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Annual monitoring report

4th quarter 2010

JI project

Revamping and Modernization of the Alchevsk Steel Mill, Ukraine

Version 2.1 dated 5th of May 2011

Track 1 JI Registration Reference UA 1000022

ІНСТИТУТ ПРОБЛЕМ ЕКОЛОГІЇ
ТА ЕНЕРГОЗБЕРЕЖЕННЯ

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List of abbreviations

PJSC "AISW" - Public Joint Stock Company "Alchevsk Iron and Steel Mill";

JI – Joint Implementation;

Slab Caster – Slab Casting Machine;

LF – Ladle Furnace;

FER – Fuel and Energy Resources.

1. Introduction and project description

The modernization program of Public Joint Stock Company "Alchevsk Iron and Steel Mill" (PJSC "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 PJSC "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 01/10/2010 till 31/12/2010.

Version of the document – #2.1 dated 5th of May 2011

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

Under the monitoring plan outlined in the PDD (section D.1, paragraph 7), ERUPT emission factors for electricity from the grid are to be used and are to be replaced by national emission factors once they will be available. On March 28, 2011 the Order of the National Environmental Investment Agency of Ukraine (NEIA) № 43 [1] regarding approval of specific indicators of carbon dioxide emissions for the year 2010 was issued.

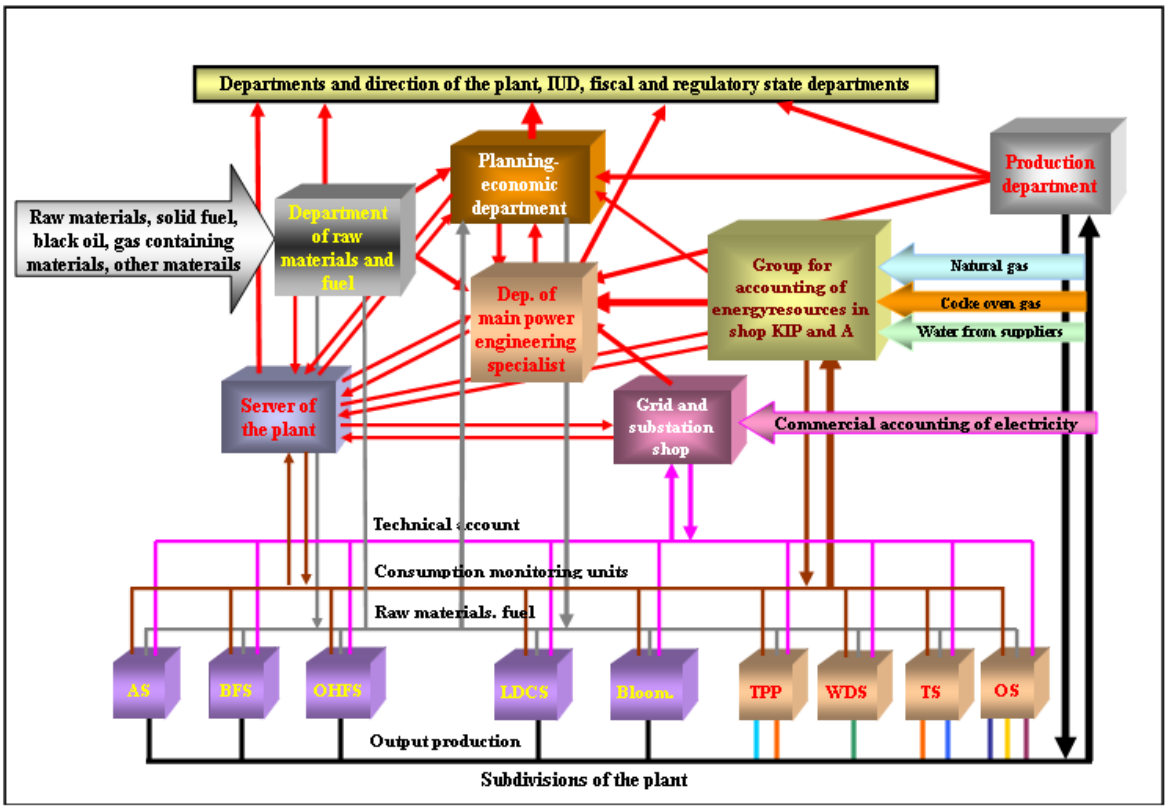
Within project boundaries for the calculation of the amount of CO_2 emissions for electricity from grid the emission factor was used according to the new decree of NEIA[2] for the 1st – class electricity consumers - 1,093 kg CO_2/kWh. The utilization of the emission factor for the 1st-class electricity consumers is justified by the resolution of National Electricity Regulatory Commission of Ukraine № 1052 of 13 August 1998[3], according to the resolution the 1st – class electricity consumers are the consumers, who:

1) receive electricity from electricity supplier at the point of sale of electricity with the degree of voltage 27.5 kV and above;
2) connected to the power rails of power plants (except hydroelectric, which produce electricity periodically), as well as to power rails of substations of the electricity grid with voltage of 220 kV and above, regardless voltage level at the point of sale of electricity by the power supplier to consumer;
3) is the industrial enterprise with average monthly rate of electricity consumption - 150 million kWh and above for the technological needs of production, regardless of the voltage level at the point of sale of electricity by the power supplier to consumer.

[1] http://www.neia.gov.ua/nature/doccatalog/document?id=126006
[2] http://www.neia.gov.ua/nature/doccatalog/document?id=126006
[3] http://energetik.org.ua/node/90

Based on the information stated above, PJSC "AISW" refers to the 1st – class electricity consumers, which can be proven by the agreements on electricity supply to PJSC "AISW", which are stored at the plant.

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 PJSC "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 2010	November 2010	December 2010
	Baseline Emissions (BE)	Tonnes CO_2	**584 753**	**534 878**	**671 041**
B-1	**Total Steel Output (TSO)**	Tonnes	150 494	153 400	199 813
B-2	**Total CO_2 of Pig Iron (TCPI)**	Tonnes CO_2	**541 838**	**494 824**	**615 198**
B-3	**Total CO_2 from Fuel Consumption in Pig Iron production (TCFCPI)**	Tonnes CO_2	**29 493**	**29 780**	**36 679**
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	154 725	151 079	211 970
B-6	**Total Pig Iron Produced (TPIP)**	Tonnes	154 725	151 079	211 970
B-7	**Quantity of each fuel (fpi) used in making Pig Iron (Q_{fpi})**				
	NG	m^3,	15 824 603	15 319 173	17 061 774
	COG	1000 m^3	209	1 412	6 189
B-8	**Emission factor of each fuel (fpi) EF_{fpi}**				
	NG[4]	Tonnes CO_2 per m^3	0,00185	0,00187	0,00186
	COG[5]	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	**57 329**	**29 604**	**39 836**
B-10	**Electricity Consumed in producing Pig Iron (ECPI)**	MWh	52 451	27 085	36 447
B-11	**Emissions Factor for Electricity Consumption in making Pig Iron (EFECPI)**[6]	Tonnes CO_2/MWh	1,093	1,093	1,093
B-12	**Total CO_2 from inputs into Pig Iron (TCIPI)**	Tonnes CO_2	**455 015**	**435 440**	**538 682**
B-13	**Total Carbon from Fuel Consumption in Sintering (TCFIO)**	Tonnes CO_2	**11 825**	**11 456**	**11 403**
B-14	**Quantity of each fuel (fio) used in Sintering (Q_{fio})**				
	NG	m^3	3 685 847	3 704 821	2 683 365
	COG	ths. m^3	6 257	5 670	8 032
B-15	**Emission factor of each fuel in Sintering (fio) EF_{fio}**				
	NG	Tonnes CO_2 per m^3	0,00185	0,00187	0,00186
	COG	Tonnes CO_2 per 1000 m3	0,79824	0,79824	0,79824
B-16	**Total CO_2 from Electricity**	Tonnes CO_2	**12 302**	**10 962**	**14 533**

[4] In accordance with Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. Reference Manual (Volume 2), Chapter 1 (Energy), Table 1-1 (continued), page 1.13 (http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref1.pdf).

[5] In accordance with "National GHG inventory of Ukraine, period 1999-2008", Table P2.7, page 264 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).

[6] In accordance with the Order of the National environmental investment agency of Ukraine #43 dated 28th of March 2011 – http://www.neia.gov.ua/nature/doccatalog/document?id=126006.

	used in Sintering (TCEIO)				
B-17	**Electricity Consumed in Sintering (ECIO)**	MWh	11 255	10 029	13 297
B-18	**Emissions Factor for Electricity Consumption in Sintering (EFECIO)**	Tonnes CO_2/MWh	1,093	1,093	1,093
B-19	**Total CO_2 from Reducing Agents (TCRAPI)**	Tonnes CO_2	**380 265**	**368 720**	**469 901**
	Total Reducing Agent	Tonnes	101 240	97 975	123 474
	Default Emission Factor[7]	Tonnes CO_2/Tonne	3,66	3,66	3,66
	Total Reducing Agent	Tonnes	3 891	4 052	7 194
	Default Emission Factor[8]	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	**50 623**	**44 302**	**42 844**
	Total Limestone	Tonnes	73 469	61 356	62 165
	Default Emission Factor[9]	Tonnes CO_2/Tonne	0,44	0,44	0,44
	Total dolomite	Tonnes	38 357	36 280	32 477
	Default Emission Factor[10]	Tonnes CO_2/Tonne	0,477	0,477	0,477
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	**35 462**	**31 354**	**42 391**
B -25	**Total CO_2 emissions from fuel consumption in the furnace process (TCFCFP)**	Tonnes CO_2	**10 492**	**9 081**	**11 468**
B -26	**Quantity of each fuel (ffp) used in furnace process (Q_{ffp})**				
	NG	m^3	3 482 034	3 548 929	5 578 849
	COG	ths. m^3	0	0	0
	Total Reducing Agent	Tonnes	572	311	22
	Total Reducing Agent	Tonnes	778	522	404
B -27	**Emission factor of each fuel in furnace process (ffp)**				

[7] In accordance with Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. Reference Manual (Volume 3), Chapter 2 (Industrial Processes), Table 2-12, page 2.26 (http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch2ref2.pdf) and 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3 Industrial Processes and Product Use, Chapter 4 Mineral Industries Emissions, Section 4.2.2.3 *Choice of Emission Factors*, Table 4.1, page 4.25 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/3_Volume3/V3_4_Ch4_Metal_Industry.pdf).

[8] In accordance with Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. Reference Manual (Volume 3), Chapter 2 (Industrial Processes), Table 2-12, page 2.26 (http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch2ref2.pdf).

[9] In accordance with Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. Reference Manual (Volume 3), Chapter 2 (Industrial Processes), Section 2.5.2 *Emissions estimation methodology for CO_2*, page 2.10 (http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch2ref1.pdf).

[10] In accordance with Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. Reference Manual (Volume 3), Chapter 2 (Industrial Processes), Section 2.5.2 *Emissions estimation methodology for CO_2*, page 2.10 (http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch2ref1.pdf).

	EF_{ffp}				
	NG	Tonnes CO_2 per m^3	0,00185	0,00187	0,00186
	COG	Tonnes CO_2 per 1000 Nm^3	0,79824	0,79824	0,79824
	Default Emission Factor	Tonnes CO_2/Tonne	3,66	3,66	3,66
	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	**21 558**	**19 528**	**24 044**
B -29	**Electricity Consumed in furnace process (ECFP)**	MWh	19 723	17 867	21 998
B -30	**Emissions Factor for Electricity Consumption in furnace process (EFECFP)**	Tonnes CO_2/MWh	1,093	1,093	1,093
B -31	**Total CO_2 emissions from inputs to the furnace process (TCIFP)**	Tonnes CO_2	**3 413**	**2 745**	**6 879**
B -32	**Total CO_2 from Argon entering the furnace (TCAFP)**	Tonnes CO_2	**2**	**13**	**24**
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	**13**	**158**	**253**
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	0,00185	0,00187	0,00186
	COG	Tonnes CO_2 per 1000 m3			
B -39	**Electricity Consumed in making compressed air for the furnace process in steel making (ECCA)**	MWh	12	144	231
B -40	**Emissions Factor for Electricity Consumption (EFECCA)**	Tonnes CO_2/MWh	1,093	1,093	1,093
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	1,093	1,093	1,093
B-46	**Total CO_2 from limestone for furnace process (TCLFP)**	Tonnes CO_2	**3 398**	**2 575**	**6 602**
	Total Limestone	Tonnes	7 722	5 852	14 346
	Default Emission Factor	Tonnes CO_2/Tonne	0,44	0,44	0,44
	Total dolomite	Tonnes	0	0	608
	Default Emission Factor	Tonnes CO_2/Tonne	0,477	0,477	0,477
B-47	**Total CO_2 from blooming (TCBM)**	Tonnes CO_2	**7 453**	**8 700**	**13 452**
B-48	**Total CO_2 from fuel consumption in blooming (TCFCBM)**	Tonnes CO_2	**1 046**	**1 394**	**3 118**
B-49	**Quantity of each fuel (fbm) used in blooming (Q_{fbm})**				
	NG	m^3	19 095	20 125	0
	COG	1000 m^3	1 266	1 699	3 906
B -50	**Emission factor of each fuel in blooming (fbm) EF_{fbm}**				
	NG	Tonnes CO_2 per m^3	0,00185	0,00187	0,00186
	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	**6 407**	**7 306**	**10 334**
B-52	**Electricity Consumed in blooming (ECBM)**	MWh	5 862	6 684	9 455
B-53	**Emissions Factor for Electricity Consumption in blooming (EFECBM)**	Tonnes CO_2/MWh	1,093	1,093	1,093

Project line

ID number	Data variable	Units	October 2010	November 2010	December 2010
	Project Emissions (PE)	Tonnes CO_2	**527 769**	**480 993**	**600 685**
P-1	**Total Steel Output (TSO)**	Tonnes	150 494	153 400	199 813
P-2	**Total CO_2 of Pig Iron (TCPI)**	Tonnes CO_2	**488 259**	**448 848**	**565 197**
P-3	**Total CO_2 from Fuel Consumption for Pig Iron (TCFCPI)**	Tonnes CO_2	**22 898**	**20 730**	**27 584**
P-4	**Percentage of Total amount of Pig Iron Produced Used in project**	share	**1,00**	**1,00**	**1,00**

	Steel Making Activity (PII)				
P-5	**Total Pig Iron Input into Steel Making Process (TPII)**	Tonnes	134 854	133 792	185 512
P-6	**Total Pig Iron Produced (TPIP)**	Tonnes	134 854	133 792	185 512
P-7	**Quantity of each fuel (fpi) used in making Pig Iron (Q_{fpi})**				
	NG	m^3	12 277 547	10 550 467	12 518 087
	COG	1000 m^3	182	1 249	5 384
P-8	**Emission factor of each fuel in Pig Iron Production (fpi) EF_{fpi}**				
	NG	Tonnes CO_2 per m^3	0,00185	0,00187	0,00186
	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	**49 841**	**25 909**	**34 426**
P-10	**Electricity Consumed in producing Pig Iron (ECPI)**	MWh	45 600	23 705	31 497
P-11	**Emissions Factor for Electricity Consumption in Pig Iron Production (EFECPI)**	Tonnes CO_2/MWh	1,093	1,093	1,093
	Total Electricity Used in Steel Making Process				
	Grid Emission Factor	Tonnes CO_2/MWh	1,093	1,093	1,093
	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	0,00185	0,00187	0,00186
P-12	**Total CO_2 from inputs into Pig Iron (TCIPI)**	Tonnes CO_2	**415 520**	**402 209**	**503 187**
P-13	**Total CO_2 from Fuel Consumption in Sintering (TCFIO)**	Tonnes CO_2	**13 109**	**12 815**	**14 814**
P-14	**Quantity of each fuel (fio) used in Sintering (Q_{fio})**				
	NG	m^3	4 724 548	4 708 602	4 947 304
	COG	1000 m^3	5 453	5 021	7 030
P-15	**Emission factor of each fuel in Sintering (fio) EF_{fio}**				
	NG	Tonnes CO_2 per m^3	0,00185	0,00187	0,00186
	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	**10 902**	**9 850**	**13 008**
P-17	**Electricity Consumed in Sintering (ECIO)**	MWh	9 974	9 011	11 902
P-18	**Emissions Factor for**	Tonnes	1,093	1,093	1,093

	Electricity Consumption (EFECIO)	CO_2/MWh			
P-19	**Total CO_2 from Reducing Agents (TCRAPI)**	Tonnes CO_2	**331 428**	**326 530**	**411 249**
	Total Reducing Agent	Tonnes	88 238	86 765	108 062
	Default Emission Factor	Tonnes CO_2/Tonne	3,66	3,66	3,66
	Total Reducing Agent	Tonnes	3 391	3 588	6 296
	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	**60 081**	**53 014**	**64 115**
	Total Limestone	Tonnes	81 170	69 131	82 986
	Default Emission Factor	Tonnes CO_2/Tonne	0,440	0,440	0,440
	Total dolomite	Tonnes	51 083	47 371	57 865
	Default Emission Factor	Tonnes CO_2/Tonne	0,477	0,477	0,477
P-21	**Total CO_2 from steam production in Pig Iron Production (TCSPI)**	Tonnes CO_2			
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	0,00185	0,00187	0,00186
	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	**27 486**	**21 489**	**24 129**
P-25	**Total CO_2 emissions from fuel consumption in the furnace process (TCFCFP)**	Tonnes CO_2	**2 644**	**2 916**	**2 673**
P-26	**Quantity of each fuel (ffp) used in furnace process (Q_{ffp})**				
	NG	m^3	832 106	790 218	754 545
	COG	1000 m^3	68	13	0
	Total Reducing Agent	Tonnes	30	237	40
	Total Reducing Agent	Tonnes	375	224	449
P-27	**Emission factor of each fuel in the furnace process (ffp) EF_{ffp}**				
	NG	Tonnes CO_2 per m^3	0,00185	0,00187	0,00186
	COG	Tonnes CO_2 per 1000 Nm^3	0,79824	0,79824	0,79824
	Default Emission Factor	Tonnes CO_2/Tonne	3,66	3,66	3,66
	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	**24 766**	**18 422**	**21 030**

P-29	**Electricity Consumed in the furnace process (ECFP)**	MWh	22 659	16 855	19 241
P-30	**Emissions Factor for Electricity Consumption in the furnace process (EFECFP)**	Tonnes CO_2/MWh	1,093	1,093	1,093
P-31	**Total CO_2 emissions from inputs to the furnace process (TCIFP)**	Tonnes CO_2	**76**	**151**	**426**
P-32	**Total CO_2 from Argon entering the furnace (TCAFP)**	Tonnes CO_2	**3**	**16**	**26**
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	**7**	**69**	**110**
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	0,00185	0,00187	0,00186
	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	6	63	101
P-40	**Emissions Factor for Electricity Consumption in compressed air production (EFECCA)**	Tonnes CO_2/MWh	1,093	1,093	1,093
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**	MWh			

	making oxygen (ECOP)				
P-45	**Emissions Factor for Electricity Consumption in making oxygen (EFECOP)**	Tonnes CO_2/MWh	1,093	1,093	1,093
P-46	**Total CO_2 from limestone for furnace process (TCLFP)**	Tonnes CO_2	**66**	**66**	**290**
	Total Limestone	Tonnes	151	150	659
	Default Emission Factor	Tonnes CO_2/Tonne	0,440	0,440	0,440
	Total dolomite	Tonnes	0	0	0
	Default Emission Factor	Tonnes CO_2/Tonne	0,477	0,477	0,477
P-47	**Total CO_2 from casting (TCBM)**	Tonnes CO_2	**12 024**	**10 656**	**11 359**
P-48	**Total CO_2 from fuel consumption in casting (TCFCBM)**	Tonnes CO_2	**388**	**329**	**430**
P-49	**Quantity of each fuel (fbm) used in casting (Q_{fbm})**				
	NG	m^3	133 955	100 671	165 765
	coal electrodes	Tonnes	39	39	34
P-50	**Emission factor of each fuel used in casting (fbm) EF_{fbm}**				
	NG	Tonnes CO_2 per m^3	0,00185	0,00187	0,00186
	coal electrodes[11]	Tonnes CO_2/Tonne	3,6	3,6	3,6
P-51	**Total CO_2 from electricity consumption in casting (TCECBM)**	Tonnes CO_2	**11 636**	**10 327**	**10 929**
P-52	**Electricity Consumed in casting (ECBM)**	MWh	10 646	9 448	10 000
P-53	**Emissions Factor for Electricity Consumption in casting (EFECBM)**	Tonnes CO_2/MWh	1,093	1,093	1,093

Data indicated in the tables above, shows that the production volumes of steel in the fourth quarter of 2010 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.

Thereby, actual level of GHG emission reductions within the project, which were received during 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[12]:

[11] In accordance with Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. Reference Manual (Volume 3), Chapter 2 (Industrial Processes), Table 2-12, page 2.26 (http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch2ref2.pdf).

	October 2010	November 2010	December 2010	4th quarter 2010
Baseline Emissions, t CO_{2e}	584 753	534 878	671 041	**1 790 672**
Project Emissions, t CO_{2e}	527 769	480 993	600 685	**1 609 447**
Emission Reductions, t CO_{2e}	**56 984**	**53 884**	**70 356**	**181 224**

7. Measures to ensure the accuracy of the results

The monitoring of JI project indicators of at PJSC "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 detailed information on the monitoring equipment provided in the document "The list of monitoring equipment used for monitoring of industrial emissions at PJSC "AISW" as of the date 24.03.2011[13]. The monitoring of the project forms an organic part of routine monitoring of manufacturing process. This allows receiving data regarding the project continuously.

PJSC "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 PJSC "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 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.

[12] Project emissions, baseline emissions together with emission reductions (which are provided in this chapter) are rounded to the whole figure (1t) and are based on calculations which are demonstrated in the attached excel file. The file is provided to the verifier.

[13] The document was submitted to the verifier.

The procedures of receiving data for monitoring execution and responsibility for its realization at PJSC "AISW" are regulated by the normative documents of PJSC "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 PJSC "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.

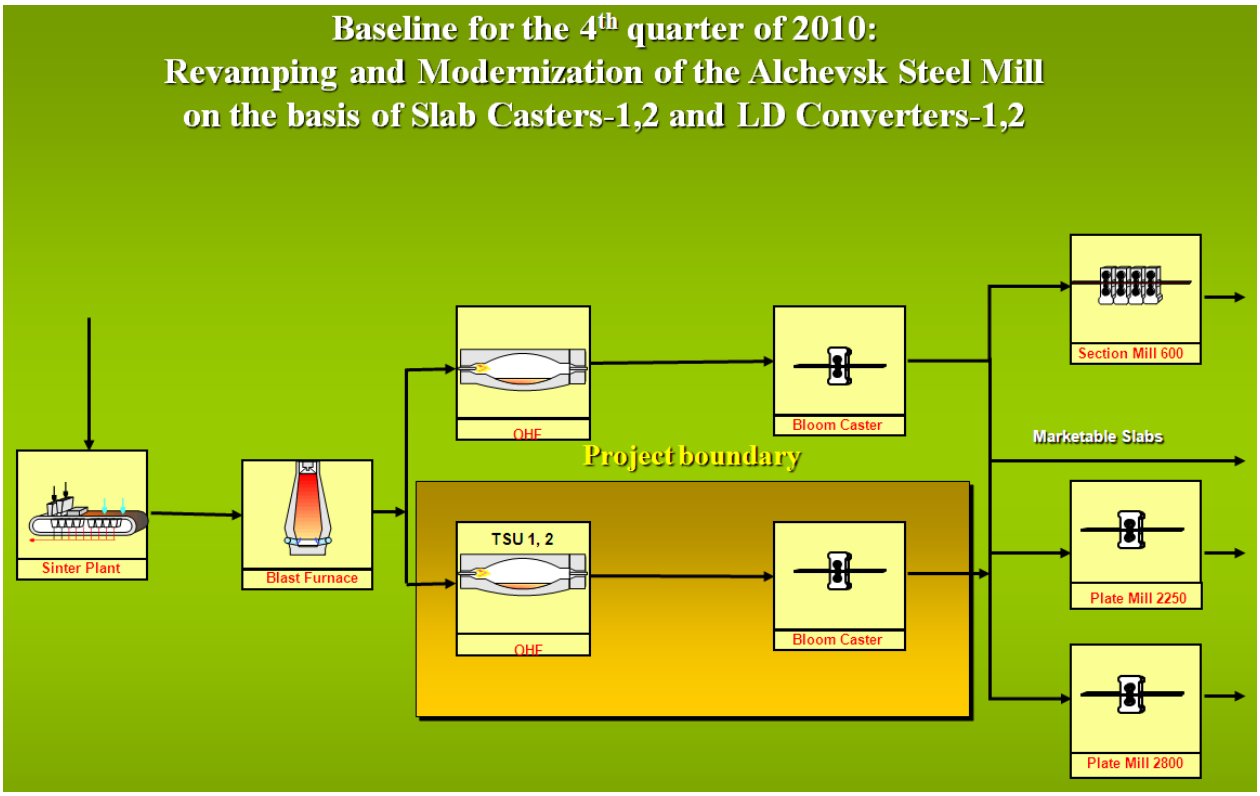
Data are collected in the electronic database of PJSC "AISW" and in printed documents. Also data are systematized in the documents of the daily, monthly and annually registration. All those documents are saved in the planning-economic department.

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.

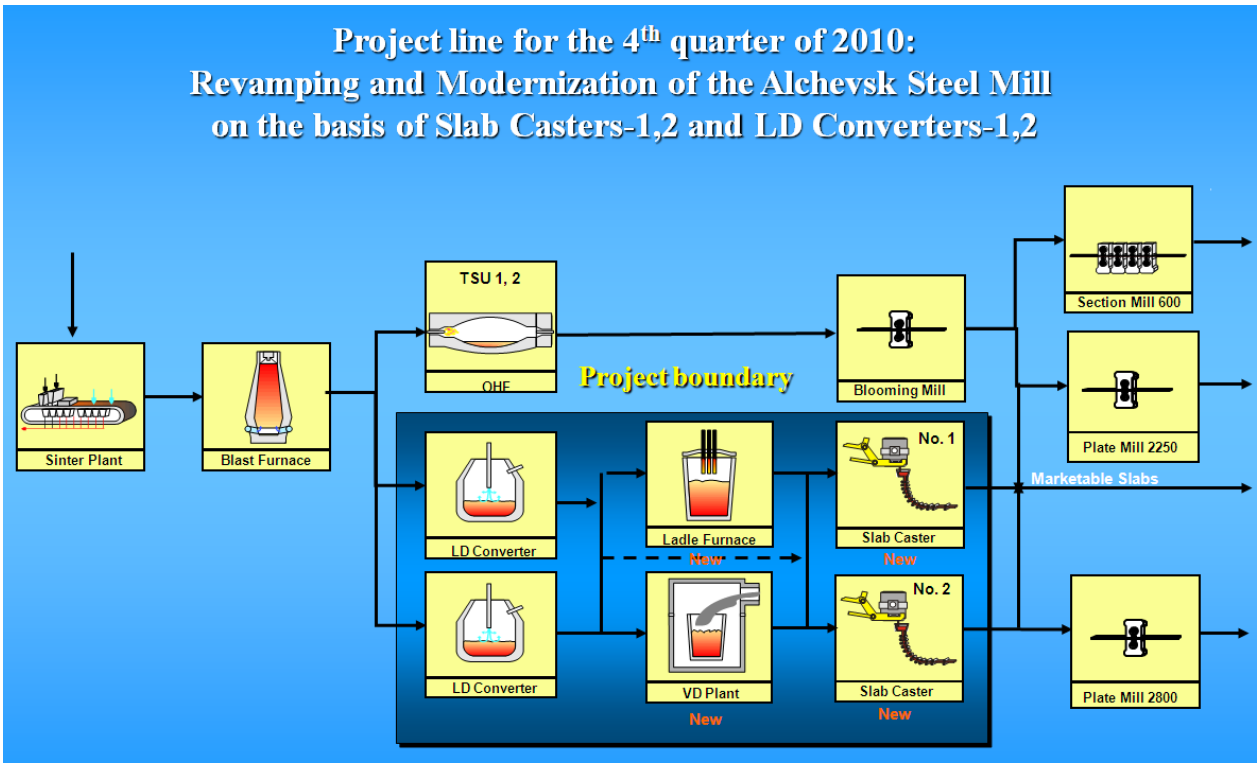
The direction of PJSC "AISW" has organized appropriate staff training to operate the project equipment. Thus, the trainings were conducted at the Ukrainian and foreign plants in order to operate Slab Casters and LD Converters. With the project equipment introduction the workers of PJSC "AISW" have the 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 PJSC "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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