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CURRENT STATE AND DEVELOPMENT PROSPECTS OF PHOSPHORIC INDUSTRY IN KAZAKHSTAN

The article considers the current state and the development trends of Kazakhstan's phosphoric industry. It shows the significance of the branch for the Republic's economy. The description of Kazakhstan's chemical industry development program is given. Main innovative and investment development projects of Kazakhstan's phosphoric industry are outlined.

Keywords: *phosphoric industry; mineral fertilizers; innovative and investment projects.*

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СУЧАСНИЙ СТАН І ПЕРСПЕКТИВИ РОЗВИТКУ ФОСФОРНОЇ ПРОМИСЛОВОСТІ КАЗАХСТАНУ

У статті розглянуто сучасний стан і тенденції розвитку фосфорної промисловості Казахстану. Показано перспективи розвитку і значущість галузі для економіки республіки. Надано характеристику програми розвитку хімічної промисловості Казахстану. Наведено основні інноваційні та інвестиційні проекти розвитку фосфорної промисловості Казахстану.

Ключові слова: *фосфорна промисловість; мінеральні добрива; інноваційні та інвестиційні проекти.*

Рис. 1. Літ. 10.

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СОВРЕМЕННОЕ СОСТОЯНИЕ И ПЕРСПЕКТИВЫ РАЗВИТИЯ ФОСФОРНОЙ ПРОМЫШЛЕННОСТИ КАЗАХСТАНА

В статье рассмотрены современное состояние и тенденции развития фосфорной промышленности Казахстана. Показаны перспективы развития и значимость отрасли в экономике республики. Дана характеристика программы развития химической промышленности Казахстана. Приведены основные инновационные и инвестиционные проекты развития фосфорной промышленности Казахстана.

Ключевые слова: *фосфорная промышленность; минеральные удобрения; инновационные и инвестиционные проекты.*

Problem statement. Production of phosphoric salts and mineral fertilizers is one of the most profitable and promising branches of the chemical industry. The world market of mineral fertilizers has been rapidly developing during the last 50 years and its volume has exceeded 70 bln USD. The development of this market has stable increasing character provided by such factors as the increase in the Earth population, increase in demand for food, world's gradual loss of cultivated resources, increased demand for agricultural products quality. All of this, in its turn, requires increased farmland efficiency and involves increase in production and consumption of mineral fertilizers (Kudinova, 2011).

Latest research and publications analysis. According to the data of International Fertilizer Industry Association (IFA), consumption of phosphate fertilizers in 2010 achieved the record of 40 mln tons (Kim, 2011). At the same time, production of three basic kinds of phosphate fertilizers, monoammonium phosphate, diammonium

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phosphate and triple superphosphate, increased up to 28.4 mln tons, i.e. by 16%. This, of course, resulted in the increased volumes of production and consumption of raw materials for their output, including phosphoric acid.

The main application field of phosphoric acid is the production of phosphate and complex fertilizers, because more than 90% of phosphorus-containing ores are used for these purposes. Among other fields we can mention food, wood-working and pharmaceutic industries, production of household chemistry, building materials etc. (Kim, 2011).

The world production of phosphoric acid in 2011 was 42.1 mln tons. To the year of 2015, we expect its increase up to 47.8 mln tons (in terms of P_2O_5). The overall gain in production was observed in China, USA, Morocco and Russia, in other countries these indicators did not practically changed (Kim, 2011).

The mineral fertilizers market, despite the economic crisis, slowly, but steadily continues to expand. Increase in the world consumption of fertilizers is expected from 179.5 mln tons in 2012 up to 190 mln tons in 2015. The overall gain in consumption is expected in the countries of Asia (59%) and American continent (23%) (Kudinova, 2011).

Research objective is to analyze the current state, problems and trends of Kazakhstan's phosphoric industry development.

Key research findings. Kazakhstan has lucrative reserves of phosphorus-containing raw material in the fields of Karatau basin. The country is among the 5 of the world countries which have 90% of the world phosphorus reserves. Over 50 phosphorites fields with explored and potential reserves have more than 5 bln tons in the ore or more than 1 bln tons of the useful component, phosphorus pentoxide (P_2O_5) (Sokolov, 1990). Phosphate rocks are mineral raw material for the production of phosphate fertilizers and ordinary phosphorus that serves as a component in many kinds of chemical products.

Kazakhstan's phosphoric branch, presented by companies specialized in ore mining and production of ground phosphorites, thermal and extraction phosphoric acid, phosphate mineral fertilizers, phosphorus-containing salts of technical and food qualification, is based on the ground of Karatau basin phosphorites' fields (Sadyrova, 2005).

Today Kazakhstan's phosphoric branch provides 34.1% of the Republic's chemical industry products. A problem to increase the production of mineral complex fertilizers is one of the key one for the Republic's economy. Mineral fertilizers are used with a view of quality and efficiency increase for agricultural sector. Today, there is a strengthening tendency of production and using the N-P-K complex – fertilizers, containing three basic components, such as nitrogen, phosphorus and kalium, and also necessary microelements, as plants require the whole complex of nutritive substances (Bazhirova and Toltebaeva, 2013; Plyatsuk et al., 2005).

To increase the consumption of mineral fertilizers, Kazakhstan has developed a program on subsidization of national agricultural producers, that is successfully realized and the share of subsidies in the price of 1 ton of fertilizers increased by up to 50%. This state policy already shows its positive results, in particular, in the amount of mineral fertilizers' production. Thus, only in 2009, the amount of mineral fertilizers purchased by agricultural producers increased twice and reached 450 ths tons.

For many years, the leading company in the phosphoric branch has been "Kazphosphate" LLP. It produces 20 kinds of competitive products and exports them to 27 countries of the CIS, Eastern and Western Europe, China. "Kazphosphate" LLP is the leading company in production of phosphorus-containing products on the territory of CIS and it includes the following units:

- Novodzhambul phosphoric plant, Taraz city.
- Mineral fertilizers plant, Taraz city.
- Ore mining and processing complex "Karatau", Zhanatas town.
- Ore mining and processing complex "Chulaktau", Karatau town.
- Railway-transport complex, Taraz city.
- Chemical factory, Stepnogorsk city.
- Synthetic detergents shop, Shymkent city.

The current state of Kazakhstan's phosphoric branch is showing a low level of technical and technological equipment of most enterprises (Sadyrova, 2009). The real way out from the current situation is the concentration of attention and resources on production modernization, and, first of all, innovative development and investment in effective scientific developments, the use of new chemical technologies and production of competitive products (Poyarel, 2003).

The operational "Program on the development of chemical industry of the Republic of Kazakhstan for 2010–2014 years" has the following fundamental problems, tendencies and prerequisites for chemical industry development:

- high worn-out state of main production facilities of the chemical industry (43–80%) at their low renewal level (2%);
- small capacity of the chemical domestic products' market;
- low competitiveness of domestic chemical products and its narrow nomenclature;
- low level of innovative activity in its branches;
- lack of the well-proven system to attract technologies transfer into the industry;
- deficit of own financial means of enterprises for production development.

Today, only the Republic of Kazakhstan, among the CIS members, produces thermal phosphoric acid. Other CIS countries carry out the production of phosphoric acid by the extraction method. Natural phosphates are used for production of such mineral fertilizers as superphosphate, ammophos. Figure 1 demonstrates the production amounts of phosphorus and phosphoric acids, and also ground phosphorites and phosphoric fertilizers.

Target indicators and outcome measures from realization of the specified Program on the development of chemical industry in the Republic:

- a twofold increase in chemical products' gross output;
- a twofold increase in export of chemical products of high processing;
- creation of 21 new kinds of chemical products;
- increase in the production of mineral fertilizers up to 1140 ths tons.

Building and reconstruction of suspended-concentrating mill of "Kazphosphate" LLP with processing capacity of 2.8 mln tons of float a year was planned for 2013–2014.

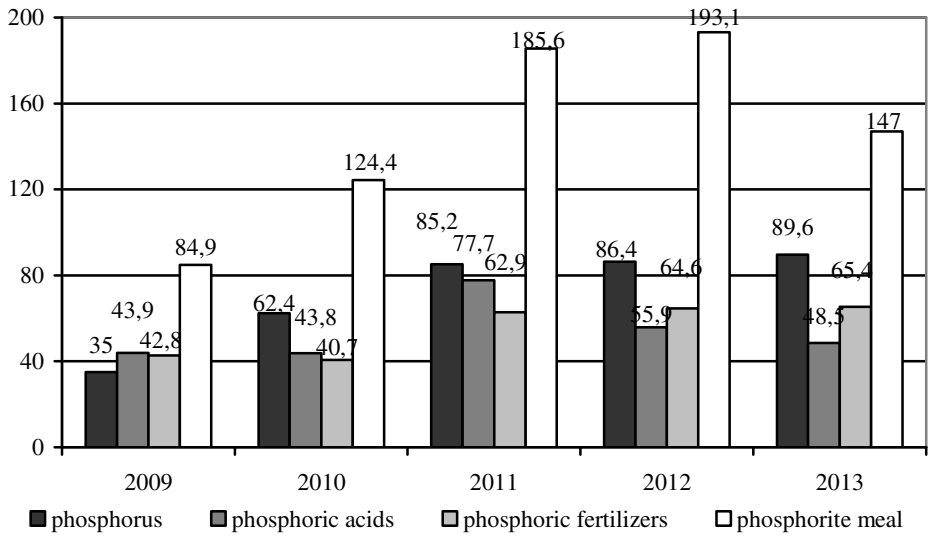

Figure. **Production amounts of phosphoric products,** *ths tons*
(Industry of Kazakhstan and its regions, 2014)

Today "Kazphosphate" LLP also realizes the following investment projects:

- organization of production of sodium hexametaphosphate and food phosphates;
- production of phosphorus trichloride with the capacity of 40 ths tons a year;
- modernization of suspended-concentrating and crushing-grinding factories with a view to concentrate phosphate rocks;
- building a sulfuric chop.

In a result of that, "Kazphosphate" LLP plans to expand the assortment of its products, increase labor capacity in 3 times, reduce energy demands by 15%, prune away costs on raw materials and components. Up to the year 2020, "Kazphosphate" LLP plans to invest in its projects more than 800 mln USD.

One of the major projects is the investment project of "EuroKhim-Udobreniya" LLP (a sub-company of Russian OJSC "Mineral-chemical company "Eurokhim") on building of a mining-and-processing integrated works for production of high quality float and a major plant with wide range of mineral fertilizers with the total load of about 2 mln tons a year. In Kazakhstan, the company plans to invest more than 2.5 bln USD into the development of phosphoric fields and building a plant for mineral fertilizers production.

Building a plant of "Shilisai Chemicals" LLP on the production of phosphate mineral fertilizers in Aktyubinsk oblast with the capacity in 880 ths tons a year was planned for the year 2014.

In general, in accordance with the "Program on the development of chemical industry in the Republic of Kazakhstan for 2010–2014 years" it was planned to attract the investments totaling to 11.4 bln USD.

Conclusions. Despite the economic crisis, there is a worldwide trend of increasing the production of phosphorus and phosphate fertilizers, which is associated with

the increased demand for agricultural products and the need to improve soil productivity. However, the possibilities for expanding the capacities of most of global manufacturers are limited by phosphoric ore reserves. Kazakhstan has huge reserves of natural phosphate raw materials and ranks 4th in the world.

The phosphoric industry of Kazakhstan, with its richest raw materials of phosphate rock, is one of the priorities in the program on the development of the Republic's chemical industry. It has great opportunities for further development and is of great interest for national and foreign investors.

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Стаття надійшла до редакції 25.12.2014.