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Ukrainian Steel and Rolled Steel Production, Market (1998-2014) and Forecast (until 2030)

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Abstract

The report is devoted to investigation of the current state of the steel industry of Ukraine and forecast of its development in the coming years. The report contains 568 pages including 94 tables, 48 figures.

The **first section** describes the general characteristics of Russia's steel industry. It is divided into **10** chapters.

The **first chapter** provides an analysis of production from 2000 to 2014, and the use of existing facilities.

The **second chapter** describes the economic and financial situation in the industry after the crisis. The chapter shows the financial performance of major metallurgical enterprises of the sector in 2007-2013.

The **third chapter** describes the situation with the raw material for production of steel (iron ore and pellets, pig iron, scrap and waste). For all types of raw data are given for its production in 2000-2013 by enterprises-producers, the dynamics of the internal and external supply in 2000-2013.

The **fourth chapter** is devoted to the problems of restructuring and modernization of Ukraine's steel industry. It describes the main government program for the metallurgical industry development strategy for the period up to 2020, data on investment projects implemented by various companies of the industry. The data on the two major iron and steel groups in the country.

The **fifth chapter** describes in detail the main export markets of Ukrainian metallurgical enterprises. Data are presented on Ukrainian exports and imports in 2000-2013 for main products (pig iron, scrap, ferro alloys, billets, wire rods, bars, fittings, profiles, hot-rolled sheet, cold rolled sheet proc, coated sheets).

The **sixth chapter** is devoted to anti-dumping investigations and restrictions applicable to the Ukrainian metallurgical companies in 1992-2013 years.

The **seventh chapter** provides an analysis of the domestic consumption of rolled steel in Ukraine.

The **eighth chapter** presents data on the main domestic consumers of Ukrainian metallurgical enterprises. A separate analysis of consumption of rolled steel in the major consuming industries of Ukraine - production of pipes and metal products, machinery, automotive, rail services, construction – is made.

The **ninth chapter** lists the key factors influencing the pricing of steel products in Ukraine (electricity, conventional fuel rail). Also this chapter provides an analysis of internal and external prices of major steel products in 1996-2013 years and January-September 2014.

The **tenth and final chapter** presents a forecast of production and consumption of steel and rolled steel in Ukraine up to 2030.

The second section of the report is devoted to a detailed description of the five major steel mills in Ukraine - **Arcelor Mittal Krivoy Rog, Mariupol steel plant named after Ilyich, Zaporizhstal, and Dnieper steelmaker named after Dzerzhinsky**. For each plant the following information is provided: a brief historical background, the enterprise composition, production capacity, product range, data on production from 1997 to 2011, the main development trends in the company, the sources and suppliers of raw materials, the organization of sales, both on the domestic and foreign markets, export data in 1998-2013 by country and by product, the assessment of competitiveness of production in the various markets, data on personnel and labor productivity, the description of environmental protection, history of privatization, the structure of its shareholders and owners, financial performance in recent years, the description of the realized projects and the program of development. Attachments to each company describes the main technological equipment and its characteristics, the range of products and their characteristics, the export of rolled steel plant in the last 12 years, by type and country.

This work is a "**desk**" research. As **information sources**, data Goskmstata Ukraine, the Ukrainian Customs Service, Ministry of Industrial Policy of Ukraine. Also, data of sectoral and regional press, annual and quarterly reports of companies, web-sites of company, business information databases, as well as the database of "InfoMine".

Part I. Standing of Ferrous Metallurgy of the Ukraine

INTRODUCTION: Current General Situation in Ferrous Metallurgy of Ukraine: Problems and Outlook

Mining and Metallurgical Complex (MMC) of Ukraine ranks second among the CIS countries for the production of ferrous metals. In latest years, the share of Ukraine in the ferrous metallurgy production of the CIS is as follows: 35-39% of the pig iron, 30-34% of steel and 25-28% of rolled steel.

In 2010, Ukraine, as other CIS countries, increased the ferrous metals production compared with the crisis 2009 year.

Positive changes were taking place in 2011, when Ukraine, like Russia, increased the output of ferrous metals, including iron, steel and rolled products. 2012 and 2013 turned out to be more complicated: Ukraine, which is more dependent on the export of steel products, in 2012 was forced to reduce the production of cast iron, steel and finished steel. At the same time, Russia increased its output of ferrous metals. In 2013 Russia reduced the production of steel and rolled steel, while Ukraine actually retained the release of metal products at the level of the same period of the previous year.

In 2014 (January-October), the situation in the steel industry of Ukraine was complicated by the deterioration of the situation in the south-east of the country, the loss of the Crimea (which came under the jurisdiction of Russia), the general decline in the economy and a decline in industrial production. Naturally, this was accompanied by a reduction in the production and consumption of ferrous metals.

The share of exports in total sales of Ukrainian ferrous metallurgy sector amounted in latest years to XX%. And this determines by the strong dependence of the mining and metallurgical complex of Ukraine on the situation in the global steel market. Reduction of prices for steel and the decrease of demand reduction at the increasing competition have a negative impact on the financial position not only of metallurgical enterprises, but also the economy as a whole.

Metallurgical enterprises of the country export iron ore resources, including concentrate, pellets and lump ore, ferroalloys, pig iron, semis (square billet, slabs, hollow billet), finished steel products, including HR and CR flat steel in coils and sheets, rails, rebar and wire rod, sections, pipes, metalware products, coated steel, etc.

The presence of a number of major steel plants allows Ukraine to occupy serious positions among the world's producers of ferrous metals.

Nevertheless, those positions have been diminishing in recent years.

On results of 2009, Ukraine was the 6th largest producer of pig iron, overtaking the USA, and the 8th largest steelmaker in the world. In 2010, due to a more active recovery of the iron and steel industry in the USA, Europe, Brazil, etc, Ukraine in terms of the cast iron production moved to 8th place. By volume of steel production in Ukraine in 2010 continued to occupy the 8th place in the world. Ukraine's positions have not changed also in 2011.

By the end of 2012, amid difficulties in the economy of individual countries and regions and the reduction in the production of ferrous metals, particularly in the EU, Ukraine ranked 7th in the world in the production of iron and 10th - for steelmaking. By results of 2013 Ukraine in terms of the steel production remained in the 10th place in the world, yielding in addition to the leading manufacturers (China, Japan, USA, India, Russia) also to South Korea, Brazil, Turkey and Germany. In January-October 2014, Ukraine significantly (by 15%) reduced the steel production compared to the same period last year to 23.4 million tons. However, the country remains in 10th place in the world steel production by results of 10 months of 2014.

Ferrous metallurgy has always been and still remains a leading industry of Ukraine. Volumes of its production provide about 20% of GDP of the country. In the structure of exports ferrous metals and their products have always occupied an important place. The rise in prices for

steel products in the world market in 2007 and in January-August 2008 provided the country with more than 32% of all export foreign exchange earnings. But in the crisis 2009 year ferrous metal prices on the world market fell sharply. As a result, the share of ferrous metals in the structure of Ukrainian exports decreased to XX %.

In 2010, the share of ferrous metals in the structure of Ukrainian exports again increased significantly and reached XX %. In value terms, deliveries of ferrous metals for export increased in 2010 compared to the previous year by more than 40%. This was due to the growth of both exports and the level of prices for steel products compared with the crisis 2009 year. In the first half of 2011, the share of ferrous metals and ferrous metal products reached 33.2%. This is higher than the figure for the pre-crisis 2007 year.

However, by results of 2011, the share of the industry in total exports was XX %. In total in 2012 exports of ferrous metals in value terms amounted to nearly \$18.2 billion or 26.4 % of total exports. Exports of ferrous metal in value terms in 2012 decreased compared to the previous year by 16.9% mainly due to a fall in export prices, and the exports ferrous metal products - by 0.3%.

In 2013, the share of ferrous metals in the structure of Ukraine's exports amounted to XX %. The export of ferrous metals in terms of value dropped to \$14.3 billion, and with the products of iron or steel - to \$16.9 billion.

This is due to a decrease in export prices because of the existing problems in the economies of several countries and regions, and a low demand for steel products.

The ferrous industry of Ukraine includes around XX enterprises, among them XX metallurgical Integrated Works and plants, XX pipe plants, more than XX metalware plants, XX by-product coke plants, XX refractory plants, XX mining enterprises, ferroalloys plants, more than XX enterprises for processing scrap and wastes.

The current standing of the Ukrainian ferrous metallurgy, in spite of large investments in upgrading the industry in recent years, is characterised by a backward structure of steel-making. The share of steel produced by the open-hearth technology is high (above 41% in 2008, 28% in 2010, 23.9% in 2011, XX % in 2012, and XX in 2013), and a relatively low share of the continuously cast steel (39% in 2008, 48% in 2010, 51.4% in 2011, XX % in 2012, and XX % in 2013). The share of semis in the structure of export of metal products is high.

The structure of released metal products has a high proportion of semi-finished steel products, wire rod and rebar, i.e. products with low added value.

In the second half of the past decade, the metallurgical enterprises of the country much of the investment directed at the reconstruction and modernization of the iron production, in particular the sinter production.

In the last few years (excluding the crisis 2009 year) the owners of steel mills directed significant investments for the reconstruction and modernization of production in the framework of the developed programs of modernization. This applies primarily to MMC "ArcelorMittal Kryvyi Rih", which before the crisis was strengthening its presence on both the domestic and global markets by increasing the production of metal products, as well as to the Group "Metinvest Holding" and the corporation Industrial Union of Donbass (ISD).

However, positive changes in the sector were interrupted by the global crisis. Due to financial difficulties most of the projects had been postponed to a later date or cancelled.

The production of steel and rolled steel products in the country are in need of significant investments. But due to lack of funds the majority of Ukrainian metallurgical enterprises were unable to use the decline in production in the period of crisis for the modernization of existing facilities.

And only in 2010 and 2011 some projects began to be realized, most of which concerned the steelmaking and rolling processing. The companies have resumed long-term projects, including the construction of arc-furnaces plants. And in 2012, the investments remained approximately at the level of the previous year. To a large extent this was due to unfavorable trends in the global and domestic market of ferrous metals, the decrease in prices and demand for steel products.

In 2013, investments aimed at the development of metallurgical enterprises decreased compared to 2012. However, in this period in Ukraine the construction of a modern arc-furnace plant of the group "Interpipe" was completed, and the construction of an arc-furnace shop at Donetssteel MH and the reconstructed of blast furnaces with the development of technology of the pulverized coal injection were carried out.

The steel industry of Ukraine is characterized by high depreciation of fixed assets, which at the beginning of 2014, according to various estimates, was around XX %. In 2010-2013, at the metallurgical enterprises of Ukraine 80% of open hearth furnaces operated in excess of the regulatory deadlines. It should be noted that the open-hearth furnaces in 2014 operated only at two smelters. The share of outdated converters was about 30%. Depreciation of rolling capacities at some enterprises ranged from 40 to 90%.

Investments in MMC of Ukraine are grossly insufficient and do not allow to expect a rapid replacement of fixed assets. Due to a high degree of depreciation of fixed assets the steel mills experience emergency situations that adversely affect the industry.

The industry is also experiencing social problems: the vast majority of businesses are town-forming, leading to serious complications when reducing inefficient production capacities.

Particularly serious social problems emerged during the crisis (the fourth quarter of 2008 and 2009), when metallurgical companies of Ukraine had to cut the staff numbers.

The Government of Ukraine in a crisis tried to improve the situation by providing the metallurgical enterprises with benefits, delayed payments to the budget, reduced taxes and tariffs.

In November 2008 the Ukrainian government and the country's mining and metallurgical companies signed a Memorandum of Understanding (MoU) aimed at the minimization of the consequences of the economic crisis in the industry, in particular at the stabilization of prices for ore, coal and steel products, the maintenance of jobs, salary levels and other social securities for employees, and also at the development of the Ukrainian domestic market. Under the memorandum the government (the decree No. 925 of 14.10.2008) imposed a moratorium on increasing tariff on rail freight transportation for enterprises of mining and metallurgical and chemical industries, as well as proposed the National Commission for Electricity Regulation to suspend from 1 November 2008 raising prices on electricity for the enterprises.

Later an item was added, according to which the delivery of steel products to the domestic market should be made at prices not higher than export prices.

Initially, the Memorandum was made for the period up to January 1, 2009, then it was extended for the 1st quarter of 2009, at the beginning of April - until 01.07.2009, at the end of June - until 1.10.2009. However, already on July 22 the government has decided to prolong the action of this memorandum to the end of 2009. True, the number of commitments has been tightened for metallurgists: in order to get preferences two additional requirements were set: to establish domestic steel prices not higher than export prices and to have no liabilities for pension funds, "Naftogaz of Ukraine" and wages. In the event of any breach of the memorandum, the Government did not intend to grant preferences to these enterprises.

Mining Companies have committed themselves to:

- Organize the work in the enterprises at a level not less than the minimum volume that maintains production facilities in working conditions in accordance with the balance of iron production and coke consumption;
- Maintain a professional structure and number of jobs, the level of wages and other social guarantees for workers;
- Implement measures aimed at reducing the cost of steel products, etc.

Given that most of the mining and metallurgical companies of Ukraine are now in private hands, one can understand that the help of the state, especially in times of crisis, was focused mainly on containing rates and prices of natural monopolies, on promoting the restructuring of debts, etc .

The improvement in the global economy in general and Ukraine in particular, as well as the growth of steel production led to the cancellation of the Memorandum of Understanding between

the Government of Ukraine and the companies of the mining, metallurgy and chemical industry. The Memorandum has become invalid from July 1, 2010.

In the second half of 2010, according to "UkrZaliznytsya" (Ukrainian Railways), products of Ukrainian metallurgical companies were transported by rail on a common basis, without providing additional discounts, but also without raising tariffs. However, since the beginning of 2011, the tariffs increased again. New growth of tariffs occurred also in 2012. Moreover, according to market participants this was due to a rapid reorganization "Ukrzaliznytsia". And a transfer of rolling stock, as in Russia, led to a worsening of the shortage of wagons, etc.

Thus, it can be assumed that only the support of the state allowed the metallurgical enterprises of the country to quite successfully overcome the crisis.

At the same time the problem of reimbursement of VAT, paid on exported products, remained unsolved. And, given that all the Ukrainian metallurgical companies export most of their products, the scale of the problem is clear. Applications of steel companies for VAT refunds at the beginning of 2014 amounted to about 5 billion UAH.

In the middle of 2013, again a memorandum of understanding was signed in Ukraine to assist the enterprises of the metallurgical complex, which in difficult working conditions worsened their financial performance indicators due to falling prices for their products at a high cost of fuel and energy and raw materials, as well as the growth rates of natural monopolies.

The government again committed itself to ensure the prompt reimbursement of VAT to prevent the growth of VAT payable during the term of the memorandum; to provide rapid refunds of taxes of all kinds, which were paid "forward"; to prevent until the expiration of the memorandum the increase of rail transport tariffs for cargo of steelmaking companies for more than 5% from the level in 2012, etc.

But, unlike the first memorandum, breaches of commitments, for example, for the growth of rates of natural monopolies, appeared already a few weeks after reaching an agreement, and metallurgical enterprises have noted a significant increase in the cost of electricity. In 2013 and 2014, tariffs for railway transportation of steel rose again - by 10.1% and 12.5% by the last quarter of the previous year.

During the last few years, in the metallurgical industry of Ukraine there are active processes of the redistribution of fixed assets. The group "Metinvest Holding", which manages the mining and metallurgical assets of the companies "SCM" and "Smart Holding", is strengthening its positions. Also Russian holdings - "Evraz Group", "Severstal" and others – continue working on the Ukrainian market. But the group "Mechel" has lost its asset - Donetsk Electrometallurgical Plant. It was sold to the previous owner - the businessman Varshavskiy. This greatly affects the situation in the mining and metallurgical complex of Ukraine. The group "Severstal" also declared the desire to sell its assets in Ukraine.

The group "Metinvest Holding" established its control on two steel mills (Mariupol Ilyich and MC "Zaporizhstal"), and generally solved the question of providing their needs for iron ore resources.

Nevertheless, in 2010-2013 metallurgical companies have announced plans for significant investments in the development, which will in the medium term increase the production of ferrous metals, significantly change the structure of steel production in the country and reduce the specific consumption of fuel and energy resources, increase productivity and reduce the adverse impact on the environment. But the growth of production can only happen in the case of improving the economic situation in the countries and regions that are major markets for the Ukrainian mining and metallurgical complex, as well as the increasing demand in the domestic market.

And just with this in 2012 and 2013 appeared problems. A large consumer of the Ukrainian ferrous metal production is Europe, where there is a recession. The policy of reducing the expenses led to the decreased demand, including the demand for ferrous metals. However, the second half of 2013 was marked by positive developments in the economies of individual countries in the region, which allowed to increase the supply of metal to the European market in the last year.

The problems in the Middle East and North Africa, where Ukraine also supplies large amounts of metal, affect the export potential of enterprises. The reduction of exports together with the low domestic demand in 2012 has led to a temporary halt of separate units by enterprises. Especially in 2013, there was a problem with the direction of integration of Ukraine - with EU or with the Customs Union. And this has led to tensions within the country.

However, the year 2014 turned out to be more problematic. The change of government, the fighting in the south-east of the country, the reduction in production and, of course, in consumption of ferrous metals at the background of lowered prices for steel products in the world market, have not added optimism. In addition, Ukraine experiences the reduction in the number of paying customers, and many companies lack the working capital. Logistic supply chains for raw materials for the steel industry were violated, particularly in the south-east of the country. The association between Ukraine and the EU (so far without the economic part of the agreement) leads to a reduction in the sales market in Russia not only in ferrous metals, but also in other products of the country. The refocusing on other markets takes time and investments.

Even in such difficult conditions (the suspension of the work of a number of enterprises or individual units in the conflict zone) businesses continued to invest in the renewal of fixed assets and in the introduction of energy-saving technologies and the implementation of environmental projects.

1. Production, Capacity Utilisation in 2000-2013

Overall, for the period from 1998 to 2007 the production of crude steel in Ukraine demonstrated uptrend, except for 2005, when there was a relatively small reduction in steelmaking (by 0.7%) with the growth of release of rolled products.

The most successful for mining and metallurgical companies in Ukraine were years 2006 and 2007, which was associated with both positive changes in the economy, the growth of consumption of steel in the domestic market and active exports of the metal.

In 2006, production of finished steel in the country (excluding semi-finished products) decreased compared to the previous year by 1.5% and amounted to nearly XX million tons (XX million tons a year earlier). At this, the release of rolled products as a whole increased by more than 3% to XX million tons (XX million tons in 2005), which was associated with an increase in the production of semi-finished products in the country, the demand for which in the world market was at a high level. The steel production in 2006 increased compared to the previous year by almost 5% and amounted to about XX million tons.

In 2007, Ukraine reached peak figures in crude and rolled steel output in the past decade. The crude steel manufacture reached XX million tons (the increased by 5% or above XX million tons compared to the previous year), and the total rolled steel output increased to almost 36.2 million tons. Production of finished steel in the country in 2007 amounted to XX million tons.

2008 and 2009 years proved difficult for the Ukrainian steel industry. The beginning of 2008 was quite optimistic - the increase of production of ferrous metals with a significant price growth, both in the domestic and regional markets abroad.

But in the last months of 2008 due to the global financial and economic crisis the country has seen a sharp drop in the production of ferrous metals (September-December).

As a result, in 2008 the steel output in the country decreased compared with 2007 by XX% to XX million tons. The steel output was reduced by all the metallurgical enterprises of the country, except for Donetsk Electrometallurgical Plant - formerly "Istil (Ukraine)". The release of pig iron, steel and rolled products in the country in 2008 has decreased to approximately the 2003 level. Thus, production of finished steel was XX million tons (a decrease by 4 million tons compared to the previous 2007), and of rolled steel - XX million tons.

In 2009 there was a significant drop in steel production compared to the previous year. The main reason are adverse changes in the economy amid the global financial crisis, the decline in domestic demand and falling exports due to reduced demand in key export markets, particularly in Europe.

In the course of 2009 there was a gradual increase in the production of ferrous metals from their lows at the end of 2008.

At the end of the third quarter of 2009, some metallurgical companies of the country announced reaching the pre-crisis production levels. This was associated with a gradual recovery in demand for pipes, vessel steel in the domestic market as well as a higher activity in the export sectors.

On the whole, in 2009, Ukraine produced less than XX million tons of steel. This was the lowest level of the steel production in the country in the past decade.

The metallurgical companies in that period actively supplied their products to regional markets abroad. In addition to the traditional markets in the CIS and Eastern Europe, steel companies of Ukraine actively shipped products to Asian countries, including China, Singapore and others.

The output of rolled products in the country amounted to XX million tons, and of finished rolled steel – XX million tons.

Positive changes in the market of ferrous metals, started at the end of 2009, continued in 2010, and thus contributed to the growth of production of iron, steel and rolled steel in the country compared to 2009. Thus, in 2010 production of iron in the country increased as compared with the

previous year by above 6.5% to XX million tons, a crude steel output – by 10% to XX million tons, and a rolled steel production – by 11% to XX million tons.

Nevertheless, on the background of the overall growth, a number of companies faced problems with a short supply of resources and weak sales of products that forced some companies to decrease production volumes compared to planned figures. Some enterprises were on the verge of stoppage.

Difficulties with iron ore provision have been linked to the fact that the Ukrainian metallurgical enterprises that do not have iron ore assets were interested in getting high-quality iron ore resources (with a high content of iron), which Ukrainian mining companies could not always deliver. Naturally, there were contradictions between suppliers and consumers of iron ore resources concerning prices of the supplies. Such a disagreement was one of reasons for interruptions of supplies of iron ore resources for some customers, for instance, Zaporizhstal and Mariupol Ilyich.

However, after the recent merger of the Mariupol Ilyich Works, and later Zaporizhstal, by the Metinvest Group, which has large iron ore-producing assets, the iron ore supply problems were resolved.

In 2011 Ukraine increased the production output of iron and steel products compared to the previous year due to an increase in domestic demand and quite successful deliveries of steel products for export, with the (annualized) prices exceeding those for 2010.

In 2011, the operation of steel-making companies was affected by the problems with the exploitation of the main equipment, including the high depreciation of fixed assets in the industry (about 70%).

Thus, accidents were reported on "ArcelorMittal Kryvyi Rih" (a failure on the sinter plant, an emergency stop of the blast furnace No. 9), MMK Ilyich (a blow of a horn at the blast furnace No. 2 at the beginning of May 2011), MK "Zaporizhstal" (an emergency stop of the blast furnace No. 5), DMK Dzerzhinsky (an emergency stop of CCM No. 3, which was put into operation in early 2011), the Alchevsk Steel (a blast furnace No. 1), and others.

In 2012 the production of pig iron, crude steel and rolled steel in the mining and metallurgical complex in the country has decreased in comparison with the previous year. Thus, the pig iron production was about XX million tons (by 1.25% less than in 2011), the output of steel declined by approximately 5.1% to XX million tons, and of rolled products - by 8.7 % - to XX million tons.

And, although the reduction in output was relatively small, it was a symptom of the deepening problems in the industry due to negative changes in the global steel market, where there is an oversupply of steel. Naturally, the increased competition in the global market of ferrous metals, along with reductions in demand at large regional markets for various reasons, had a negative impact on export opportunities of Ukrainian metallurgical enterprises. And demand in the domestic market was always very small.

In 2013, production of ferrous metals, including iron, steel and rolled steel in the country increased slightly compared to the previous year.

Thus, the production of pig iron in the country at the end of 2013 amounted to nearly XX million tons (an increase of 2% compared to the previous year). The steel output in the country increased in 2013 by about 0.4% to about XX million tons. The output of rolled products at the end of 2013 was almost XX million tons (about XX million tons a year earlier).

To a large extent difficulties with exploitation of basic equipment at enterprises were related to insufficient investments in updating fixed assets in the industry. Although the country in recent years has made significant positive steps in updating the first and second processings (the blast furnace and steel productions), significant investments are required to the hardware upgrades, particularly in the rolling production.

According to PA "Metallurgprom" metallurgical enterprises of the country, members of the association, in the second half of the past decade have significantly increased investments in the development of production. But still they were insufficient. Especially because in the crisis of 2009 and 2010 years investments more than halved compared with peak levels in 2007. In 2009-2010,

according to PA "Metallurgprom", the investments in the industry per 1 ton of steel amounted to only \$24 (\$8.7 billion in total), and the bulk of the investments belonged to ISD Group. At the same time, for comparison, the investments in Russia exceeded \$57/ton of steel (\$37 billion).

In 2010, the metallurgical enterprises reduced investments by 9.2% compared to 2009, to 4.467 billion UAH.

In 2011, steel plants, according to "Metallurgprom", absorbed 6.368 billion UAH in investments, which is by 42.6% higher than in 2010. Note that MMC "ArcelorMittal Kryvyi Rih" designated almost 1.771 billion UAH on modernization (a decrease by 2.1%), DMK im. Dzerzhinsky - 196.8 million UAH (a decrease by 2.4%), DMZ im. Comintern - 114.6 million UAH (a 10.3-fold increase), "Evraz - DMZ Petrovsky" - 47.1 million USD (a 2.9-fold increase). Enakievo increased investments by 80.3% to 1.097 billion UAH, while reducing funding for the Makeyevka branch of EMZ (former Makeevskiy MZ). MK "Azovstal" in 2011 allotted on technical re-equipment 980.6 mln UAH (a 2.6-fold increase), Mariupol Ilyich - 427.4 million UAH (an increase by 60.1%), "Donetskstal MZ" - 149.4 million UAH, Donetsk MZ - 97.6 million UAH, "Electrostal" (Kurakhovo) - 26.6 million UAH (by 8.3%), Donetsk Electric Factory - 24.8 million UAH (by 57.8%), "Zaporizhstal" - 463.6 million UAH (by 0.5%), EMR "Dneprospetsstal" - 107.1 million UAH, Alchevsk - 469 million UAH (by 63.2%).

In the first half of 2012 the production investments of Ukrainian metallurgical enterprises reached nearly 3,014 million UAH. This is below the pre-crisis years, but the growth of investment shows that the country's steel companies are seeking to modernize the production assets and improve the market competitiveness of their products. The most significant investments in the first half of 2012 were made by "ArcelorMittal Kryvyi Rih" (736.8 million UAH), Alchevsk (371.2 million UAH), MK Illich (487.1 million UAH). "EnergoMashSpetsStal" committed substantial investments (330.4 million UAH) to the completion of the steel-making complex.

Overall, the specific investments per 1 ton of steel produced in the first half of 2012 were \$23.8 (\$14.9 for the same period of the previous year), and \$22.5 for 2011.

In 2012, investments in the development of production remained at approximately the level of the previous year and amounted to 6.34 billion UAH. At this, specific investments (per 1 ton of steel produced) amounted to \$24.5. However, the growth of specific investments is associated with a reduction of steelmaking in the country in 2012 compared to the previous year (by 5.1%).

We note a significant increase in investments in 2012 at Alchevsk MC. In total for 2012, the plant invested in the production development 824.8 million UAH (484.4 million UAH in 2011). Mariupol Ilyich invested in 2012 399 million UAH.

In 2013, investments in the development of production, according to "Metallurgprom", decreased compared to the previous year and amounted to approximately 6.22 billion hryvnia (a decline of about 2% compared with the previous year). However, those are investments only in the metallurgical production of enterprises that are members of PA "Metallurgprom". At the same time, metallurgical companies direct significant investments to the development of the mining sector (production of iron ore).

The high degree of depreciation of fixed assets for some steel-making companies of Ukraine is one of the most important problems. This primarily refers to the shops that were built in the Soviet times. Production upgrades are costly. Note that the wear of the rolling equipment at the metallurgical enterprises of Ukraine varies from 40% to 90%.

In order to raise the leading metallurgical enterprises of Ukraine at least to the Russian level, an estimated amount of investment must be at minimum \$25 billion. This applies only to "ArcelorMittal Kryvyi Rih", MMK Illich, MK "Azovstal", MK "Zaporizhstal", MK Alchevsk and Enakievo.

The positive changes in the steel industry of Ukraine, which have been observed after the crisis of 2009, in general have not resolved the existing problems. The positive changes in the industry are manifested in the last few years: a decrease in the proportion of open-hearth steel and increase in the share of the CCM steel, an update of the blast furnace (the reconstruction of blast furnaces, equipping them with the pulverized coal injection units) and the steelmaking process

stages (the decommissioning of open-hearth furnaces and commissioning modern electric systems, etc.). At the same time, the rolling production, the increase in the output of coated steel, etc., require more attention.

Nevertheless, the main problems of the Ukrainian metallurgical industry are:

- Dependence on the situation in the major regional markets of ferrous metals abroad (the country exports most of the produced steel);
- Low consumption of steel by the domestic market;
- The presence of significant excess production capacity;
- Insufficient supply of some metallurgical enterprises with coke and scrap metal;
- High depreciation of fixed assets;
- Obsolete structure of steel and rolled steel production;
- The need to invest heavily in the production development;
- Low productivity;
- Increased costs for services of natural monopolies;
- High production costs, which reduces the competitiveness of products in the major commodity markets abroad;
- A high proportion of semi-finished products in the export structure;
- High risks associated with the instability of the situation in the country.

The presence of significant excess capacities for the production of steel and rolled steel in the metallurgical industry of Ukraine is due to its formation within the USSR. It is clear that Ukraine smelters were built with the expectation to meet the needs of the entire USSR. With the collapse of the USSR Ukraine was forced to reroute most of the steel for export.

By 2008, the production capacity of ferrous metals in Ukraine declined significantly compared to 1990, but still by far exceeded the needs of the domestic market in ferrous materials.

Moreover, in connection with the implementation of a number of projects to create new steel plants, as well as with updating existing capacities the manufacturing capabilities for the production of iron, crude steel and rolled steel in the medium term will only increase, even with the decommissioning of all open-hearth furnaces in the country.

Thus, steelmaking capacities of Ukraine by early 2008 decreased by more than 9 million tons (by 16%) to around XX million tons. However by the beginning of 2009 the capacities grew up to above 51 million tons per year in connection with a launching a converter at the Alchevsky Works, as well as the construction of several electro-steelmaking plants in the country. During the 2009-2010 the steelmaking capacities in Ukraine decreased due to the decommissioning of open-hearth furnaces. In 2010 they stood at XX million tons per year. In 2011 they dropped to 44 million tons, and in 2012 - to XX million tons.

In 2013, capacities declined slightly, reaching XX million tons. In 2014, taking into account temporarily shut down businesses and steel complexes (of the open-hearth shop at Mariupol Ilyich), steelmaking capacities remained at the level of the previous year.

But this is a temporary phenomenon, as soon new electrosteel-making capacities will be introduced, and in the future - oxygen-converter ones. But it is necessary to take into account the decommissioning of the last open hearth shops with a total capacity of 8 million tons per year. Therefore, the overall growth of the steelmaking capacity in the country will be negligible. Existing enterprises carry out the reconstruction and modernization of production, which also leads to an increase in the steelmaking capacity.

In the medium term one can expect an increase in the production capacity for steel and rolled steel in the country, which will result from the implementation of plans of a number of existing steel companies to build new steel plants and rolling mills, as well as the establishment of new steel-making enterprises. However, the implementation of a number of projects requires to stabilize the situation in the country after the events of 2014.

In 2011, the construction of the electrosteel-making complex (ESPK) "**Dneprostal**" (currently "**Interpipe Steel**") by the Group "Interpipe" on Nizhnedneprovsk Pipe Plant was practically completed. However, the design capacity was achieved only in early 2013. However, already in November 2012, the group announced the decommissioning of the open-hearth shop with the capacity of 800 thousand tons per year with 5 single-bath units.

In addition, for a number of years an electric furnace has been constructed on **Donetsksteel MZ** with a production target of XX million tons per year. The new workshop was scheduled for commissioning in 2013. Then the timing of the commissioning was postponed for 2014. Currently in connection with the events in the south-east of the country its entering into operation can be postponed to a later period. At least, in January-November the enterprise carried no steel production.

Nevertheless, in April 2012 the company stopped the open-hearth shop, due to the preparations for the European Football Championship and the requirements of environmentalists.

In 2007-2008 the metallurgical enterprises of Ukraine had 50 hearth furnaces, including 5 twin-bath facilities. Productivity of the open-hearth production in Ukraine was at that time almost XX million tons of steel per year. The share of open-hearth steel in the structure of the steel production in the country exceeded 40%.

It is clear that during the crisis the steel plants were forced to halt furnaces in order to reduce the production costs. Thus Makeevka MZ ceased all the steel production, with the exception of rolled steel.

In 2010 the number of open-hearth furnaces in Ukraine decreased to 38, including 4 twin-bath facilities). Note that MC "Zaporizhstal" (except for an electric furnace for casting), Donetskstal and Nizhnedneprovskiy Pipe Plant had no other steelmaking capacity.

However, already in 2011-2012 the situation changed. MC "Azovstal" completely stopped open-hearth furnaces (9 in 2011). Somewhat earlier (in November 2010), open-hearth furnaces were stopped at Alchevsk MZ.

As a result, by mid-2011 the output capacity of the open-hearth steel production in the country had decreased by almost 2 times compared to 2008 - from more than XX million tons to XX million tons per year.

In 2012, open-hearth (OH) furnaces were stopped at MK Donetskstal and Nizhnedneprovsk Pipe Plant, the OH production capacity decreased at MK Ilich. In 2014, open-hearth furnaces of Mariupol Ilyich were mothballed.

Thus, the open-hearth steel production in Ukraine are currently performed by only two companies: AMKR and MK "Zaporizhstal". The total OH steel production capacity of these plants by early 2014 was around XX million tons per year.

It is obvious that in the medium term (2015-2017) open hearth furnaces will be closed at ArcelorMittal Kriviy Rih, and later (no sooner than in 2017) – at MK "Zaporizhstal". The companies plan to build new facilities for the production of steel (oxygen converters).

In particular, the group "Metinvest" planned to increase the steel production at its assets to 25-30 million tons, which would reduce the share of supply of iron ore to third parties from 50% of total production to less than 10%. In addition, the proportion of semi-finished products in rolled steel production will decrease from about 20% in 2012 to less than 5%. The group was going to expand production capacities for steel and rolled products on its core steel assets, including Enakievo MK (up to XX million tons per year), Mariupol Ilyich and MK "Azovstal" (up to XX million tons per year at two steel mills).

However, the implementation of development plans of metallurgical enterprises of the group can be adjusted due to the high negative risks of the investment activity in the country.

The analysis of the production of steel and rolled steel in Ukraine (Figure 1), suggests that the capacity utilization of metallurgical enterprises in pre-crisis years exceeded 80% for steel and finished rolled steel production (excluding commodity semi-finished products).

In late 2008, amid a decline in production capacity, the utilization rate fell dramatically to less than 50%. Most of steelmaking and blast units were stopped. Thus, on November 1, 2008 only

Part II. Standing of the Main Ukrainian Steelmaking Enterprises

II.1 ArcelorMittal Kryvyi Rih

(former Krivorozhstal Integrated Iron-and-Steel Works)

II.1.1 General Information

Krivorozhstal Integrated Iron-and-Steel Works is located in the city Krivyi Rih (Dnepropetrovsk region).

Krivorozhstal, as Mining-Metallurgical Works, was organised in October, 1996 by the governmental decree through merging of three enterprises - Krivorozhstal Metallurgical Works, Krivorozhsky coal-tar chemical plant and Novokrivozhsky GOK. In addition, since 2001 the Mining Administration named after Kirov became part of the company. Thus, at present, the enterprise has a complete metallurgical production cycle and also a complete raw material recourses cycle, which is its obvious.

The enterprise releases steel products from carbon steel and alloyed steel. It is the main Ukrainian producer of reinforcing bar from carbon steel (including heat-resistant high-strength rebar), as well as wire rod and rolled steel.

In 2012, the company has regained the first place in terms of steel production in Ukraine. In 2013, the enterprise released almost XX % of the total production of rolled ferrous metals in Ukraine, while in 2007-2011 - XX %. According to data for 2013, the share of the enterprise on the domestic market of rebar and wire rod exceeded XX %.

At the company shareholders meeting on January 12, 2006, Krivorozhstal was renamed Mittal Steel Kryvyi Rih. In 2007 the company name was changed to ArcelorMittal Kryvyi Rih (AMKR).

On April 21, 2011, JSC "Arcelor Mittal Kryvyi Rih" changed its form of organization to the Public Joint Stock Company (PJSC) "Arcelor Mittal Kryvyi Rih".

Production capacities of PJSC "Arcelor Mittal Kryvyi Rih", which has a full production cycle, in 2013 were designed to release annually more than XX million tons of rolled steel, XX million tons of crude steel and XX million tons of pig iron.

Paramzhit Kalon was appointed the Acting Director General of PJSC "Arcelor Mittal Kryvyi Rih" by the decision of the Supervisory Board of the enterpris from September 25, 2014. This is the fifth head of "Kryvorizhstal" for six years the plant is part of a multinational corporation.

Awards and achievements of PJSC "Arcelor Mittal Kryvyi Rih" in 2013:

- The second place in the ranking of socially responsible companies of Ukraine, compiled by the Ukrainian rating magazine "GVardiya";
- The second place among 100 Ukrainian companies in the Index of transparency;
- The winner in the category "Development of cleaner production technologies" by the results of the XII All-Ukrainian competition "Ecological quality and safety".

II.1.2 The enterprise structure, capacities, range of products

ArcelorMittal Kryviy Rih (–Krivorozhstal”) is a unique in its scale and capabilities enterprise with a complete metallurgical cycle.

The basis of the production cycle of the enterprise is a significant raw materials base of deposits of ferruginous quartzites. The development of these fields is carried out by two divisions of the enterprise - the Mining Administration and the Mining-Concentration Complex.

The **Mining Administration** implements the underground ore mining (the shaft named after Artem and the shaft –Prokhodcheskaya”) and the open-cut mining (the quarry –Yuzhny” or Mining workshop). The Mining Administration also includes a crushing-sorting plant.

The Mining Administration produces sinter-ore with the iron content at least XX %, as well as a sub-standard rock mass fraction (blast furnace lump) with the iron content at least XX %.

In 2013 balance reserves of the iron ore deposit were estimated at about XX million tons.

The design capacity of the mining administration is 1.6 million tons of sinter iron ore and XX thousand tons of other crude ore.

Mining-Concentration Complex (Novokrivorozhsky GOK) extracts and concentrates low-iron magnetite quartzites, and releases commodity iron ore. Its production is the iron ore magnetite concentrate with the iron content of XX % and 10.5% of moisture.

The resources base of the Complex is presented by the Novokrivorozhsky and Valyavkinsky ferruginous quartzite deposits, mined by two open pits: # 2-bis and # 3. Balance reserves of magnetite ferruginous quartzite exceed XX million tons.

The mining and processing production includes two divisions:

- the mining-transportation unit (the mining administration, crushing plants # 3 and 4, the mining and transportation shop);
- the crushing and concentrating unit (the crushing plant, ore dressing plants (ROF-1 and ROF-2), the sludge shop).

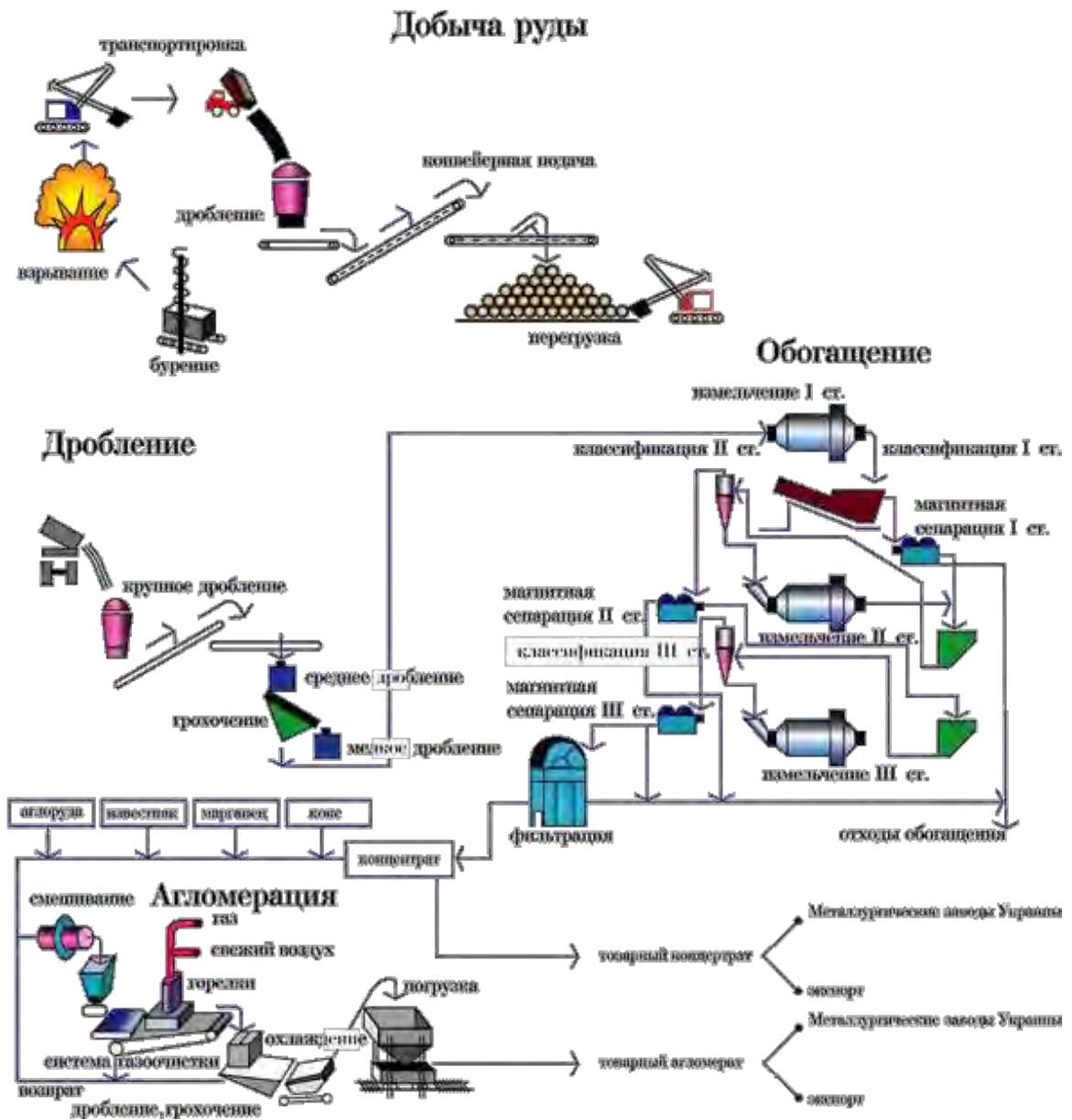
As of 01.01.2014, design capacities of the complex were as follows:

For crude ore mining – XX million tons per year, including XX million tons per year in the open pit # 2-bis and XX million tons per year in the open pit # 3;

For concentrate – XX million tons per year, including XX million tons per year at the concentrator # 1 (ROF-1) and XX million tons per year at the concentrator # 2 (ROF-2).

The process flow sheet of the Mining-Concentration Complex is presented in Fig. 17.

Figure 17: Process flow sheet of the Mining-Concentration Complex of Arcelor Mittal Kryvyi Rih



Source: data of the company