging environmental issue by reducing flared gas volumes up to complete avoidance of flaring. [1]

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PEST ANALYSIS OF SMART METERING MARKET IN RUSSIA

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INTRODUCTION

In order to describe a current smart meter market in Russia the PEST analysis will be used. PEST is an acronym for political, economic, social, and technological – external factors that commonly affect business activities and performance. Created by

Harvard professor Francis Aguilar in 1967, PEST can work alone or be used in combination with other tools, such as Porter's Five Forces and SWOT analysis, to determine an organization's overall outlook. [15]

POLITICAL FACTORS

National policies on smart meters and smart grids

(Smart) meters and metering systems should be installed at all participants of electricity market by the year 2012 in accordance with the Federal law № 261-FZ dated 23.11.2009. [7]

This law does not explicitly state that the meters installed must be smart meters, focus is on having each grid connection metered and billed. This law also requires the Russian Energy Agency to develop a smart grid Initiative/Roadmap. [12]

Tab. 1. Current smart metering legislation in Russia [2], [8]

Legal requirements and other requirements	Explanation
Federal law № 261-FZ, Energy saving and increasing of energy efficiency, dated 23.11.2009.	Installation of (smart) meters and ametering systems by 2012 and developing a Smart Grid Initiative / Roadmap.
Government Decree from 15.04.2014 №321 " On approval of the state program of the Russian Federation "Energy efficiency and energy development"	Modernization of commercial electricity metering system and replacement of metering devices which don't meet the modern requirements on smart electricity meters (18.9% by 2020)
" The program on development of commercial electricity metering based on smart technologies for period till 2020" (approved by decree of Minenergo of Russia №173 from 10.05.2011	Action list on stagewise market encouragement to smart meter usage, concept definition of smart metering, technology testing on pilot projects

ECONOMICAL ASPECT

Currently in Russia there has been no cost benefit analysis of smart meter rollout including whole country. However, particular pilot projects were conducted.

The first smart grid project is actually a smart meter project. It is the project in the city of Perm. This project includes replacement of more than 50,000 meters by smart meters. It is funded by federal budget, IES holding and the local distribution company Permenergo. The share of the local grid company in this project is approximately 9 mln EUR. The meter functionality includes 4-6 tariff registers, remote controlled power switch, power quality registration and communication by power line carrier. Meters installed are from Russian, French and North American manufacturers.

Goal of the Smart City project in Belgorod is to increase reliability of power supply, reduce grid losses as well as costs of electricity for consumers. The Belgorod Smart City project is funded by the distribution company, the Belgorod region and by the federal government, based on Federal Law 261. Almost 40,000 meters will be installed. The smart meter installed is a Neiron meter with GSM communication. It includes functionality of limiting the available power in case of defaulting and a display

for feedback of the electricity consumption during the previous 24 hours to the consumer.

Distribution grid reliability is increased by installing new equipment such as step-up transformers and automatic reclosers.

SOCIAL ASPECTS

Uncaring consumer behavior

Often consumers don't pay attention to charging devices leaved in socket, not de-energized computer screens or to the fact that what light bulbs have been installed. Consequently, consumer on the subconscious level increases unadvisable energy consumption and as a result its cost. According to surveys made in different regions of Russia only 5-7 % of people have awareness on energy saving measures. [8]

TECHNOLOGICAL ASPECT

Smart meters manufactures in Russia

Main key manufactories of equipment and software are factories of electrotechnical instrumentation. These market players have a production of needed equipment and they start to develop a software for end consumer. Alternatively, if there is no own staff for software development, a factory can involve the third party contractors for accomplishment of this function and as a result independently offer to the market a service package for smart metering installation. (e.g. Leningrad electromechanical factory). [5]

In general, in Russian market there are 150 producers. Also strong positions are held by Moscow factory of electrical metering devices, Leningrad electromechanical factory and Nizhny Novgorod Research and Production Association named after M.V. Frunze. (Figure 1). [13]

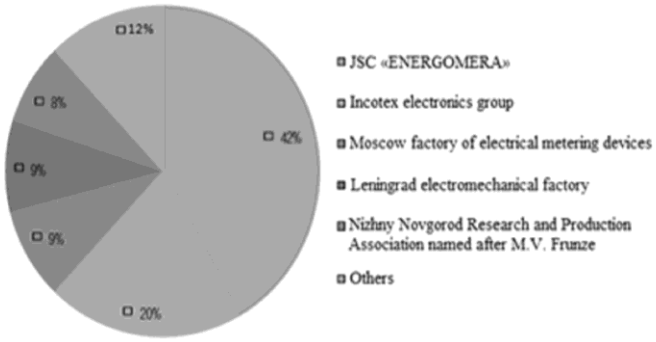

Fig. 1. Leaders of internal production of electrical meters in Russia 2009

Consumers

Initially smart metering system was only implemented in entities of energy domain. However, as consequence its advantages were estimated in industrial and residential areas. Group description of consumers and their necessities are presented in Table 2.

Tab. 2. Main consumers of smart metering systems

Consumer	Description	Necessities
Energy suppliers	Enterprise-owner of generating equipment, owner of electrical grid, energy supplier etc.	Providing of automated account of electrical energy for commercial calculations among market participants. Determination of technical and commercial losses.

Industrial entities	Generally consumer of smart metering are large industrial enterprises, having a large enough consumption level of electrical energy	Automation of electrical energy account for precise and true calculations based on different tariffs. Control for consumption level of enterprise units
Domestic household	Community facilities, maintaining private sector, enterprises and Housing and Utilities infrastructure	Precise and true account of outputted energy. Organization of communal and door to door account of electrical energy, including electricity for lightning of stair wells, ascensor operation etc. Balance control of input and output energy

CONCLUSION

Russia is pursuing the State policy of innovation activity in the electricity sector. This applies to energy efficiency, renewable energy and smart grids. 18.9% share of smart meters is a target by 2020. However, no regional energy policies regarding smart grids were identified. It seems that smart grid related regulations are mainly made on a national level. There is no cost benefit analysis of smart meter rollout including whole country. However, particular pilot projects were conducted.

At this moment average Russian citizen does not pay attention to energy savings measures. There is low propaganda of EE measures among consumers. However, 80% of Russian citizens expressed readiness to use the energy efficiency technologies within own houses.

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PROGRAM FOR THE FORCE AUTOTRANSFORMER'S CHOICE

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На рисунке 1 представлен аналитический расчет, проведенный в среде Mathcad.

The force autotransformer is the important equipment for distribution of electrical energy; students often have problems with its choice. In the studying help of material, the developed program at Department of Electric Power Systems of the Tomsk polytechnic university is offered.

The provided program is written in the Delphi programming language allowing to create the user-friendly interface [1, 2].