



DETERMINATION OF THE NEW VALUE OF POLYMER COMPONENTS IN FORMATION GASES IN THE ECONOMIC EVALUATION OF HYDROCARBON RESERVES IN THE BUKHARA- KHIVA OIL AND GAS REGION

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Abstract. *The article analyzes the economic importance of polymer components in reservoir gases during the evaluation of hydrocarbon reserves in the Bukhara–Khiva oil and gas region. The study demonstrates the efficiency of processing propane, butane, and pentane into polymer products. Considering the polymerization coefficient can increase the economic value of deposits by 10–20 times. This method contributes to the efficient use of natural resources and ensures environmental safety.*

Key words: *Bukhara-Khiva oil and gas field, formation gases, polymer components, economic assessment, hydrocarbon reserve, polymerization coefficient, SUG, propane, butane, pentane, processing efficiency.*

Аннотация. *В статье проанализировано экономическое значение полимерных компонентов пластовых газов при оценке запасов углеводородов в Бухара–Хивинском нефтегазоносном регионе. Показана эффективность переработки пропана, бутана и пентана в полимерную продукцию. Учёт коэффициента полимеризации позволяет увеличить экономическую стоимость месторождений в 10–20 раз. Данный подход способствует более рациональному использованию природных ресурсов и обеспечению экологической безопасности.*

The practice of flaring waste gases containing hydrocarbon raw materials extracted from oil and gas fields is still widely used to the extent that it harms the

environment. This situation not only causes environmental problems, but also reduces economic efficiency. Therefore, within the framework of this research project, the possibilities of increasing economic efficiency by processing waste gases to produce polymer products, instead of burning them only as a source of heat or electricity, were studied. The project analyzed eight reports on determining the economic value of hydrocarbon gases that are not used by converting them into polymers. Until now, the existing reports did not take into account the polymerization coefficient as an economic indicator. The results of the study indicate that by taking this coefficient into account, the true economic value of deposits estimated at an average value of 1 billion soums can be increased by 10-20 times.

The Bukhara-Khiva oil and gas region is the largest hydrocarbon production region in the Republic of Uzbekistan. Currently, this region accounts for approximately 70% of the hydrocarbon raw materials extracted in the country. Every year, the Uzbekgeofizika Joint-Stock Company calculates the full reserves of 4-5 fields using the volumetric method. The chemical and physical properties of formation gases are of great importance in accurately calculating hydrocarbon reserves. The separation of formation gases into dry and oily fractions and their accurate calculation is an urgent issue in meeting the needs of the chemical industry of Uzbekistan.

The consumption of polymer products by the population is increasing every year. If in the 1960-1970s the per capita consumption of polymer products was about 5 kg, then in 2020-2025 this figure will average 70-80 kg, and in developed countries it will be 100-130 kg. Polymers are becoming an indispensable part of natural products due to their low cost, strength and low degradation properties. With the help of modern technologies, the market value of natural gas components has increased significantly as a result of the production of polymer products in various

forms. If in the last century in developed countries 75% of these raw materials were burned in the torch, now this figure is only 10%, and the remaining 90% is processed.

One of the main goals of this study is to study the chemical composition of natural gases in gas condensate and oil gas condensate fields located in the Bukhara-Khiva oil and gas region, compare hydrocarbon fractions, and determine quality indicators in the assessment of economic efficiency according to their quality.

Currently, when assessing the effectiveness of geological and geophysical surveys, and calculating the technical and economic indicators of reserves, natural gases are considered conditional fuel only by their calorific value. However, modern requirements require deep processing of natural gases, that is, the production of value-added products from their polymer components. Therefore, it is necessary to take into account not only the calorific value of natural gases, but also the price and market value of their polymer components. The article analyzes and compares the current market price of natural gas components, the costs associated with their processing and utilization, and net income indicators.

Gas condensate deposits average composition of natural gas



Oil and gas condensate fields average composition of natural gas



Chemical composition of natural gases in gas condensate fields

Bukhara-Khiva gas fields	Метан CH ₄	Этан C ₂ H ₆	Пропан C ₃ H ₈	Бутан C ₄ H ₁₀	Пентан C ₅ H ₁₂	Гексан C ₆ H ₁₄	Сера H ₂ S	Азот N ₂	Диоксид CO ₂
Алан-1988	91,45	3,11	0,97	0,39	0,24	0,22	0,12	0,79	3,21
Самантепе – 2006	90,39	1,01	0,36	0,16	0,08	0,04	3,06	0,48	4,31
Новый Алан 2016	91,32	3,58	0,82	0,31	0,96	0	0,04	0,38	2,59
Хаккул 1996	80,82	9,68	3,48	1,05	0,72	0	0	1,82	2,33

Chemical composition of natural gases in oil gas condensate deposits

Bukhara-Khiva oil and gas regions	Метан CH ₄	Этан C ₂ H ₆	Пропан C ₃ H ₈	Бутан C ₄ H ₁₀	Пентан C ₅ H ₁₂	Гексан C ₆ H ₁₄	Сера H ₂ S	Азот N ₂	Диоксид CO ₂
Уртарабад- 2016	85,72	1,83	1,58	0,62	0,24	0,53	0,15	8,88	0,45
Туртсари 2015	88,22	3,37	1,54	0,86	0,44	0,16	0,19	0,36	1,21
Шим. Акназар 2016	89,68	4,01	0,97	0,34	0,14	0,04	0,001	0,06	3,73
Арнийёз 1995	89,99	3,78	1,13	0,51	0,12	0	0,05	0,58	3,64

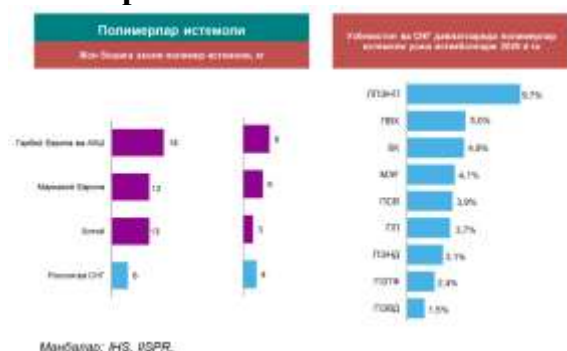
Estimated income report on combustion and processing of SUG (propane, butane, pentane), polymer production raw material contained in natural gas of gas condensate fields in the domestic market

Mines	Пропан C_3H_8	Бутан C_4H_{10}	Пентан C_5H_{12}	СУГ (пропан+бутан+ пентан) минг тонна	Исиклик энергияси ажралиши МДж/кг	ЖДж/кг=Мкв*с	1 кв*с нархи 295 сум Узбекэнерго ички бозор млрд. сум	1 т полимер нархи 14500000 сум УзКорГаз ички бозор млрд. сум	СУГни ёкишдан ва кайта ишлашдаги фарк млрд. сум	СУГни ёкишдан ва кайта ишлашдан фарк мартта
Алан-1988	17,751	9,438	7,2	34,389	3,58475E+11	100373011	29,61	498,640	469,03	17
Самантепе – 2006	6,588	3,872	2,4	12,86	1,33573E+11	37400563	11,03	186,470	175,44	17
Новый Алан 2016	15,006	7,502	28,8	51,308	5,6452E+11	158065690	46,63	743,966	697,336	16
Хаккул 1996	63,684	25,41	21,6	110,694	1,1513E+12	322363238	95,1	1 605,063	1509,963	17

Estimated income report on combustion and processing of SUG (propane, butane, pentane) polymer production raw material contained in natural gas from oil and gas condensate fields in the domestic market

Mines	Пропан C_3H_8	Бутан C_4H_{10}	Пентан C_5H_{12}	СУГ (пропан+бутан+ пентан) минг тонна	Исиклик энергияси ажралиши МДж/кг	ЖДж/кг=Мкв*с	1 кв*с нархи 295 сум Узбекэнерго ички бозор млрд. сум	1 т полимер нархи 14500000 сум УзКорГаз ички бозор млрд. сум	СУГни ёкишдан ва кайта ишлашдаги фарк млрд. сум	СУГни ёкишдан ва кайта ишлашдан фарк мартта
Уртарабад- 2016	28,914	15,004	7,2	51,118	7,50133E+11	210037363	61,96	741,211	679,251	12
Туртсари 2015	28,182	20,812	13,2	62,194	1,06002E+12	296805466	87,56	901,813	814,253	10
Шим. Акназар 2016	17,751	8,228	4,2	30,179	9,35548E+11	261953530	77,28	437,596	360,316	6
Арнӣз 1995	20,679	12,342	3,6	36,621	9,67892E+11	271009670	79,95	531,005	451,055	7

Basic, synthetic polymers consumption in the world



All types of natural gas utilization import price indicators

	Ғажы	Қалыпта сайта халықын	Ған қуырыға халықын	Электр энергия өңдеу чигарын	Чуқур бұлақтан сайта нылаын	Чуқур сайта нылаын
						
Қаңтал сарын Dollar(\$)/м3	0.0037	0.1629	-0.1852	2.888	0.5555	0.5111
Нәсілдік факторы	-0.1037	0	0.1111 мән 0.2269 сәт	0.1333 мән 0.1926 сәт	0.2025-0.1926	0.7555-0.7444
Нұқсанлан тармақ	-0.1037 мән 0.0378 сәт	-0.1333 мән -0.7333 сәт	-0.0014 мән -0.6222 сәт	-0.085 мән	-0.4518	0
Агроф мухитта табы	0.3030	0	0.0444	0.0444	0	0

Материалы: кизилар, амбонанга, нурдифио, кизил, фонде (ННТ)
Амбонанга, нур, нур

Flaring waste gases increases the amount of harmful substances released into the atmosphere, leading to environmental pollution. It is also economically inefficient to benefit from this process only in the form of heat or electricity.

Therefore, the recycling of waste gases into polymer products would be economically beneficial for our country. Electricity can also be generated from other natural resources (such as solar, wind, and hydropower), but the value and

УВ ларин казиб олишнинг ва махсулот кўринишигача бўлган замонавий жараён.



value of polymer components as a by-product are much greater.

According to the results of the study:

1. It was substantiated in tables and reports that it is possible to achieve a high level of economic efficiency by processing waste gases without harming the environment.
2. It was scientifically proven that by determining the polymerization coefficient, the economic value of deposits can significantly increase. By introducing this indicator into the economic assessment system, it is possible to contribute to the country's gross domestic product (GDP).
3. The results presented in the study are an important step towards implementing new scientific ideas in the oil and gas sector, developing innovative processing technologies, and ensuring the stability of the state economy.

Also, on the example of gas condensate and oil and gas condensate fields in the Bukhara-Khiva region, it was substantiated that it is necessary to take into account not only the conversion of formation gases into conventional fuel in terms of thermal energy, but also the efficiency coefficient of their additional polymer components. Since the current economic evaluation methods do not fully take into account the market value of polymer products extracted from chemical components in natural gas (propane, butane, pentane, etc.), a large difference (difference) in economic results is emerging.

Therefore, the introduction of the "polymer efficiency coefficient" in geological and geophysical reports is of strategic importance not only in terms of determining the true economic value of deposits, but also in terms of effective use of natural resources, increasing export potential and reducing environmental damage.

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