

Ferroalloys market of Russia and CIS.

Consolidation of market bulk ferroalloys

Tbilisi, 21-22 September

- General situation in steel sector
- Si alloys
- Cr alloys
- Mn alloys

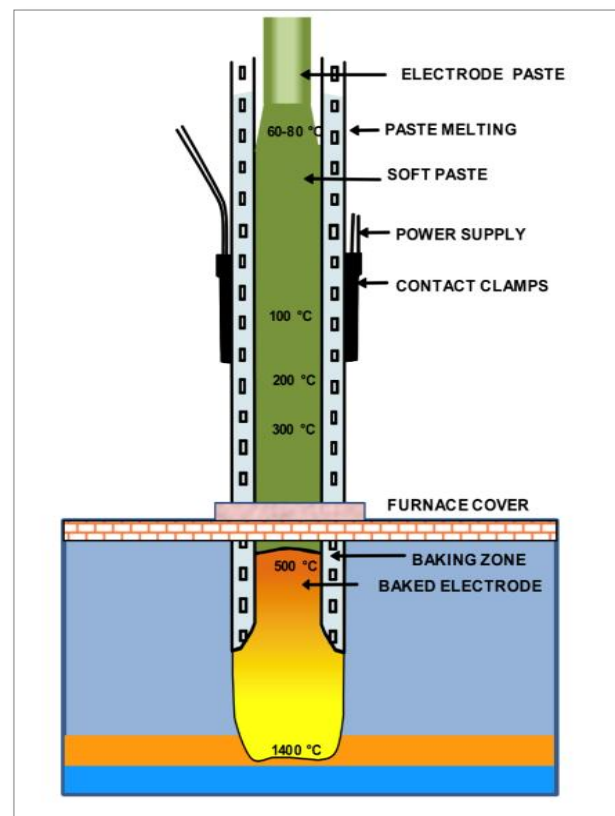
Dmitry Ostrovskiy
URM-company

Market overview

Carl Wilhelm Soderberg invented self-baking electrode in 1917.
We worked in company Elektrokemisk later known as ELKEM



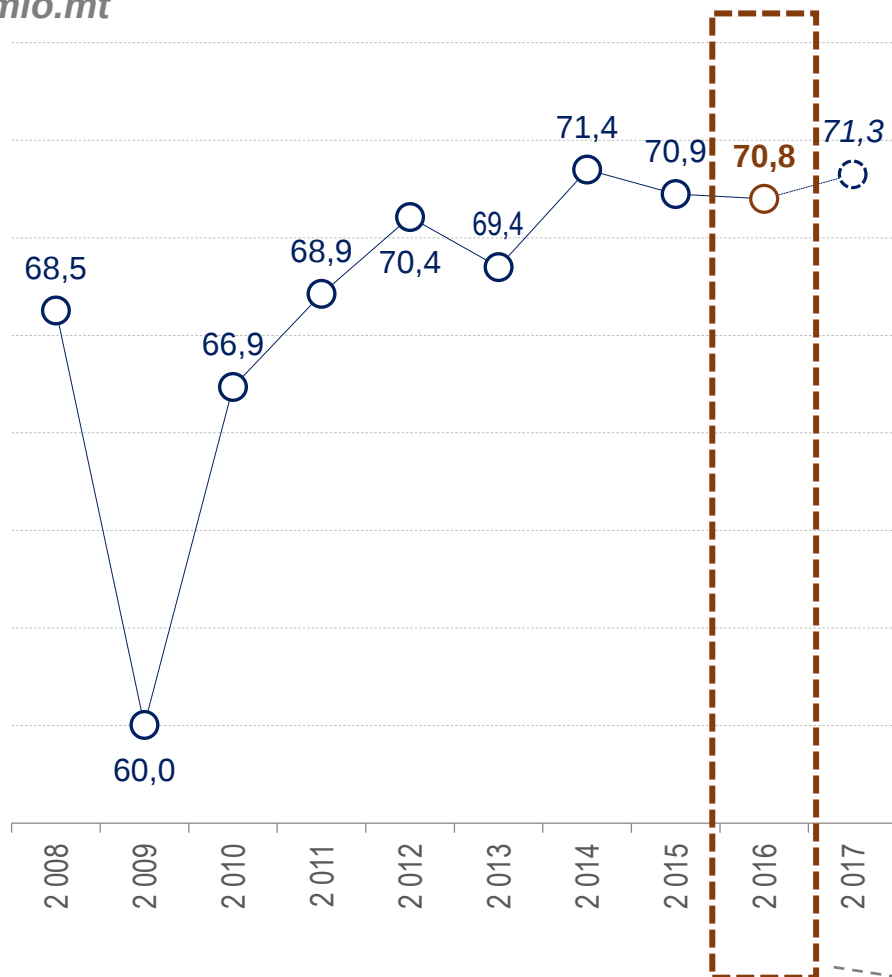
C. W. Söderberg



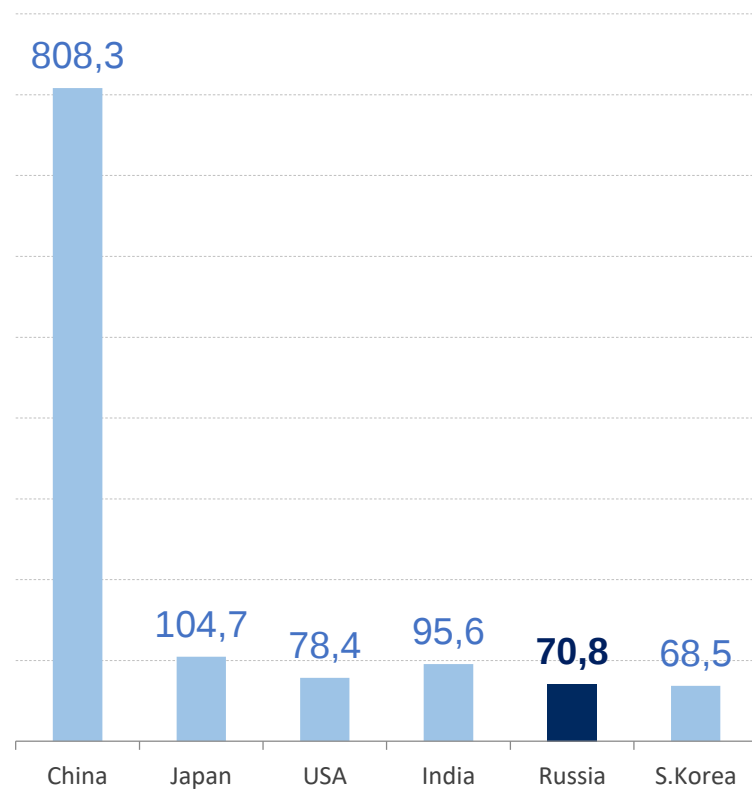
The Söderberg electrode

Ferroalloys market of Russia and CIS

Production steel in Russia, *mio.mt*

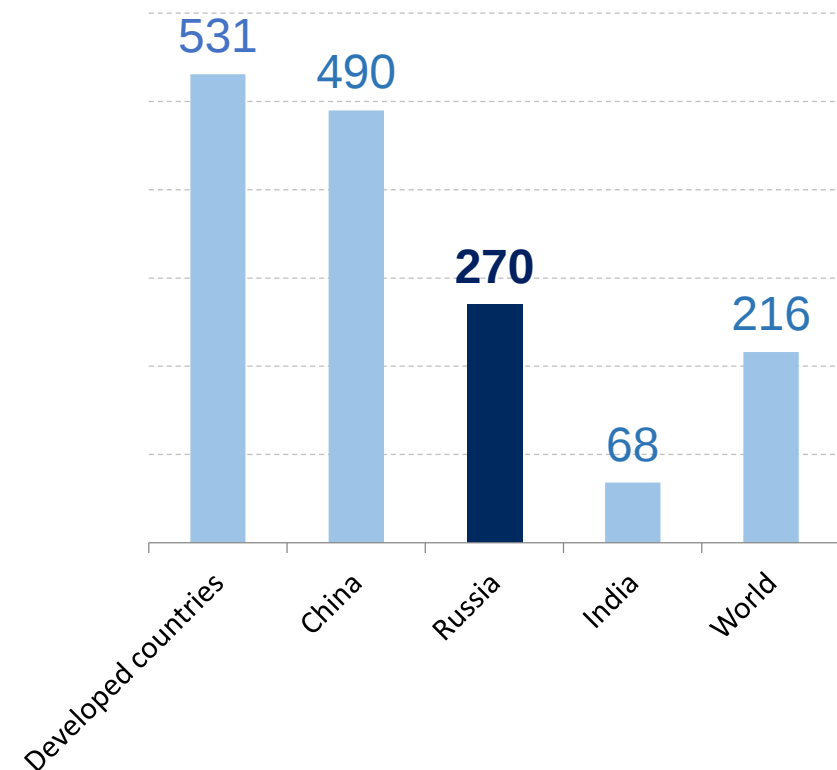


Largest world steel producers, *2016, mio.mt*

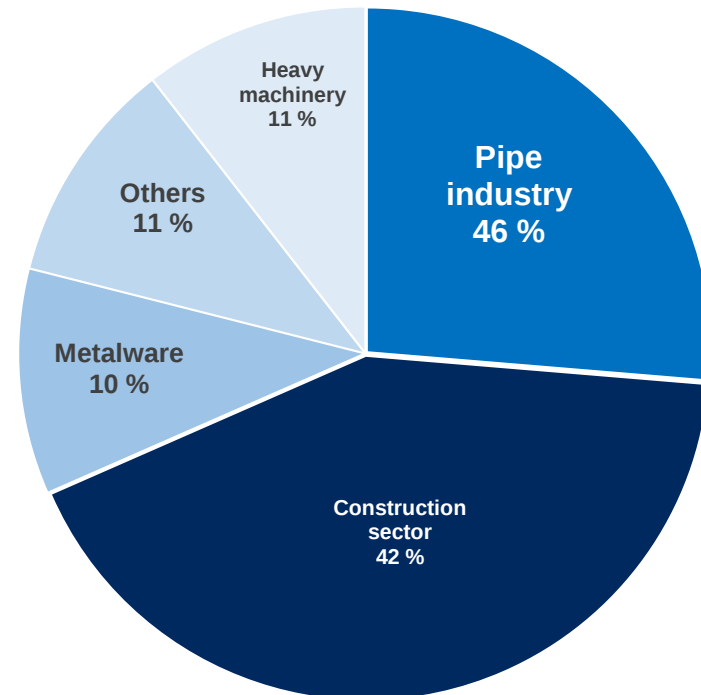


Steel consumption in Russia

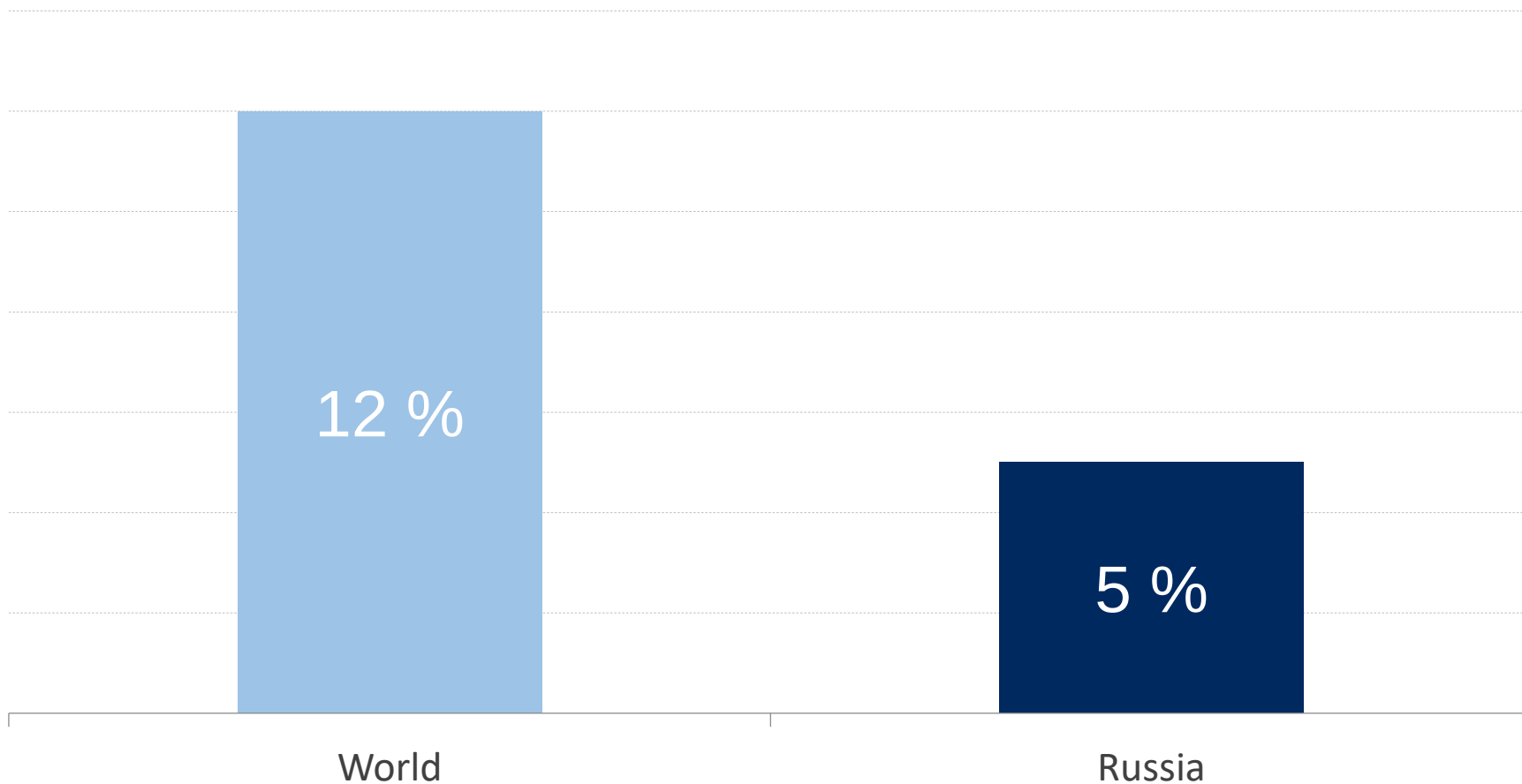
Steel consumption per capita *kg/person*



Structure domestic consumption of steel products in economic of Russia



Share of special and alloys steel in total steel production,%%

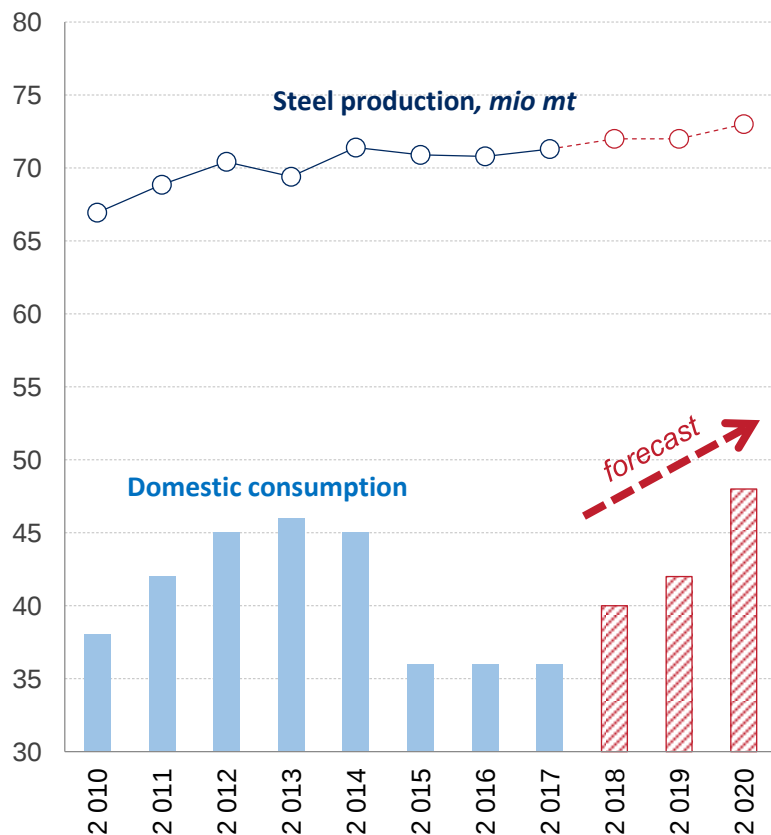


Steel industry in Russia

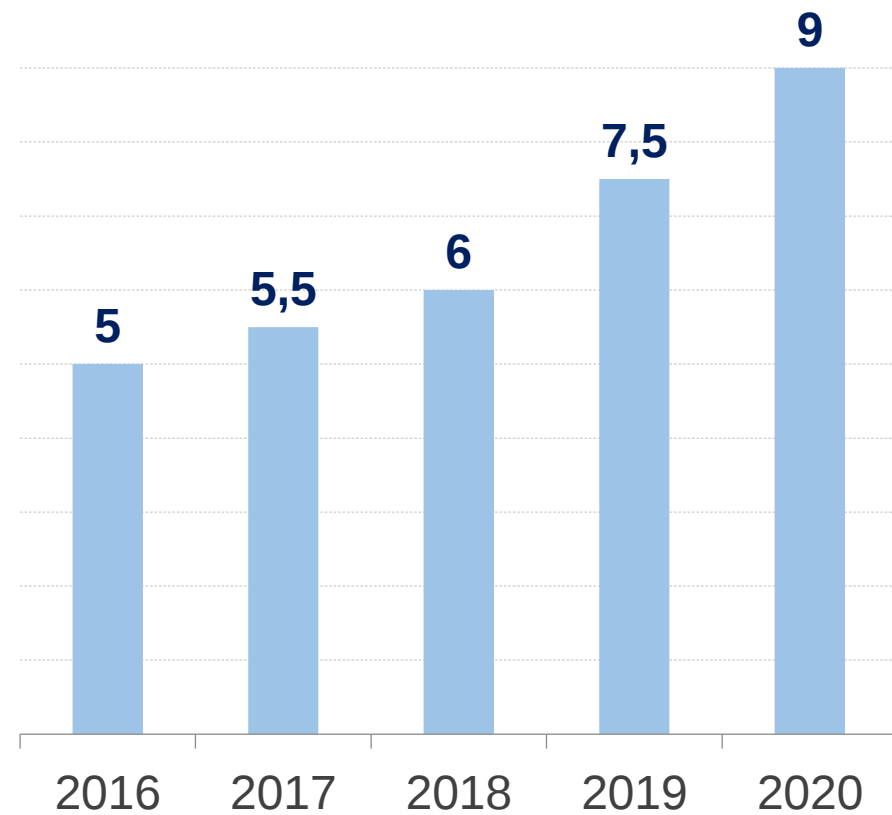
	2013	2014	2015	2016	%%
Evraz	11 795	11 793	11 356	11 060	80 %
MMK	11 917	12 989	12 195	12 533	
Severstal	10 683	11 216	11 517	11 550	
NLMK	12 400	12 804	12 882	12 985	
Metalloinvest	4 682	4 508	4 521	4 654	
Mechel	4 346	3 971	4 130	3 950	
TMK	2 700	2 750	2 750	2 750	6 %
ChTPZ	850	850	850	850	
OMK	900	900	900	900	
Others	8 968	9 672	9 797	9 800	14 %
Total	69 241	71 453	70 898	70 800	100 %

Ferroalloys market of Russia and CIS

Production steel in Russia, *mio.mt*



Production special steel and alloys, *%% / total steel production*



Consumption ferroalloys by Russian steel mills

mt/month

	SiMn	FeSi-65/75	FeMn-78	HC FeCr	LC-MC FeCr	Summ
EvrzHolding	9 000	1 800	800	210	210	12 020
MMK	6 000	2 500	1 500	-	210	10 210
Severstal	3 000	1 300	2 000	40	70	6 410
Lipetsk	3 000	2 000	3 000	-	70	8 070
Metalloinvest	4 000	1 300	300	840	350	6 790
Mechel	1 800	2 000	4 000	1 000	210	9 010
TMK	2 000	350	500	140	210	3 200
CHTPZ	1 500	100	70	-	-	1 670
OMK	700	210	70	140	70	1 190
Others	4 000	500	1 000	1 000	700	7 200
Summ	35 000	12 060	13 240	3 370	2 100	65 770

Consumption ferroalloys in Russia, th.mt

'000 mt	2013	2014	2015	2016	Consumption kg/mt steel
FeSi	196	182	165	165	2,35
SiMn	446	456	440	420	6,3
FeMn	151	153,9	160	160	2,3
FeCr	62	61	60	60	0,9
Total	835	832	802	800	11,8

Average consumption ferroalloys in the world **20 kg /mt** steel

Total production ferroalloys in CIS is about 4,5 m mt (22 plants)



World competition on the world market

country	Production, mt	Consumption, mt	overproduction, mt	%%
CIS	4 124 000	1 087 000	3 037 000	279 %
India	2 917 000	1 817 000	1 100 000	60 %
China	19 060 000	18 500 000	560 000	3 %
EU	2 158 000	3 796 000	-	-
USA	210 000	1 194 000	-	-
Japan	300 000	1 540 000	-	-

Production of Ferroalloys, mt

	 ERG	 Chemk	 Privat
FeCr HC	1 500 000	150 000	--
FeCr LC	90 000	210 000	--
SiMn	150 000	280 000	720 000
FeMn-78	--	36 000	100 000
FeSi	24 000	530 000	95 000
Total	1 764 000	1 200 000	915 000



Ferroalloys market of Russia and CIS

	Production ferroalloys in Russia in 2017, th.mt									
										
	Chemk	Tihvin	Bratsk	NLMK	SGMK	Kluchi	Metallex	Kosaya Gora	Satka	Total
FeSi	530		85	23,5			12			650
SiMn	280				45					325
FeCr HC	150	60								210
FeCr LC	210					4,0				214
FeMn	36							60	95	191
Total	1200 (75 %)	60	85	23,5	45	4,0	12	60	95	1585

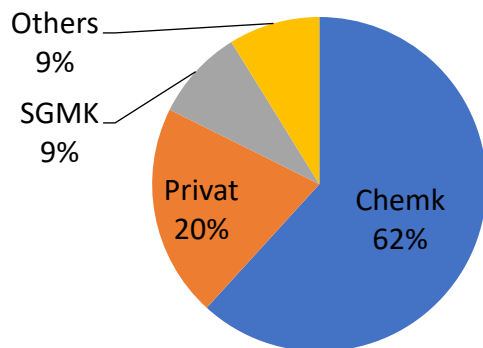
Ferroalloys market of Russia and CIS

Capacity of CHEMK and production-resources base

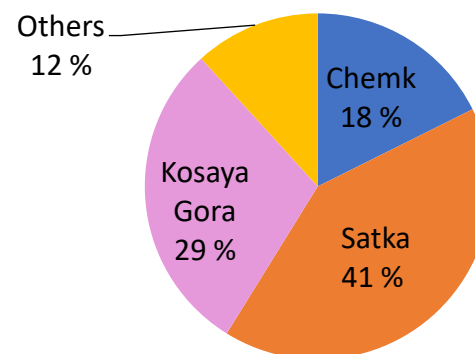


Market of ferroalloys in Russia

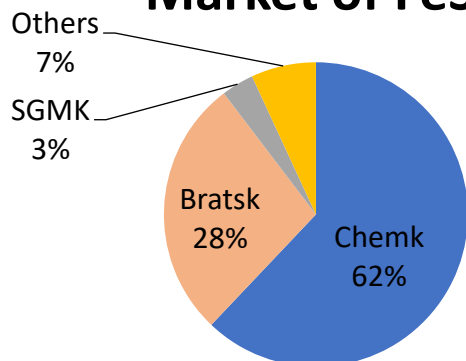
Market of SiMn



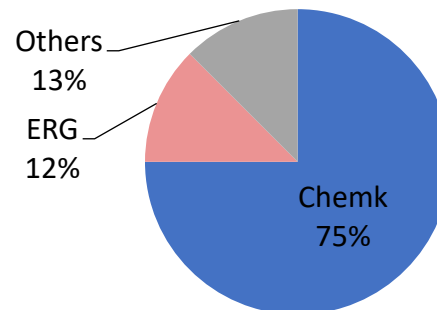
Market of FeMn



Market of FeSi



Market of FeCr



Market of ferroalloys in Russia

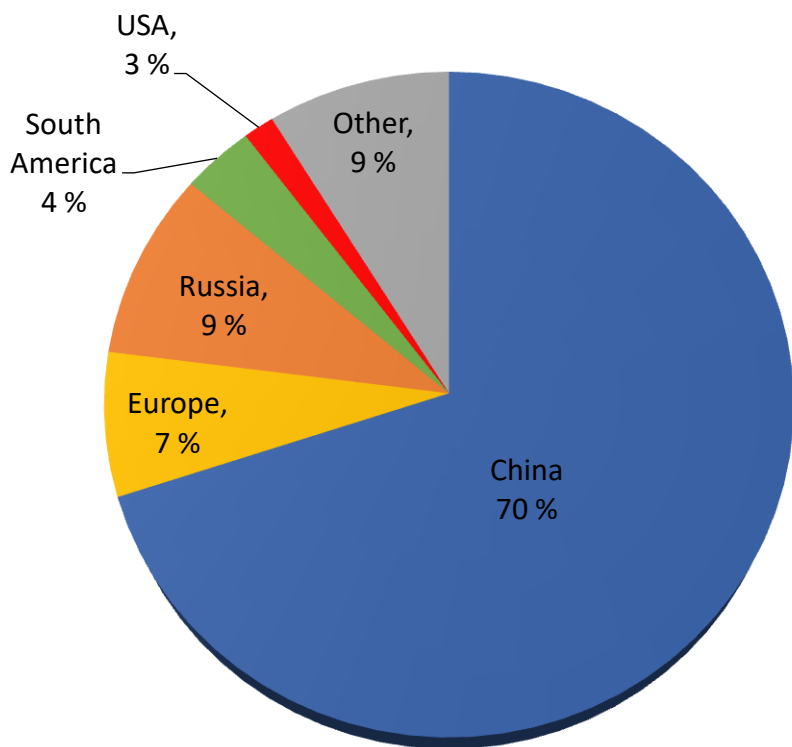
Ferrosilicon



Mark	Mass fraction, %						
	Si	C	S	P	Al	Mn	Cr
		No more					
FeSi 90	>>78>>95	0,1	0,02	0,03	3,5	0,3	0,2
FeSi 75	>>74>>80	0,1	0,02	0,04	3,0	0,4	0,3
FeSi 70	>>68>>74	0,1	0,02	0,04	2,0	0,4	0,4
FeSi 70A1	>>68>>74	0,1	0,02	0,04	1,0	0,3	0,3
FeSi 65	>>63>>68	0,1	0,02	0,05	2,5	0,4	0,4
FeSi 50	>>47>>52	0,1	0,02	0,05	1,8	0,6	0,5
FeSi 45	>>41>>47	0,1	0,02	0,05	2,0	1,0	0,5
FeSi 25	>>23>>29	0,1	0,02	0,06	1,0	1,0	0,8
FeSi 20	>>19>>23	0,1	0,02	0,10	1,0	1,0	0,8

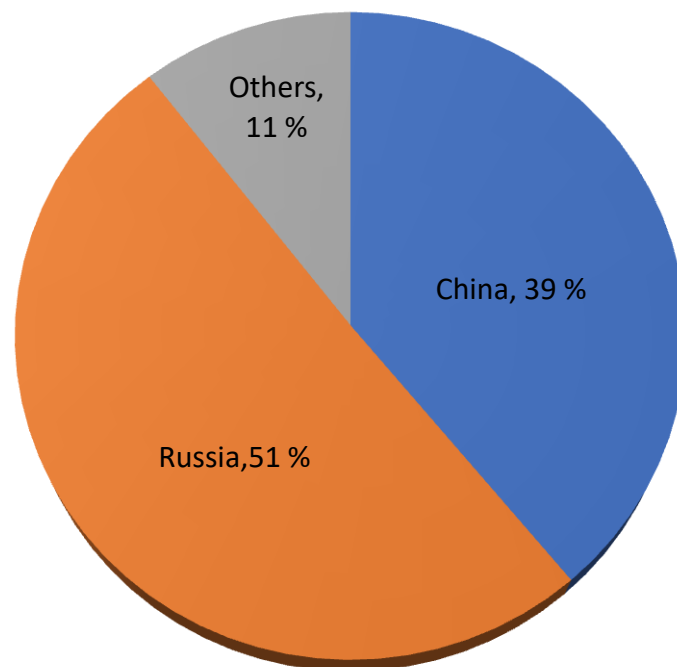
Russia on the global FeSi market

World production



Total world production is about
7,1 mio mt

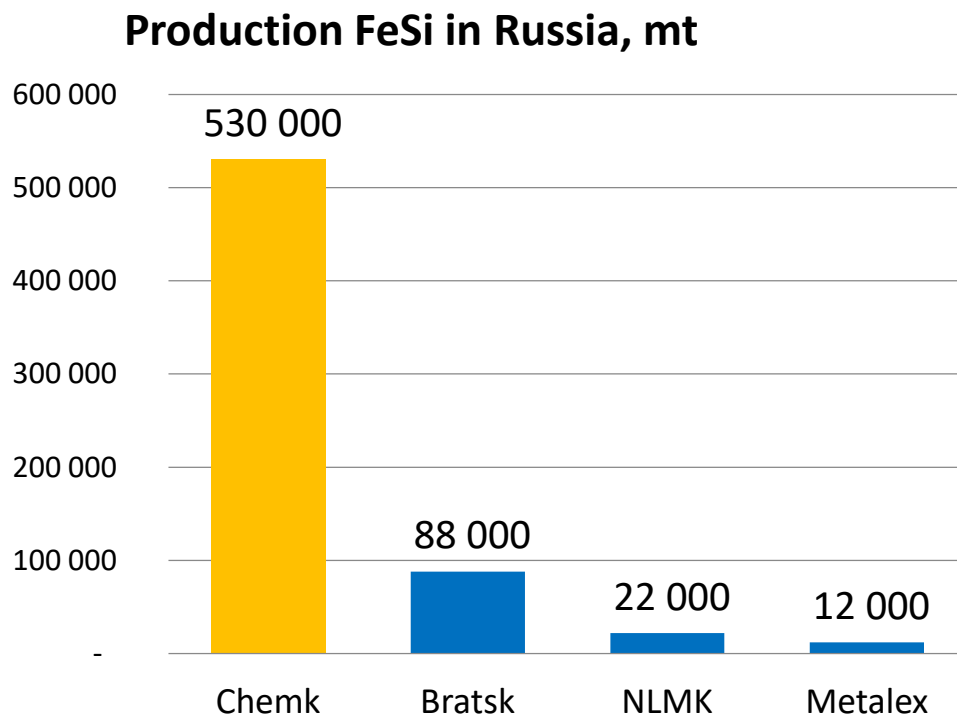
World export



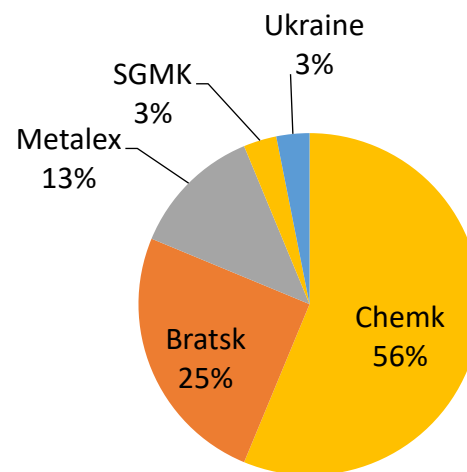
Total world export is about
950 000 mt

Market of FeSi

Russian producers of FeSi



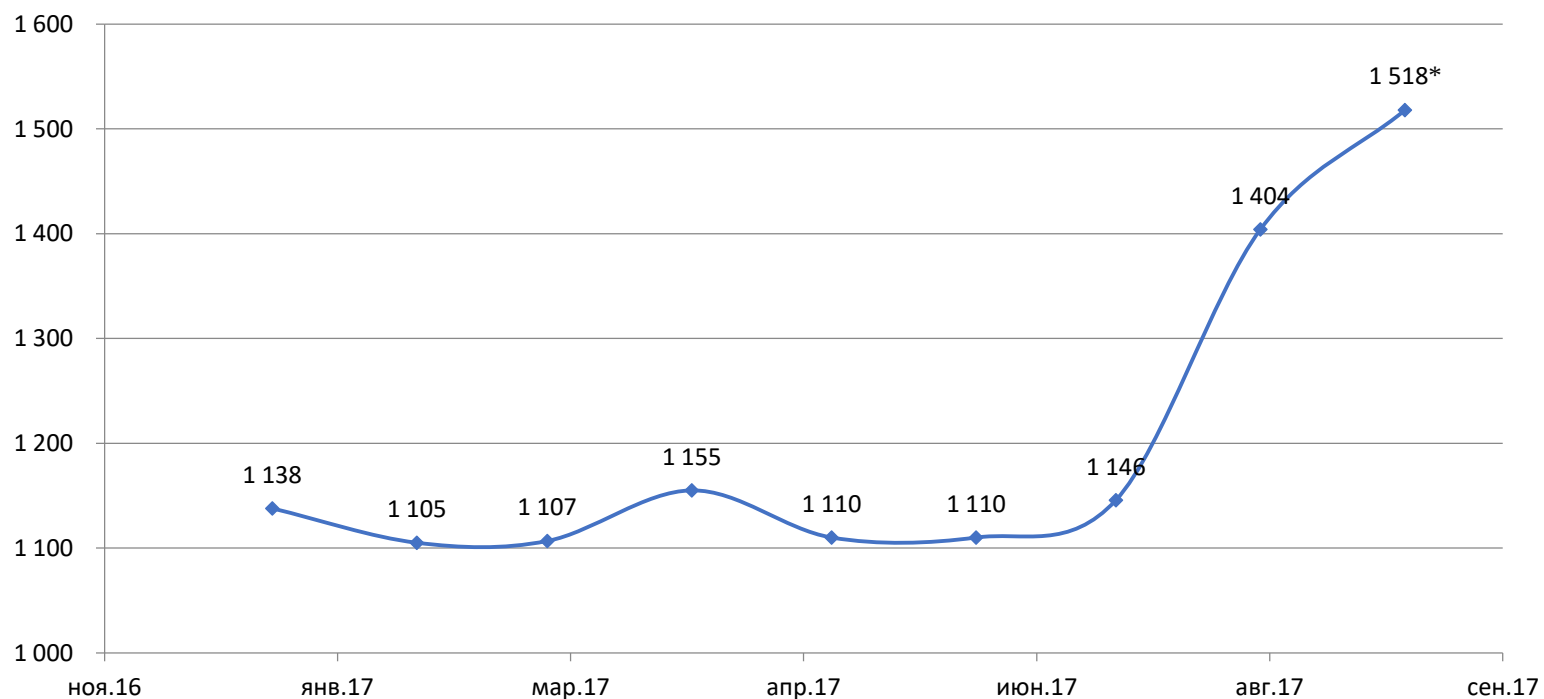
Domestic market of FeSi



Russian consumption is 165 000 mt per year or 2,35 kg/mt steel

Market of FeSi

Ferrosilicon - 75% Si FOB China, Export, \$/т



Russian consumption is 165 000 mt per year or 2,35 kg/mt steel

Ferrochrome



ХИМИЧЕСКИЙ СОСТАВ ГОСТ 4757-91

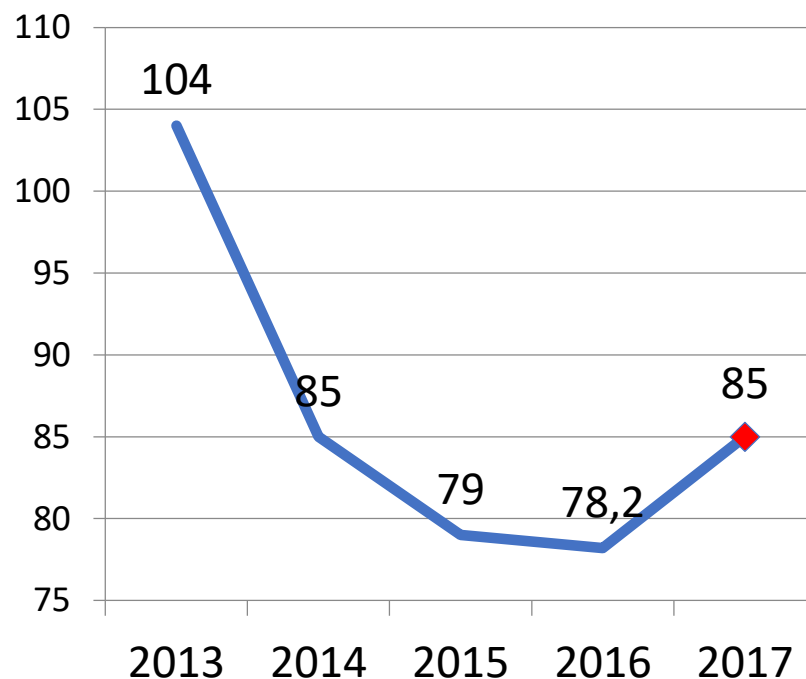
высокоуглеродистый	Хром	Углерод	Кремний	Фосфор/кл,А	Фосфор/кл,Б	Сера/кл,А	Сера/кл,Б	
ФХ650	65	6,5	2	0,03	0,05	0,06	0,08	
ФХ800	65	8	2	0,03	0,05	0,06	0,08	
ФХ850	65	8,5	2	0,03	0,05	0,05	0,08	
ФХ900	65	9	2	0,03	0,05	0,04	0,06	
низкоуглерод. азотир.	Хром	Углерод	Кремний	Фосфор/кл,А	Фосфор/кл,Б	Сера	Алюминий	Азот
ФХН100	65	0,06	1	0,02	0,03	0,02	0,2	1
ФХН200	65	0,06	1	0,03	0,04	0,02	0,2	2
ФХН400	65	0,06	1	0,03	0,04	0,04	0,2	4
ФХН600	60	0,03	1	0,03	0,04	0,04	0,2	6
низкоуглеродистый	Хром	Углерод	Кремний	Фосфор/кл,А	Фосфор/кл,Б	Сера	Алюминий	
ФХ001	68	0,01	0,8	0,02	0,03	0,02	0,2	
ФХ002	68	0,02	1,5	0,02	0,03	0,02	0,2	
ФХ003	68	0,03	1,5	0,02	0,03	0,02	0,2	
ФХ004	68	0,04	1,5	0,02	0,03	0,02	0,2	
ФХ005	65	0,05	1,5	0,03	0,05	0,02	0,2	
ФХ006	65	0,06	1,5	0,03	0,05	0,02	0,2	
ФХ010	65	0,1	1,5	0,03	0,05	0,02	0,2	
ФХ015	65	0,15	1,5	0,03	0,05	0,02		
ФХ025	65	0,25	2	0,03	0,05	0,02		
ФХ050	65	0,50	2	0,03	0,05	0,02		
среднеуглеродистый	Хром	Углерод	Кремний	Фосфор/кл,А	Фосфор/кл,Б	Сера/кл,А	Сера/кл,Б	
ФХ100	65	1	2	0,03	0,05	0,02	0,04	
ФХ200	65	2	2	0,03	0,05	0,02	0,04	
ФХ400	65	4,0	2	0,03	0,05	0,04	0,04	

Ferrochrome and stainless steel Producers of stainless steel in Russia

Largest producers of SS in Russia

Company	2013	2014	2015	2016
Mechel	40 951	23 284	16 156	15 702
Red October	36 353	33 634	35 134	37 113
Zlatoust	11 152	13 793	16 715	14 493
Electrostal	10 843	10 548	8 235	7 851
Others	4 685	4020	3 476	2094
Total	103 984	85 285	79 716	78 253

Production SS in Russia, 000,mt



Consumption SS in Russia is about **350 000** per year

Ferrochrome

Production HC FeCr

Company	Production, Mt	Consumption mt
Chemk	100 000	
Tihvin	60 000	
Total	160 000	45 000
ERG	1 500 000	

Total world production 10 mio mt

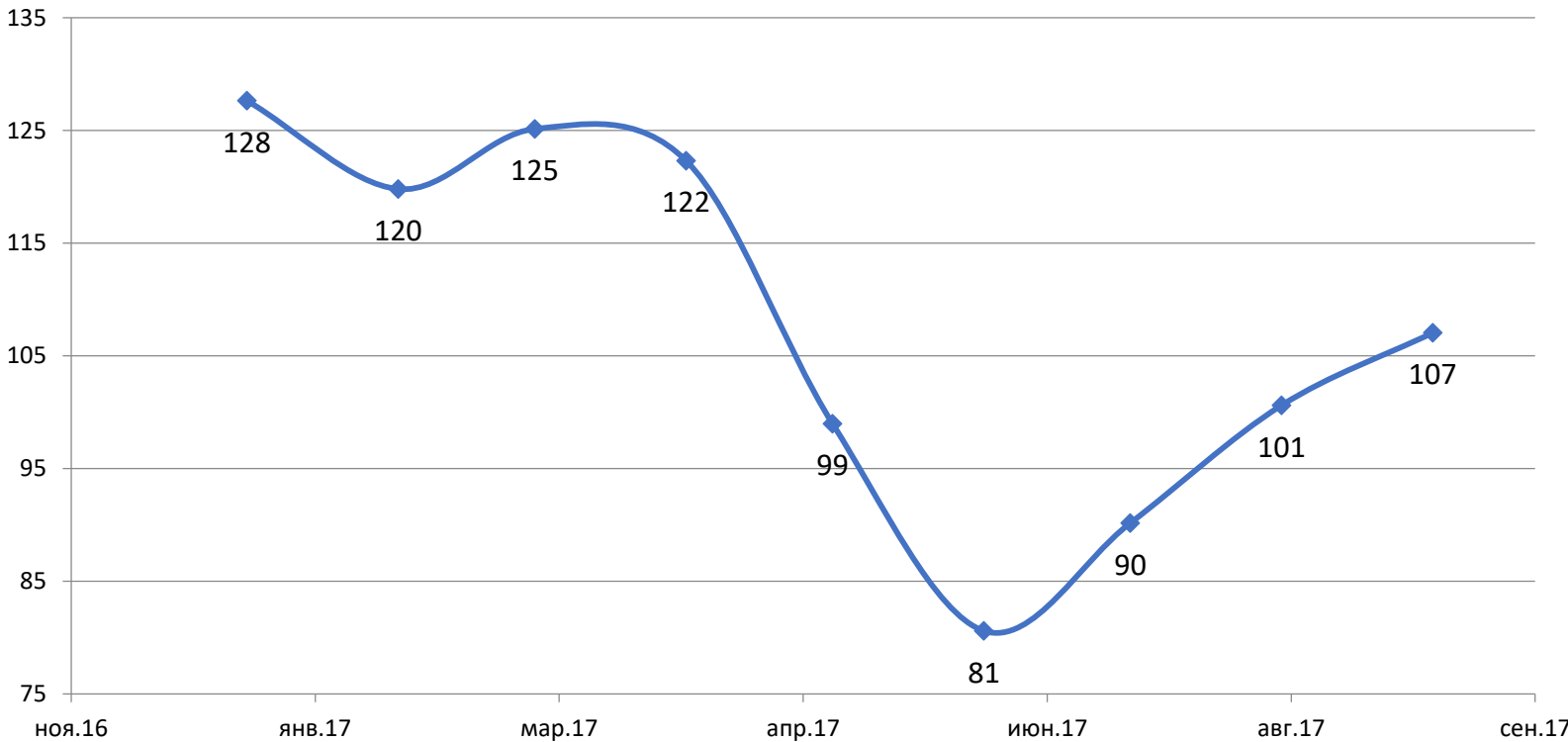
Production LC FeCr

Company	Production, mt	Consumption mt
Chemk	210 000	
Kluchi	3 900	
Novotroitsk	3 600	
Total	217 500	20 000
ERG	60 000	

Total world production is 700 th mt

Ferrochrome

HC Ferrochrome fecr55c1000 Inner Mongolia, c/lb Cr



The market of manganese alloys

Blast furnace/доменная печь

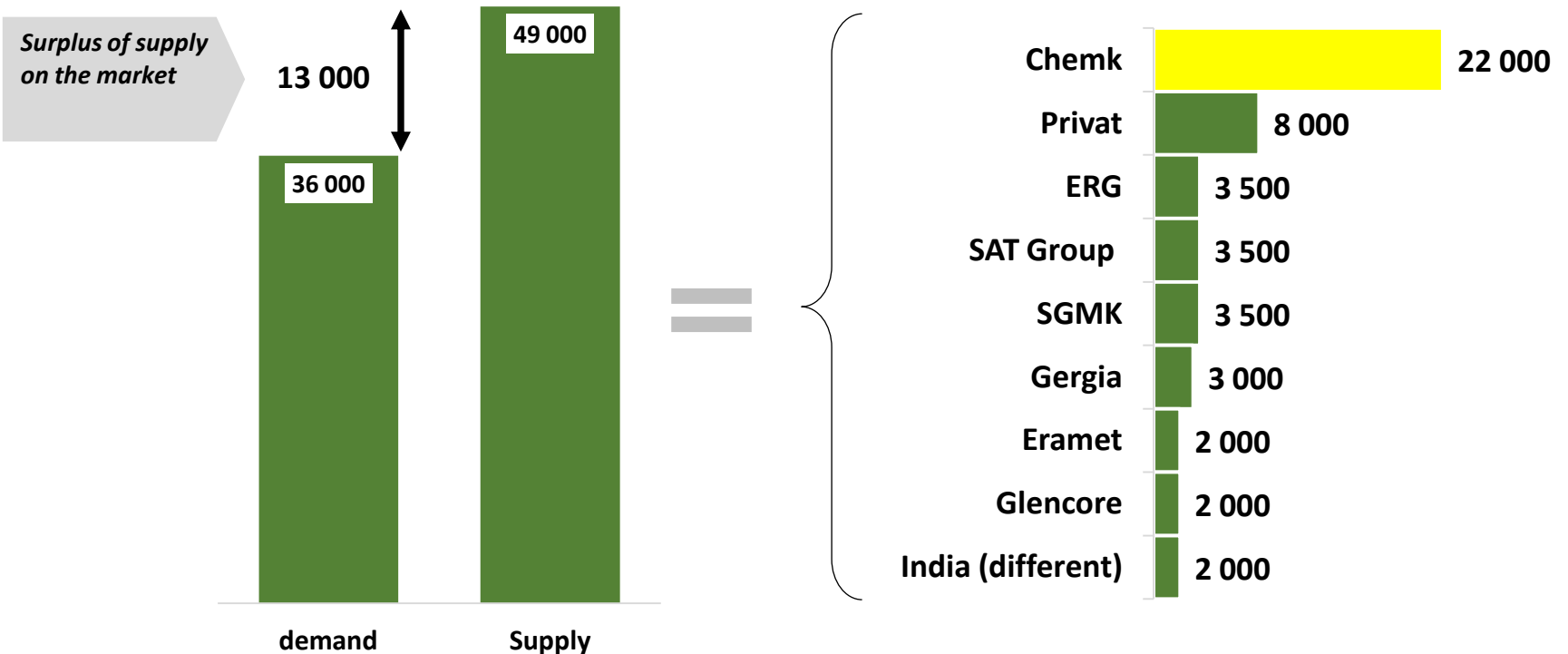


Electric furnace/электродпечь



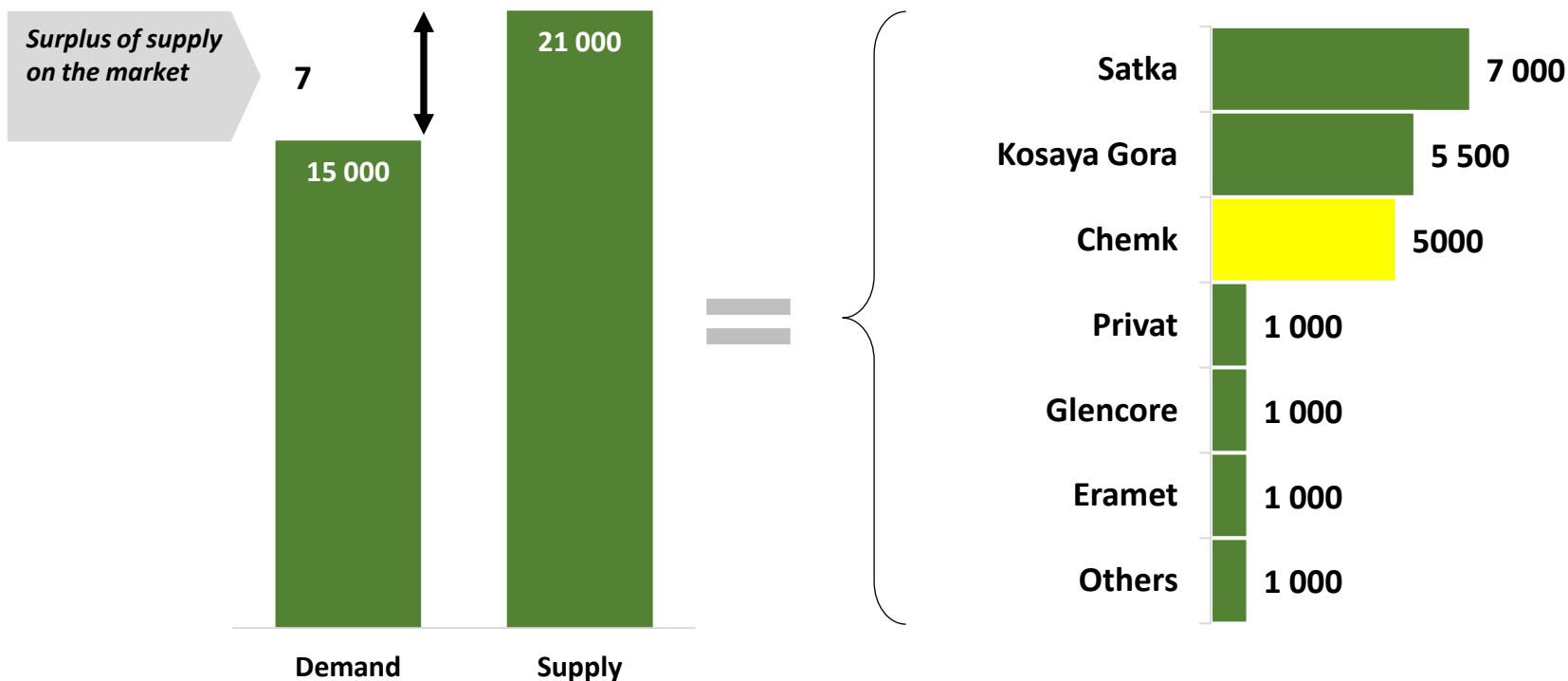
Russian market of **SiMn**

Balance and structure market supply , mt /month



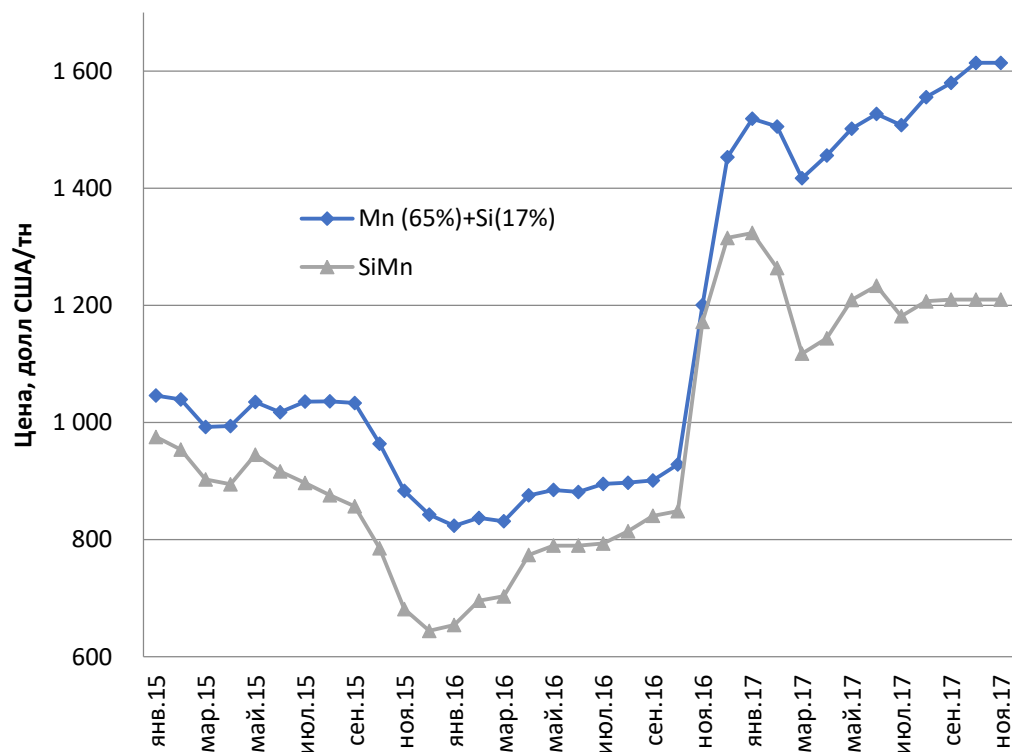
Russian market of FeMn

Balance and structure market supply , mt /month

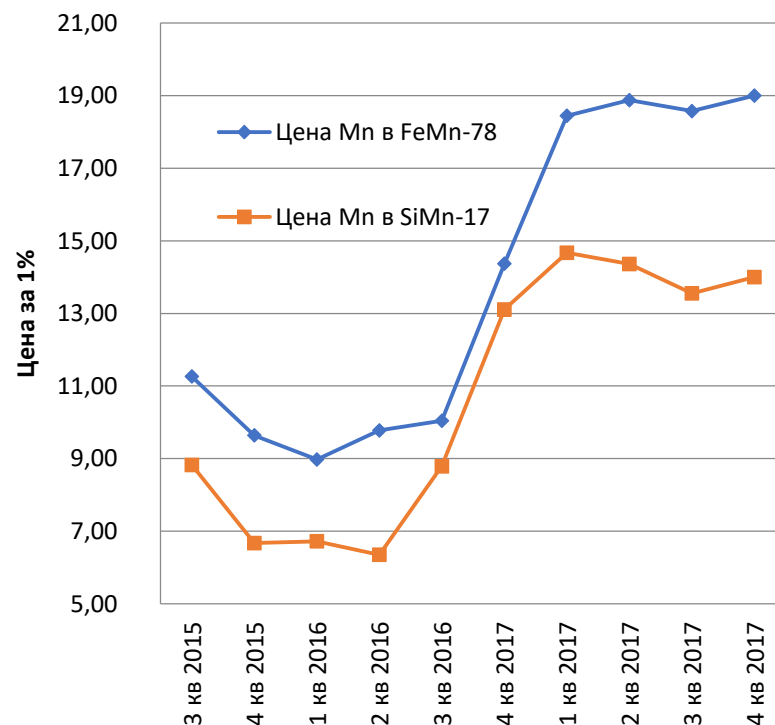


Ferroalloys market of Russia and CIS

The price of SiMn and the price of FeMn + FeSi

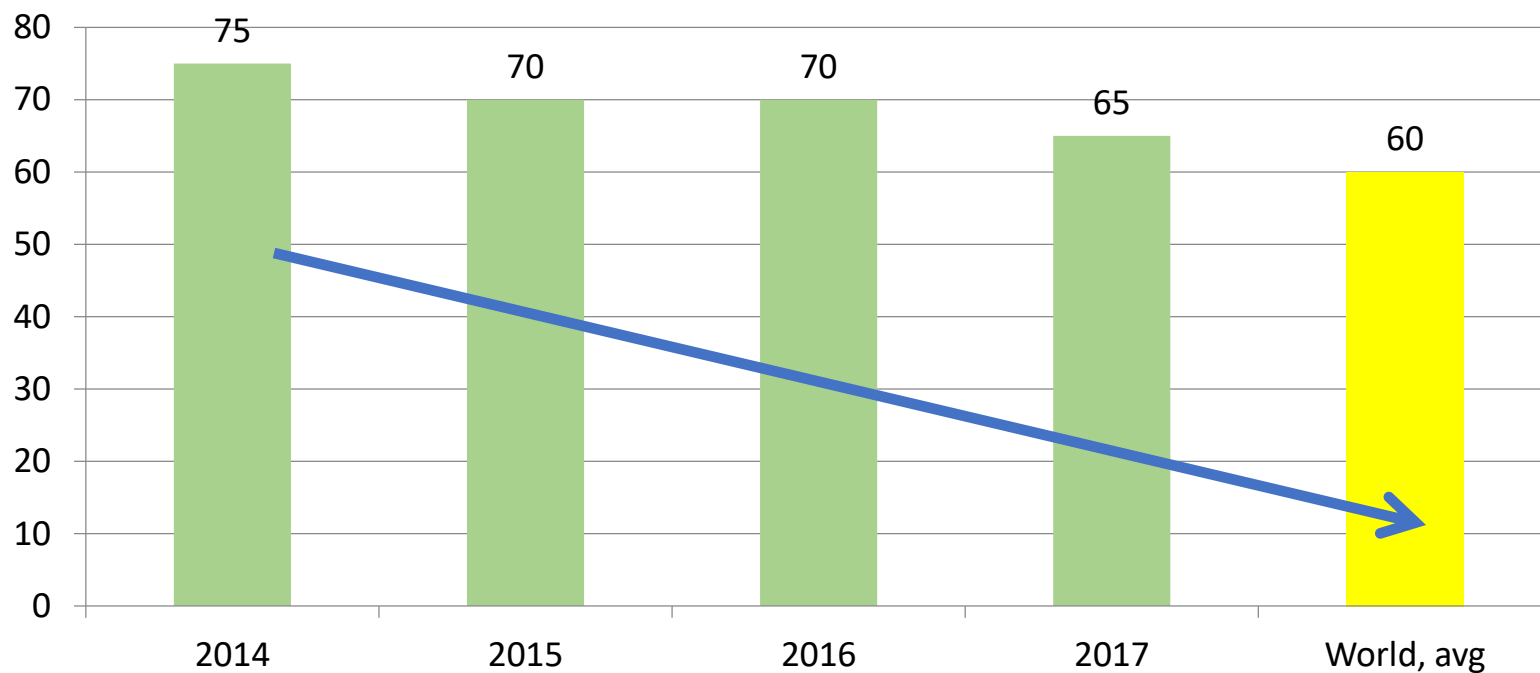


The price of "Mn" in FeMn and SiMn, usd / 1%



Tendency of share SiMn/FeMn

Share of SiMn in total Mn alloys usage,%%

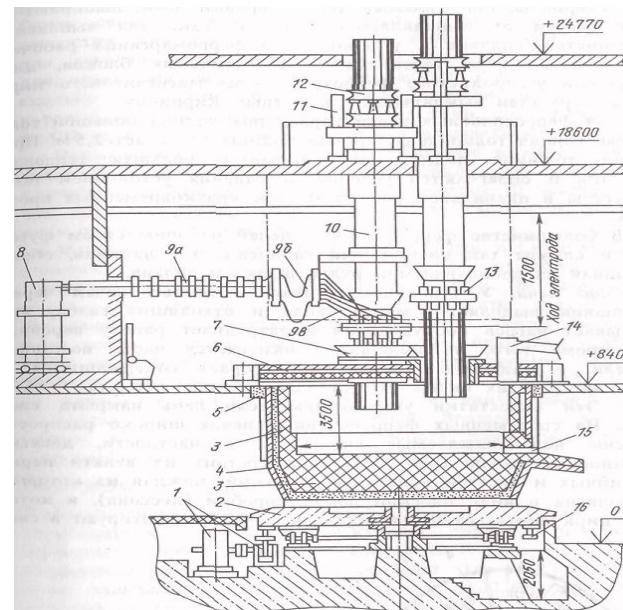


Технологические преимущества электропечи



- Руда марганцевая 511 долл/тн
- Восстановитель 119 долл/тн
- Кокс для энергии 230 долл/тн
- Прочее 100 долл/тн

производственная с/с ~1000 долл /тн



- Руда марганцевая 511 долл/тн
- Восстановитель 100 долл/тн
- Электроэнергия 150 долл/тн
- Прочее 100 долл/тн

производственная с/с ~ 880 долл/тн

Tendency on market ferroalloys

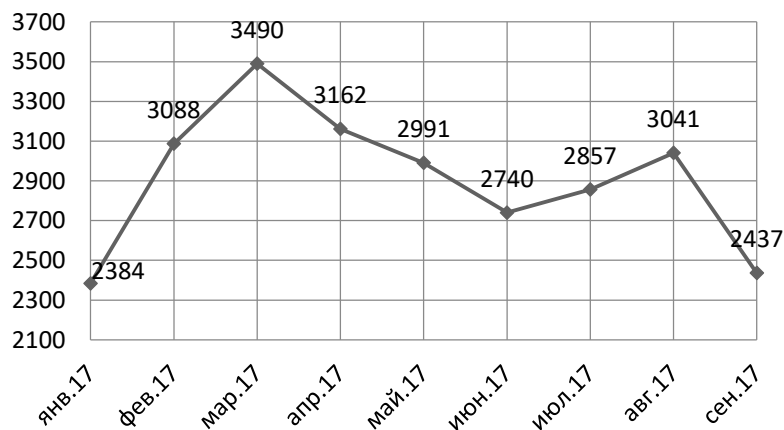


The share of the cost of raw materials and electricity in the total cost of alloys

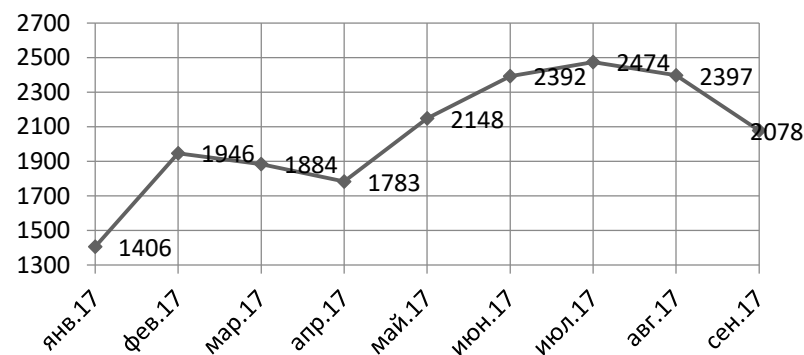
		FeSi-75				SiMn				FeCr HC		
	Цена за ед	расход	сумма, %	%%		расход	сумма, %	%%		расход	сумма, %	%%
Электроэнергия, кВт/ч	0,04	8500	340	45,64		4900	196	20,33		4300	172	17,95
Кокс, usd/mt	200	0,1	20			0,25	50			0,4	80	
Уголь usd/mt	60	0,6	36			0,3	18			0,1	6	
кварцит usd/mt	25	2,1	52,5	7,05		1	25			1	25	
марагнцевая руда usd/mt	240		0			2,1	504	52,29			0	
хромовая руда usd/mt	250		0				0			2,1	525	54,80
прочее			296,51				170,93				150,00	
Себестоимость 1 тн			745	52,6			964	72,6			958	72,7

Regularities of prices for alloys and ore residues in Chinese ports

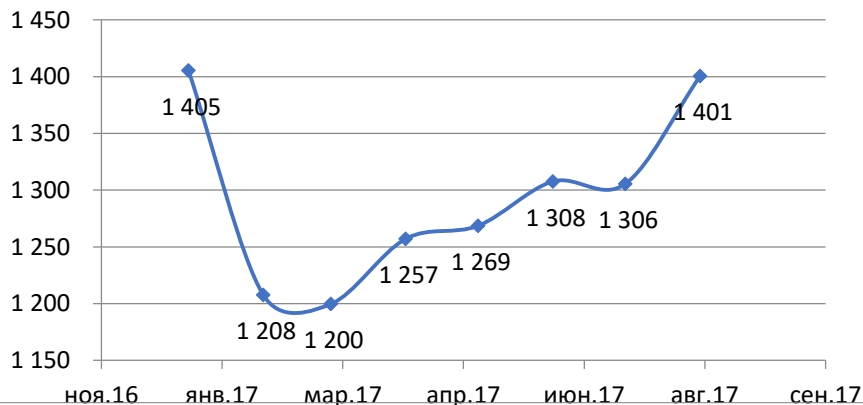
Remains of manganese ore in Chinese ports,
thousand tons



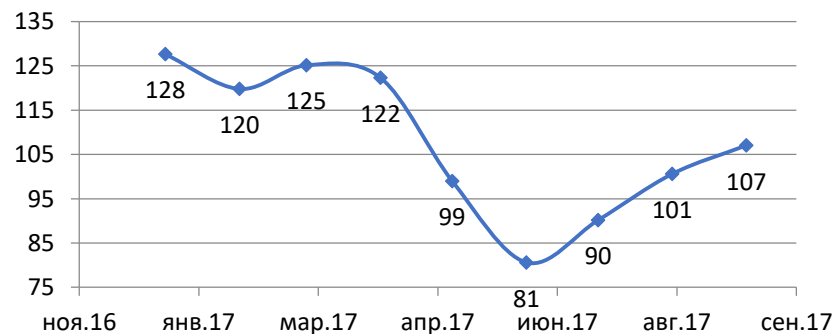
Remains of chrome ore in Chinese ports,
thousand tons



SiMn - 65% Mn FOB China, Export, \$/т



HC Ferrochrome fecr55c1000 Inner Mongolia, c/lb
Cr

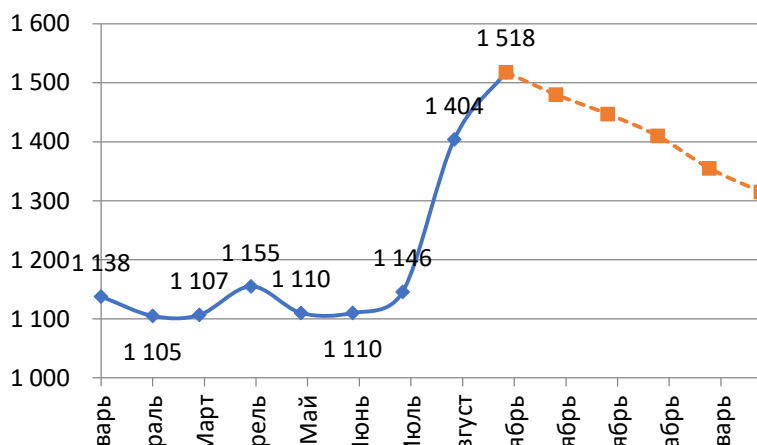


Comparison of the production efficiency of different alloys in the ore reduction furnace 24 MBA

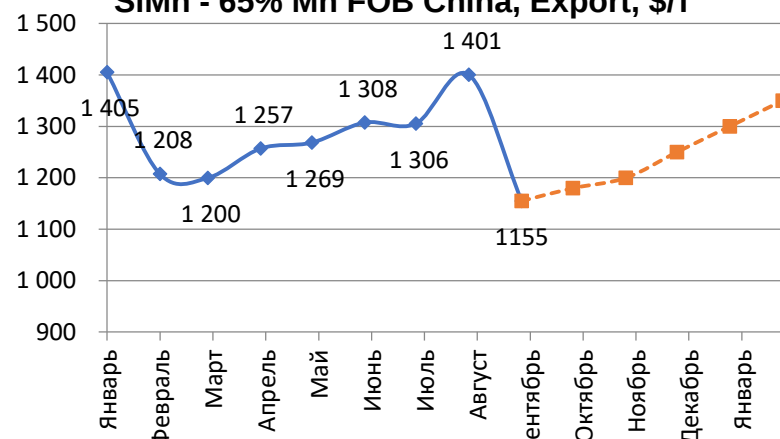
FeSi-75			SiMn			FeCr HC	
цена за 1%	прибыль, долл США		цена \$/тн	прибыль, долл США		цена с/lb	прибыль, долл США
16	739 972		1000	101 761		90	747 409
17	861 948		1100	383 883		100	1 172 661
18	983 925		1200	666 006		110	1 597 913
19	1 105 901		1300	948 128		120	2 023 165
20	1 227 878		1400	1 230 251		130	2 448 417

Forecast prices in nearest future

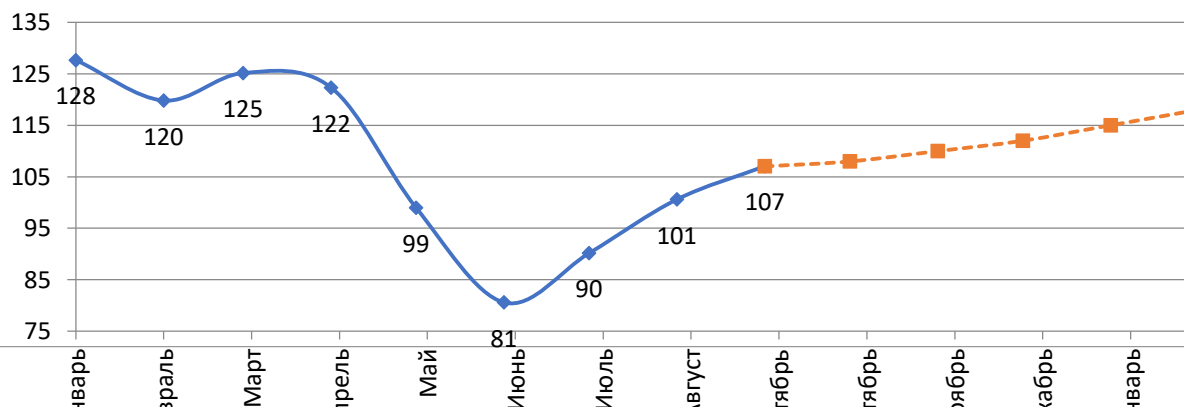
Ferrosilicon - 75% Si FOB China, Export, \$/т



SiMn - 65% Mn FOB China, Export, \$/т



HC Ferrochrome fecr55c1000 Inner Mongolia, c/lb Cr



Ferroalloys market of Russia and CIS

Capacity of CHEMK and production-resources base



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+7-495-780-04-65



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+7-495-780-04-65