Developed by	Approved by
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Annual monitoring report

4th quarter 2009

JI project

Revamping and Modernization of the Alchevsk Steel Mill, Ukraine

Track 1 JI Registration Reference UA 1000022

ІНСТИТУТ ПРОБЛЕМ ЕКОЛОГІЇ ТА ЕНЕРГОЗБЕРЕЖЕННЯ

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List of abbreviations

OJSC “AISW” - Open Joint Stock Company “Alchevsk Iron and Steel Mill”;

JIP – Joint Implementation Project;

Slab Caster – Slab Casting Machine;

LF – Ladle Furnace;

FER – Fuel and Energy Resources.

1. Introduction and project description

The modernization program of Open Joint Stock Company “Alchevsk Iron and Steel Mill” (OJSC “AISW”), which was started in 2004, pursues complex goals: implementation of energy efficient technologies to increase competitiveness of the plant, improvement of ecological impacts, and also expansion of market presence due to increase of manufacture capacity.

The realization of the technical revamping and modernization of the steel manufacturing process, which envisaged displacement old Open-Hearth Furnaces (OHF’s) by the complex of oxygen-converter shop with two new LD Converters, was the top priority task of the project. LD Converters are joined together into one cycle with two Slab Casters, with Ladle-Furnaces (LF’s) and Vacuumator (VD Plant), which together displaces the Blooming Mills. From the beginning it was envisaged that the project will be implemented as Joint Implementation (JI) project under the Kyoto protocol on climate change.

Before the project implementation OJSC “AISW” was using a traditional steel making technology: OHF’s, Ingot Casting and Blooming Mills. According to this technology, around 20-21% of produced slabs in cutoff pieces were returned back to the OHF’s.

According to the investment plan the project envisages the following basic Phases:

#1 – installation of Slab Caster #1 along with LF;

#2 – installation of Slab Caster #2 along with VD Plant;

#3 – installation of LD Converter #2

#4 – installation of LD Converter #1

#5 – reconstruction of Oxygen Plant #4

#6 – installation of Oxygen Plant #7

#7 – installation of Oxygen Plant #8

Phases 5-7 aimed to reconstruction and introduction of Oxygen Plants are indissolubly linked with the operation of main steel facilities (Phases #1-4).

With the project implementation, generally with introduction of new Slab Casters with LF’s and VD Plant, only around 3% of steel in cutoff pieces returns back to OHF’s or to the LD Converters for recasting. As a result, such a difference between projectline and baseline scenarios leads to economy of pig iron, natural gas and also blast furnace gas, which is then used as the result of project activity, for blast furnace blowing production at the existing power plant. However the project leads to increase of electricity consumption in comparison with the baseline.

In general the JI project leads to reduction of fuel and energy resources (FER) consumption and, therefore, to GHG emission reductions.

2. Project monitoring period and version of the document

The emission reductions, examined in this report, include the period from 01/10/2009 till 31/12/2009.

Version of the document – #1

3. Current status of the project

Phases #1 and #2 were implemented: Slab Caster #1 was implemented in August 2005 and Slab Caster # 2 – in March 2007.

The implementation of LD Converter #2 (Phase #3) was completed in January 2008 (it had to be finished in the third quarter of 2007). Such a delay was caused by the financial, technical and customs difficulties and also by the delay of equipment supply.

LD Converter #1 was implemented in September 2008 (completion of Phase #4). However then, in about a month, the operation of LD Converter #1 was suspended because of financial and economic crisis. LD Converter #1 was launched again in March 2009.

The reconstruction of Oxygen Plant #4 (Phase #5) was completed on 30th of September 2005 (almost together with Slab Caster #1).

The installation of Oxygen Plant #7 (Phase #6) was completed on 19th of March 2008 (according to the previous plan it should have been completed in the third quarter of 2007). The delay was caused by the same reasons (financial, technical and customs difficulties), which were mentioned for the Phase #3, because Oxygen Plant #7 supplies oxygen for LD Converter #2.

The installation of Oxygen Plant #8 (Phase #7) was completed on 10th of December 2009 (according to the previous plan it should have been completed in the third quarter of 2009). Such a delay was caused by a lack of money for balancing and commissioning of the facility, which was caused by global financial and economic crisis.

Thereby, all basic units, mentioned in Phases of project implementation, were operational in the reporting period.

During reporting monitoring period the level of OHF steel and rolled-formed slabs output (baseline slabs) was decreased. The main volume of slabs was manufactured at Slab Casters #1,2. The productivity decrease in the baseline has caused the increase of constant FER consumption data (increase of specific FER per 1 ton of steel output). At the same time, the productivity increase in the projectline (at LD Converters and Slab Casters instead of OHF’s) has caused the decrease of specific FER consumption data.

The emission reductions, examined in this monitoring report, were generated during the whole monitoring period. The monitoring was based on actual data (mentioned in the reporting documents) of output production and FER consumption in projectline and in baseline scenarios as it is required by the Joint Implementation Project Design Document (PDD).

4. Sustainability – economic and social well-being

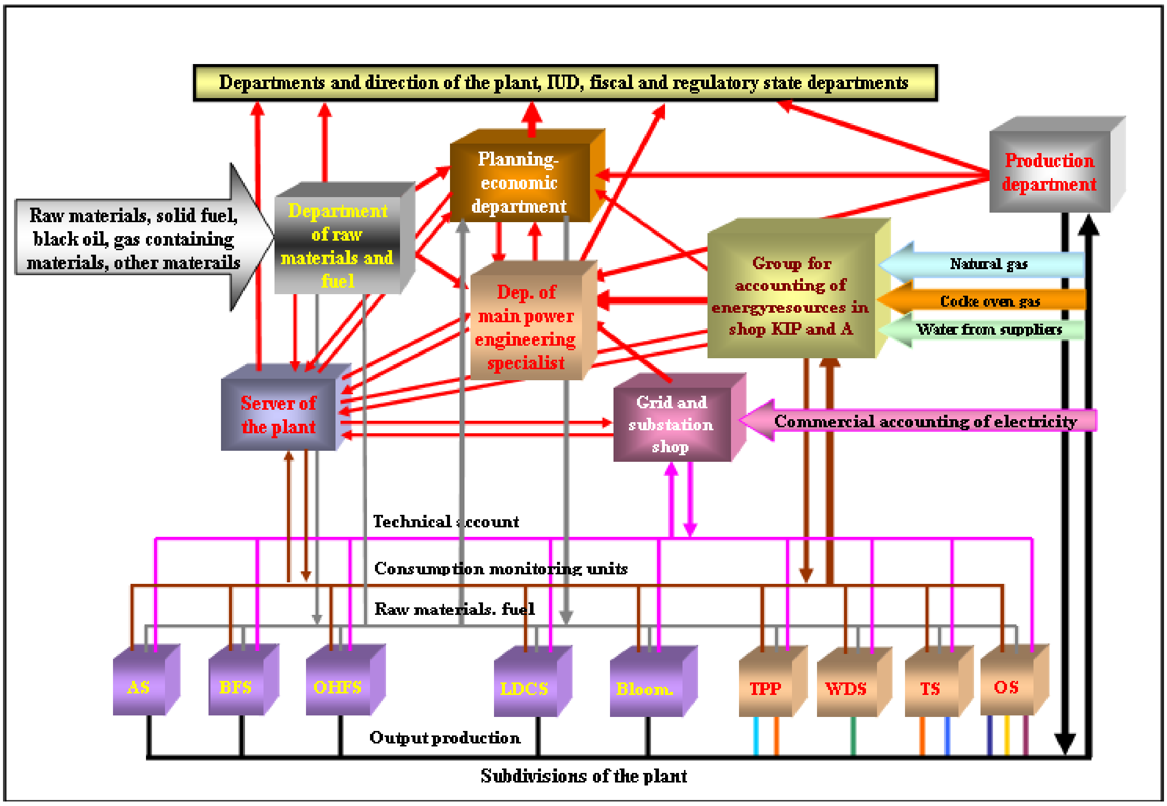
The project consists in the increase of energy efficiency, which reduces consumption of FER per 1 ton of steel output and improvement of the environmental safety due to replacing the main technological components by the modern equipment, highly efficient gas cleaning and aspiration facilities, which stops the increase of mass pollution formation due to raise of output. Besides, according to the project almost all new facilities are constructed with the complex of circulating water supply, which leads to reduction of sewage water and harmful substances spillage into the surface basins.

Therefore the realization of joint implementation project leads to significant improvement of environmental and working conditions at the Steel Mill not only because of GHG emission reductions, but also from reduction of harmful substances discharge.

In addition, project implementation leads to increase of payments to the budgets of all levels and, therefore, to increase of inhabitants social well being.

5. Parameters being monitored according to monitoring plan

The Schematic drawing of information preparation and supply system, which are used in this monitoring report, is presented below.



Legend:
AS - agglomeration shop wilth limestone section; BFC - blast furnace shop; OHFS - open hearth furnace shop; LDCS - LD Convertor shop; Bloom.- blooming; TPP - thermal power plant (blowing production, heat power); WDS - water delivery shop (pump over of technocal and circulating water); TS - thermal shop (compressed air production and secondary heat power); OS - oxygen shop (oxygen, nitrogen, agron production).

All data, used in this chapter, are based on information, confirmed by OJSC «AISW» documents. This information is available to the verifier, also regarding the interconnection with the baseline and projectline tables, presented below.

Colors that are used in the tables are described below:

Projectline	Baseline
Name of each indicator	Name of each indicator
Volume of FER consumption	Volume of FER consumption
Emission factor for FER	Emission factor for FER
Volume of CO_2 emissions	
Blank cell	

Baseline

ID Number	Data variable	Units	October 2009	November 2009	December 2009
	Baseline Emissions (BE)	Tonnes CO_2	**737 240**	**636 924**	**602 419**
B-1	**Total Steel Output (TSO)**	Tonnes	225 005	195 767	193 394
B-2	**Total CO_2 of Pig Iron (TCPI)**	Tonnes CO_2	**683 156**	**596 982**	**549 195**
B-3	**Total CO_2 from Fuel**	Tonnes CO_2	**38 204**	**27 171**	**34 642**

	Consumption in Pig Iron production (TCFCPI)				
B-4	**Percentage of Total amount of Pig Iron Produced Used in project Steel Making Activity (PII)**	share	**1,00**	**1,00**	**1,00**
B-5	**Total Pig Iron Input into Steel Making Process (TPII)**	Tonnes	219 676	196 487	179 081
B-6	**Total Pig Iron Produced (TPIP)**	Tonnes	219 676	196 487	179 081
B-7	**Quantity of each fuel (fpi) used in making Pig Iron (Q_{fpi})**				
	NG	m^3,	18 197 186	14 850 240	18 785 897
	COG	1000 m^3	6 620	419	464
B-8	**Emission factor of each fuel (fpi) EF_{fpi}**				
	NG	Tonnes CO_2 per m^3	0,00181	0,00181	0,00182
	COG	Tonnes CO_2 per 1000 Nm^3	0,79824	0,79824	0,79824
B-9	**Total CO_2 from Electricity used in Pig Iron production (TCEPI)**	Tonnes CO_2	**36 429**	**31 040**	**31 695**
B-10	**Electricity Consumed in producing Pig Iron (ECPI)**	MWh	40 657	34 643	35 373
B-11	**Emissions Factor for Electricity Consumption in making Pig Iron (EFECPI)**	Tonnes CO_2/MWh	0,896	0,896	0,896
B-12	**Total CO_2 from inputs into Pig Iron (TCIPI)**	Tonnes CO_2	**608 523**	**538 770**	**482 859**
B-13	**Total Carbon from Fuel Consumption in Sintering (TCFIO)**	Tonnes CO_2	**13 187**	**12 227**	**11 287**
B-14	**Quantity of each fuel (fio) used in Sintering (Q_{fio})**				
	NG	m^3	3 950 479	4 646 946	3 889 667
	COG	ths. m^3	7 568	4 798	5 250
B-15	**Emission factor of each fuel in Sintering (fio) EF_{fio}**				
	NG	Tonnes CO_2 per m^3	0,00181	0,00181	0,00182
	COG	Tonnes CO_2 per 1000 m3	0,79824	0,79824	0,79824
B-16	**Total CO_2 from Electricity used in Sintering (TCEIO)**	Tonnes CO_2	**12 920**	**12 279**	**13 095**
B-17	**Electricity Consumed in Sintering (ECIO)**	MWh	14 420	13 704	14 615
B-18	**Emissions Factor for Electricity Consumption in Sintering (EFECIO)**	Tonnes CO_2/MWh	0,896	0,896	0,896
B-19	**Total CO_2 from Reducing Agents (TCRAPI)**	Tonnes CO_2	**523 073**	**462 971**	**419 683**
	Total Reducing Agent	Tonnes	134 067	119 611	107 241
	Default Emission Factor[1]	Tonnes CO_2/Tonne	3,60	3,60	3,60

[1] During this monitoring period CO_2 emission factor for coke was applied by taking into account default emission factor for the coke production. This emission factor is in accordance with 2006 IPCC guidelines for national greenhouse gas inventories (Chapter 4, Table 4.1) – http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1_Volume1/V1_4_Ch4_MethodChoice.pdf. Also this emission factor was already used by other JI projects in Ukraine.

	Total Reducing Agent	Tonnes	15 994	12 789	13 303
	Default Emission Factor	Tonnes CO_2/Tonne	2,50	2,50	2,50
B-20	**Total CO_2 from limestone (TCLPI) in Pig iron production**	Tonnes CO_2	**59 342**	**51 293**	**38 794**
	Total Limestone	Tonnes	137 218	112 668	84 767
	Default Emission Factor	Tonnes CO_2/Tonne	0,27	0,27	0,27
	Total dolomite	Tonnes	76 378	71 553	56 026
	Default Emission Factor	Tonnes CO_2/Tonne	0,29	0,29	0,28
B-21	**Total CO_2 from steam production in Pig Iron Production (TCSPI)**	Tonnes CO_2			
B-22	**Quantity of each fuel (fspi) used in steam production in Pig Iron Production (Q_{fspi})**				
	fuel 1				
	fuel 2				
B-23	**Emission factor of each fuel in steam production (fspi) EF_{fspi}**				
	fuel 1				
	fuel 2				
B-24	**Total CO_2 emissions from the furnace process (TCFP)**	Tonnes CO_2	**40 429**	**30 183**	**40 077**
B -25	**Total CO_2 emissions from fuel consumption in the furnace process (TCFCFP)**	Tonnes CO_2	**13 556**	**8 739**	**15 239**
B -26	**Quantity of each fuel (ffp) used in furnace process (Q_{ffp})**				
	NG	m^3	7 493 223	4 835 492	6 760 873
	Total Reducing Agent	Tonnes	0	0	622
	Total Reducing Agent	Tonnes	0	0	266
B -27	**Emission factor of each fuel in furnace process (ffp) EF_{ffp}**				
	NG	Tonnes CO_2 per m^3	0,00181	0,00181	0,00182
	Default Emission Factor	Tonnes CO_2/Tonne	3,60	3,60	3,60
	Default Emission Factor	Tonnes CO_2/Tonne	2,50	2,50	2,50
B -28	**Total CO_2 emissions from electricity consumption in the furnace process (TCECFP)**	Tonnes CO_2	**22 581**	**16 648**	**20 802**
B -29	**Electricity Consumed in furnace process (ECFP)**	MWh	25 201	18 580	23 216
B -30	**Emissions Factor for Electricity Consumption in furnace process (EFECFP)**	Tonnes CO_2/MWh	0,896	0,896	0,896
B -31	**Total CO_2 emissions from inputs to the furnace process (TCIFP)**	Tonnes CO_2	**4 293**	**4 797**	**4 036**
B -32	**Total CO_2 from Argon entering the furnace (TCAFP)**	Tonnes CO_2	**22**	**17**	**17**
B -33	**Total CO_2 from steam production in furnace process (TCSFP)**	Tonnes CO_2			

B -34	**Quantity of each fuel (fsp) used in steam production in furnace process (Q_{fsp})**				
	fuel 1				
	fuel 2				
B -35	**Emission factor of each fuel in furnace process (fsp) EF_{fsp}**				
	fuel 1				
	fuel 2				
B -36	**Total CO_2 from compressed air production in furnace process (TCCAFP)**	Tonnes CO_2	**172**	**119**	**118**
B -37	**Quantity of each fuel (fca) used in compressed air production in furnace process (Q_{fca})**				
	NG	m^3			
	COG	ths. m^3			
B -38	**Emission factor of each fuel in furnace process (fca) EF_{fca}**				
	NG	Tonnes CO_2 per m^3	0,00181	0,00181	0,00182
	COG	Tonnes CO_2 per 1000 m3			
B -39	**Electricity Consumed in making compressed air for the furnace process in steel making (ECCA)**	MWh	192	133	132
B -40	**Emissions Factor for Electricity Consumption (EFECCA)**	Tonnes CO_2/MWh	0,896	0,896	0,896
B -41	**Total CO_2 from oxygen production (TCOFP)**	Tonnes CO_2			
B -42	**Quantity of each fuel (fop) used in oxygen production (Q_{fop})**				
	fuel 1				
	fuel 2				
B -43	**Emission factor of each fuel in oxygen production (fop) EF_{fop}**				
	fuel 1				
	fuel 2				
B -44	**Electricity Consumed in making oxygen (ECOP)**	MWh			
B-45	**Emissions Factor for Electricity Consumption in making oxygen (EFECOP)**	Tonnes CO_2/MWh	0,896	0,896	0,896
B-46	**Total CO_2 from limestone for furnace process (TCLFP)**	Tonnes CO_2	**4 099**	**4 661**	**3 901**
	Total Limestone	Tonnes	3 005	16 605	14 406
	Default Emission Factor	Tonnes CO_2/Tonne	0,27	0,27	0,27
	Total dolomite	Tonnes	11 308	567	0
	Default Emission Factor	Tonnes CO_2/Tonne	0,29	0,29	0,28
B-47	**Total CO_2 from blooming (TCBM)**	Tonnes CO_2	**13 656**	**9 759**	**13 147**
B-48	**Total CO_2 from fuel consumption in blooming**	Tonnes CO_2	**4 122**	**3 112**	**3 946**

	(TCFCBM)				
B-49	**Quantity of each fuel (fbm) used in blooming (Q_{fbm})**				
	NG	m^3	0	0	205 599
	COG	1000 m^3	5 163	3 899	4 473
B -50	**Emission factor of each fuel in blooming (fbm) EF_{fbm}**				
	NG	Tonnes CO_2 per m^3	0,00181	0,00181	0,00182
	COG	Tonnes CO_2 per 1000 Nm^3	0,79824	0,79824	0,79824
B-51	**Total CO_2 from electricity consumption in blooming (TCECBM)**	Tonnes CO_2	**9 534**	**6 647**	**9 201**
B-52	**Electricity Consumed in blooming (ECBM)**	MWh	10 641	7 418	10 269
B-53	**Emissions Factor for Electricity Consumption in blooming (EFECBM)**	Tonnes CO_2/MWh	0,896	0,896	0,896

Projectline

ID number	Data variable	Units	October 2009	November 2009	December 2009
	Project Emissions (PE)	Tonnes CO_2	**670 289**	**564 655**	**560 328**
P-1	**Total Steel Output (TSO)**	Tonnes	225 002	195 767	193 394
P-2	**Total CO_2 of Pig Iron (TCPI)**	Tonnes CO_2	**630 451**	**528 558**	**521 648**
P-3	**Total CO_2 from Fuel Consumption for Pig Iron (TCFCPI)**	Tonnes CO_2	**30 125**	**23 245**	**24 285**
P-4	**Percentage of Total amount of Pig Iron Produced Used in project Steel Making Activity (PII)**	share	**1,00**	**1,00**	**1,00**
P-5	**Total Pig Iron Input into Steel Making Process (TPII)**	Tonnes	199 005	168 523	167 367
P-6	**Total Pig Iron Produced (TPIP)**	Tonnes	199 005	168 523	167 367
P-7	**Quantity of each fuel (fpi) used in making Pig Iron (Q_{fpi})**				
	NG	m^3	14 012 014	12 703 294	13 124 428
	COG	1000 m^3	5 984	360	428
P-8	**Emission factor of each fuel in Pig Iron Production (fpi) EF_{fpi}**				
	NG	Tonnes CO_2 per m^3	0,00181	0,00181	0,00182
	COG	Tonnes CO_2 per 1000 Nm^3	0,79824	0,79824	0,79824
P-9	**Total CO_2 from Electricity used in Pig Iron production (TCEPI)**	Tonnes CO_2	**32 905**	**26 608**	**29 052**
P-10	**Electricity Consumed in producing Pig Iron**	MWh	36 725	29 697	32 424

	(ECPI)				
P-11	**Emissions Factor for Electricity Consumption in Pig Iron Production (EFECPI)**	Tonnes CO_2/MWh	0,896	0,896	0,896
	Total Electricity Used in Steel Making Process				
	Grid Emission Factor	Tonnes CO_2/MWh	0,896	0,896	0,896
	CHP Plant Emission Factor	Tonnes CO_2/MWh			
	Total Electricity Produced by CHP	MWh			
	Blast Furnace Gas	1000 m^3			
	NG	m^3			
	Emission factor for BFG	Tonnes CO_2 per 1000 m^3			
	Emission factor NG	Tonnes CO_2 per m^3	0,00181	0,00181	0,00182
P-12	**Total CO_2 from inputs into Pig Iron (TCIPI)**	Tonnes CO_2	**567 422**	**478 705**	**468 311**
P-13	**Total CO_2 from Fuel Consumption in Sintering (TCFIO)**	Tonnes CO_2	**14 286**	**12 913**	**13 173**
P-14	**Quantity of each fuel (fio) used in Sintering (Q_{fio})**				
	NG	m^3	4 871 934	5 327 701	5 073 727
	COG	1000 m^3	6 856	4 115	4 907
P-15	**Emission factor of each fuel in Sintering (fio) EF_{fio}**				
	NG	Tonnes CO_2 per m^3	0,00181	0,00181	0,00182
	COG	Tonnes CO_2 per 1000 Nm^3	0,79824	0,79824	0,79824
P-16	**Total CO_2 from Electricity used in Sintering (TCEIO)**	Tonnes CO_2	**11 806**	**10 647**	**12 343**
P-17	**Electricity Consumed in Sintering (ECIO)**	MWh	13 177	11 883	13 776
P-18	**Emissions Factor for Electricity Consumption (EFECIO)**	Tonnes CO_2/MWh	0,896	0,896	0,896
P-19	**Total CO_2 from Reducing Agents (TCRAPI)**	Tonnes CO_2	**473 852**	**397 081**	**392 232**
	Total Reducing Agent	Tonnes	121 452	102 588	100 227
	Default Emission Factor	Tonnes CO_2/Tonne	3,60	3,60	3,60
	Total Reducing Agent	Tonnes	14 489	10 969	12 433
	Default Emission Factor	Tonnes CO_2/Tonne	2,50	2,50	2,50
P-20	**Total CO_2 from limestone (TCLPI) in Pig iron production**	Tonnes CO_2	**67 477**	**58 065**	**50 563**
	Total Limestone	Tonnes	148 486	121 434	104 082
	Default Emission Factor	Tonnes CO_2/Tonne	0,27	0,27	0,27
	Total dolomite	Tonnes	93 879	86 692	79 154
	Default Emission Factor	Tonnes CO_2/Tonne	0,29	0,29	0,28
P-21	**Total CO_2 from steam production in Pig Iron**	Tonnes CO_2			

	Production (TCSPI)				
P-22	**Quantity of each fuel (fspi) used in steam production in Pig Iron Production (Q_{fspi})**				
	NG	m^3			
	COG	1000 m^3			
P-23	**Emission factor of each fuel in Steam Production (fspi) EF_{fspi}**				
	NG	Tonnes CO_2 per m^3	0,00181	0,00181	0,00182
	COG	Tonnes CO_2 per 1000 Nm^3	0,79824	0,79824	0,79824
P-24	**Total CO_2 emissions from the furnace process (TCFP)**	Tonnes CO_2	**26 242**	**23 513**	**25 571**
P-25	**Total CO_2 emissions from fuel consumption in the furnace process (TCFCFP)**	Tonnes CO_2	**3 572**	**3 403**	**4 311**
P-26	**Quantity of each fuel (ffp) used in furnace process (Q_{ffp})**				
	NG	m^3	1 299 428	1 275 943	1 530 517
	COG	1000 m^3	145	68	31
	Total Reducing Agent	Tonnes	2	19	126
	Total Reducing Agent	Tonnes	438	390	416
P-27	**Emission factor of each fuel in the furnace process (ffp) EF_{ffp}**				
	NG	Tonnes CO_2 per m^3	0,00181	0,00181	0,00182
	COG	Tonnes CO_2 per 1000 Nm^3	0,79824	0,79824	0,79824
	Default Emission Factor	Tonnes CO_2/Tonne	3,60	3,60	3,60
	Default Emission Factor	Tonnes CO_2/Tonne	2,50	2,50	2,50
P-28	**Total CO_2 emissions from electricity consumption in the furnace process (TCECFP)**	Tonnes CO_2	**22 227**	**19 617**	**20 715**
P-29	**Electricity Consumed in the furnace process (ECFP)**	MWh	24 807	21 894	23 119
P-30	**Emissions Factor for Electricity Consumption in the furnace process (EFECFP)**	Tonnes CO_2/MWh	0,896	0,896	0,896
P-31	**Total CO_2 emissions from inputs to the furnace process (TCIFP)**	Tonnes CO_2	**443**	**494**	**546**
P-32	**Total CO_2 from Argon entering the furnace (TCAFP)**	Tonnes CO_2	**24**	**18**	**19**
P-33	**Total CO2 from steam production in the furnace process (TCSFP)**	Tonnes CO_2			
P-34	**Quantity of each fuel (fsp) used in steam production in the furnace process (Q_{fsp})**				
	NG	m^3			

	COG	1000 m^3			
P-35	**Emission factor of each fuel in the furnace process (fsp) EF_{fsp}**				
	fuel 1				
	fuel 2				
P-36	**Total CO_2 from compressed air production for the furnace process (TCCAFP)**	Tonnes CO_2	**78**	**66**	**65**
P-37	**Quantity of each fuel (fca) used in compressed air production (Q_{fca})**				
	NG	m^3			
	COG	1000 m^3			
P-38	**Emission factor of each fuel in compressed air production (fca) EF_{fca}**				
	NG	Tonnes CO_2 per m^3	0,00181	0,00181	0,00182
	COG	Tonnes CO_2 per 1000 Nm^3	0,79824	0,79824	0,79824
P-39	**Electricity Consumed in making compressed air for the furnace process (ECCA)**	MWh	87	74	73
P-40	**Emissions Factor for Electricity Consumption in compressed air production (EFECCA)**	Tonnes CO_2/MWh	0,896	0,896	0,896
P-41	**Total CO_2 from oxygen production (TCOFP)**	Tonnes CO_2			
P-42	**Quantity of each fuel (fop) used in oxygen production (Q_{fop})**				
	fuel 1				
	fuel 2				
P-43	**Emission factor of each fuel in oxygen production (fop) EF_{fop}**				
	fuel 1				
	fuel 2				
P-44	**Electricity Consumed in making oxygen (ECOP)**	MWh			
P-45	**Emissions Factor for Electricity Consumption in making oxygen (EFECOP)**	Tonnes CO_2/MWh	0,896	0,896	0,896
P-46	**Total CO_2 from limestone for furnace process (TCLFP)**	Tonnes CO_2	**341**	**409**	**462**
	Total Limestone	Tonnes	580	1 465	1 705
	Default Emission Factor	Tonnes CO_2/Tonne	0,27	0,27	0,27
	Total dolomite	Tonnes	634	42	0
	Default Emission Factor	Tonnes CO_2/Tonne	0,29	0,29	0,28
P-47	**Total CO_2 from casting (TCBM)**	Tonnes CO_2	**13 596**	**12 583**	**13 109**
P-48	**Total CO_2 from fuel consumption in casting (TCFCBM)**	Tonnes CO_2	**496**	**465**	**530**
P-49	**Quantity of each fuel**				

	(fbm) used in casting (Q_{fbm})				
	NG	m^3	165 514	159 520	192 057
	coal electrodes	Tonnes	55	49	50
P-50	**Emission factor of each fuel used in casting (fbm) EF_{fbm}**				
	NG	Tonnes CO_2 per m^3	0,00181	0,00181	0,00182
	coal electrodes	Tonnes CO_2/Tonne	3,6	3,6	3,6
P-51	**Total CO_2 from electricity consumption in casting (TCECBM)**	Tonnes CO_2	**13 100**	**12 119**	**12 579**
P-52	**Electricity Consumed in casting (ECBM)**	MWh	14 621	13 525	14 039
P-53	**Emissions Factor for Electricity Consumption in casting (EFECBM)**	Tonnes CO_2/MWh	0,896	0,896	0,896

Data indicated in the tables above, shows that the production volumes of steel in the fourth quarter of 2009 are lower than it had been expected in the PDD for the baseline scenario, because financial crisis caused production decline. It caused some fluctuations of specific FER consumption indicators per 1 ton of steel output.

The calculations of GHG emission reductions, indicated in the tables, are based on the real data of FER consumption both for baseline and projectline, according to the methodology. All productivity fluctuations and, therefore, the GHG emission reductions are determined by the market and are not under control by project owner and project developer.

Thereby, actual level of GHG emission reductions within the project, which were received during for the reporting period, is a bit lower than it was expected. The emission reductions data are given in the next chapter.

6. Emission reductions

Following table shows emission reductions through the project:

	October 2009	November 2009	December 2009	4th quarter 2009
Baseline Emissions, t CO_2e	737 240	636 924	602 419	**1 976 583**
Project Emissions, t CO_2e	670 289	564 655	560 328	**1 795 273**
Emission Reductions[2], t CO_2e	**66 951**	**72 269**	**42 090**	**181 310**

7. Measures to ensure the accuracy of the results

The monitoring of JI project indicators of at OJSC «AISW» is realized on regular basis where the system of data collection on FER consumption is being used. The data needed for the monitoring of the project is collected during the process of normal equipment use. The production facilities of the plant are equipped with the measuring devices such as scales, meters and gas, water, steam, electricity consumption meters. The monitoring of the project forms an organic part of routine monitoring of manufacturing process. This allows receiving data regarding the project continuously.

OJSC «AISW» uses the accredited system of quality regulation according to the requirements of the ISO 9001 standard. The Guiding Metrological Instructions were developed in accordance with ISO 9001. They secure required level of accuracy by using monitoring equipment and by the possibility to crosscheck the data adequacy.

Monitoring equipment meets the regulatory requirements of Ukraine regarding accuracy and measurement error. All the equipment used for monitoring purposes, are in line with national legislative requirements and standards and also with ISO 9001 standards. The accuracy of devices is guaranteed by the manufacturers; the error is calculated and confirmed by device certificates. All monitoring equipment is covered by the detailed verification (calibration) plan. The verification process is under strict control. All measuring equipment is included in the verification schedule and verified with established periodicity. According to the schedule of verification, all devices are in satisfactory condition. The documented instructions to operate the facilities are stored at the working places.

The monitoring procedures are quite comprehensible, because they had already been used at OJSC "AISW" for measuring input and output production parameters, and also for receiving data on level of FER and raw-materials consumption. The most effective accessible methods are used for the error minimization. Generally

[2] Market situation influences on the manufacturing of steel, assortment of steel and also on the emission reductions of CO_2.

the error level is low for all parameters (less than 2%) that are subjected to the monitoring. Thus, the measurements uncertainty level corresponded with technologies, used in the production process, and is taken into the account when the data are taken from devices.

The procedures of receiving data for monitoring execution and responsibility for its realization at OJSC “AISW” are regulated by the normative documents of OJSC “AISW” and by the “Guiding Meteorological Instructions” in accordance with project documentation and monitoring plan.

8. Roles and obligations

The Chief Metrological Specialist of the OJSC «AISW» is in charge for maintenance of the facilities and monitoring equipment as well as for their accuracy required by Regulation PP 229-Э-056-863/02-2005 of “Metrological services of the metallurgical mills” and by “Guiding Metrological Instructions”. In case of defect, discovered in the monitoring equipment, the actions of the staff are determined in Guiding Metrological Instructions. The measurements are conducted constantly in automatic regime.

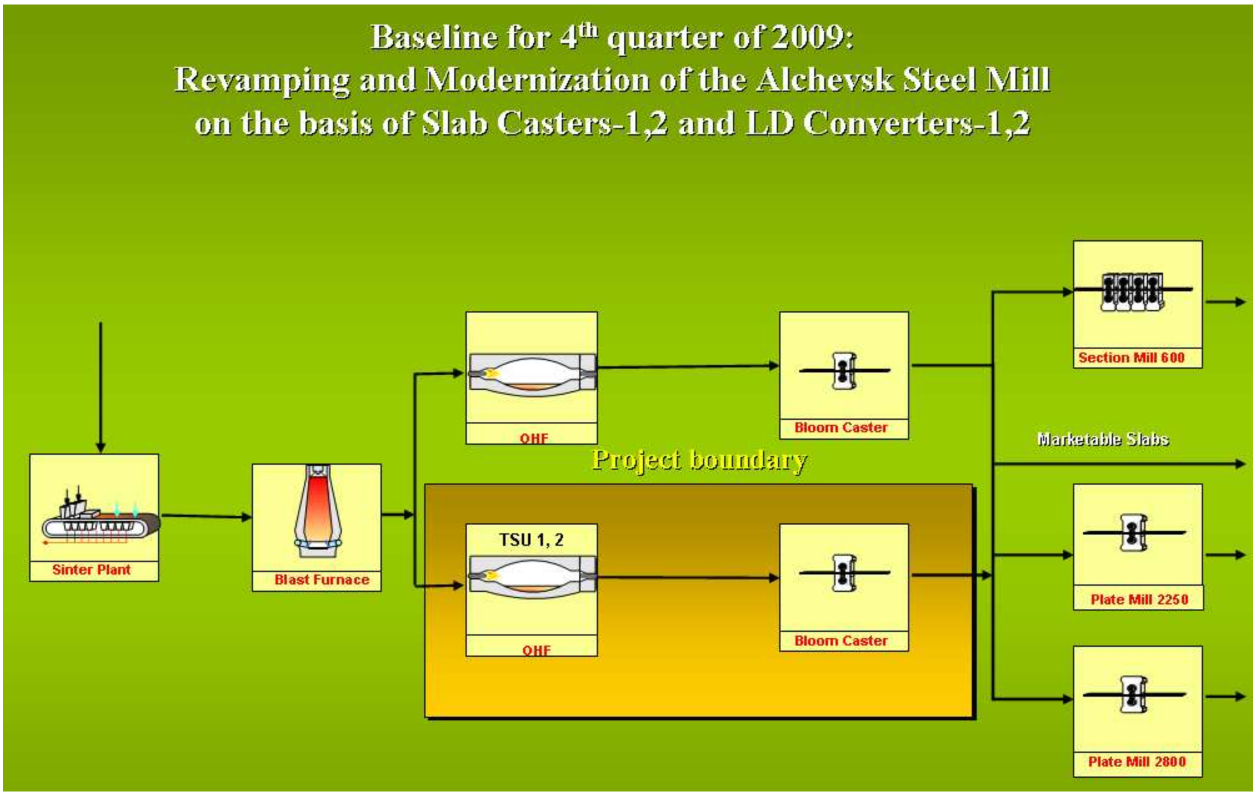
Data are collected in the electronic database of OJSC «AISW» and in printed documents. Also data are systematized in the documents of the daily, monthly and annually registration. All those documents are saved in the planning-economic department.

The measurement results are being used by the Chief power-engineering specialist department, by the following services and technical staff of the Steel Mill. They are reflected in the technological instructions of production processes regime and also in the “Guiding Metrological Instructions” revised versions. The monitoring data reports and calculations are under the competence of the Chief power-engineering specialist assistant in accordance to the interior orders of the Steel Mill.

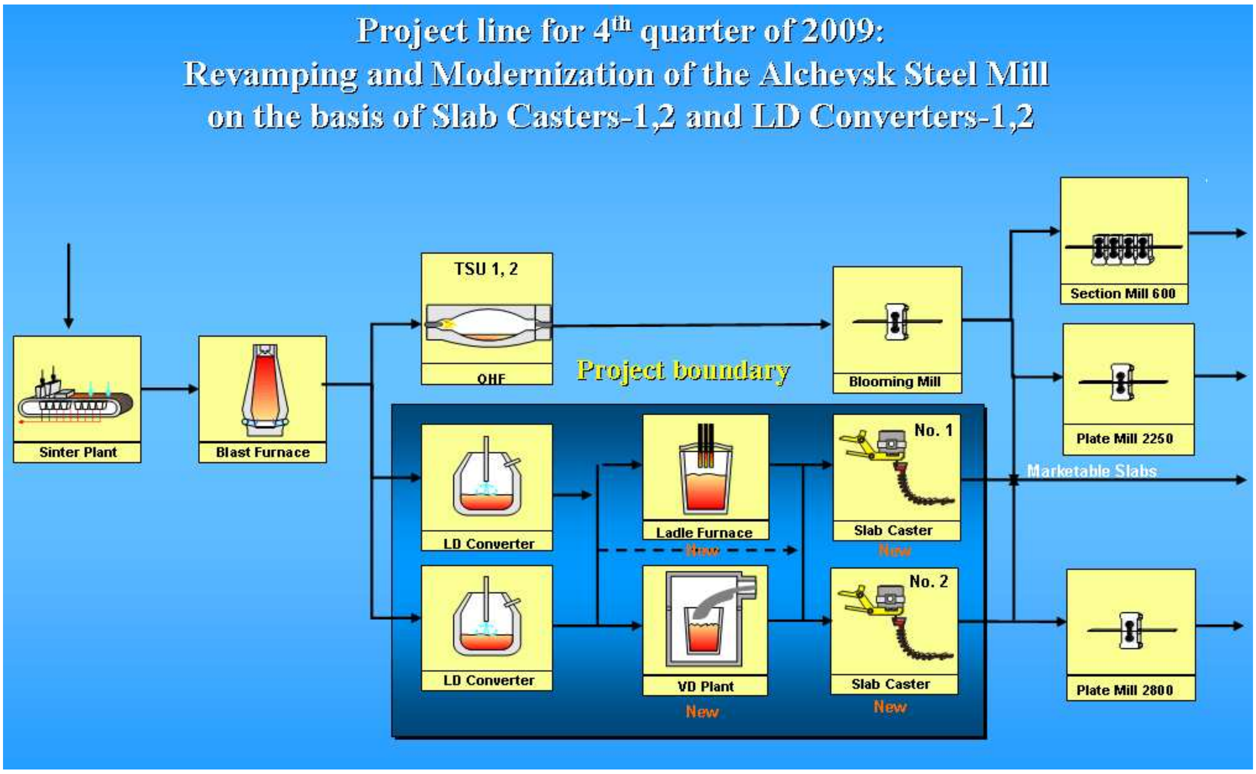
The direction of OJSC “AISW” has organized appropriate staff training to operate the project equipment. Thus, the trainings were conducted at the Ukrainian and foreign plants in order to operate Slab Casters and LD Converters. With the project equipment introduction the workers of OJSC “AISW” have the opportunity to update their working skills, stimulated by the permanent educational theoretical and practical courses at the Steel Plant. The information about the trainings can be given additionally.

9. Schemes for estimate of emission reductions

The baseline is the prolongation of the OJSC “AISW” historical practice of steel output; it means that situation observed in the baseline is the hypothetical situation of what could be without project implementation. The project baseline measures are represented at the picture below.



The projectline measures (the situation, formed during the monitoring period) are examined at the picture below.



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