JOINT IMPLEMENTATION PROJECT DESIGN DOCUMENT FORM
Version 01 - in effect as of: 15 June 2006

CONTENTS

Annexes

SECTION A. General description of the project

A.1. Title of the project:

Reconstruction of the steelmaking plant at the Izhstal OAO, Izhevsk, Russia

Sectoral scope: (9) Metal production

Version: 03.1

Date: 24.04.2012

A.2. Description of the project:

The reconstruction of the steelmaking plant at the Izhstal OAO is implemented in order to increase of steel production in electric arc furnaces, introduction of secondary treatment of steel and continuous casting of steel, decommissioning of inefficient steelmaking furnaces.

Izhstal occupies a leading position among domestic producers of special steel and stainless steel. The plant produces shapes, hot-rolled, hot-rolled peeled, calibrated steel, cold rolled strip, precision steel profiles. The company produces over 800 different grades of steel, including structural, stainless steel, tool, quick-cutting, bearing and other special steels and alloys. In the rolling mills produced more than 1,500 grades of profiles. Izhstal has a certificate of quality management system requirements of the international standard ISO 9001:2008. Traditional consumers of Izhstal products are enterprises of the defense complex and high-tech engineering, automotive, aviation, petroleum, mining and tool factories.

Izhstal is a part of Mechel Group which comprises around 30 mining, steel, ferroalloys and power enterprises both in Russia and abroad.[1]

Situation existing prior to the starting date of the project

The main production facilities existed prior to the starting data of the project have included: the steelmaking plant #21 (3 open hearth furnaces with a capacity of 390 t, 3 electric arc furnaces with a capacity of 90 t), in the steelmaking plant #23 (2 electric arc furnaces with a capacity of 60 t), in the rolling plant #20 (mill #850, mill #450, mill #400) and in the rolling plant #30 (mill #250).

Steel smelted in the steelmaking furnaces was casted into molds, steel billets are cogged down on the mill #850 until billets were ready for further rolling on mill #450, #400, #250). Production capacity before the project implementation was about 400 thousand tons per year.

Project scenario

The project scenario includes reconstruction of the steelmaking plant and modernization of the rolling plant at Izhstal.

Reconstruction of the steelmaking plant is provided by introduction of new equipment for steel billets production in steelmaking plant #23: electric arc furnace (EAF-40), ladle furnace (LF-40), vacuum vessel and continuous casting machine (CCM). The production capacity of new manufacturing line is 400 thousand tons steel per year.

The modernization of rolling plant is implemented by construction in rolling plant #30 of new heating furnace, replacement of rolling mill stands, introduction of the process control system and a set of other activities.

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[1] Izhstal characteristic has been prepared based on the data from the Mechel official web site. Source: http://www.mechel.ru/

Implementation of the project provides to the output from the operation of the inefficient steelmaking furnaces in steelmaking plant #21 (3 open hearth furnaces, 3 electric arc furnaces) and in steelmaking plant #23 (1 electric arc furnace).

History of the project

Reconstruction of the steelmaking plant at Izhstal is implemented in 2007-2011, modernization of the rolling plant in 2007-2011.[2] Decisions on the implementation and financing of the Izhstal project was taken in compliance with joint implementation of the Kyoto Protocol in order to attract additional investments. The main stages of the project implementation include:

– 2006: Decision of project implementation using the Kyoto Protocol mechanism;[3]
– 2007-2008: Consultation with the consulting companies in area of joint implementation in Russia;[4]
– 2009-2010: Organization and holding of a tender for ChMK's projects elaboration under the joint implementation mechanism;[5]
– 2011: Signing of a contract with a consulting company for the projects elaboration under the joint implementation mechanism.[6]

Baseline scenario

The baseline scenario is production of rolled products at Izhstal in amount up to 400 thousand tons per year using the steel billets supplied from the outside.

In the baseline scenario the following inefficient steelmaking furnaces would be taken from the operation: in steelmaking plant #21 (3 open hearth furnaces, 3 electric arc furnaces) and in steelmaking plant #23 (1 electric arc furnace). The steel and rolled metal production in the baseline scenario would be provided in the steelmaking plant #23 (electric arc furnace #6) and in the rolling plant #20 (mill #850, mill #450, mill #400) and in the rolling plant #30 (mill #250).

The baseline scenario provides to the rolled steel products output in comparable quantities and with comparable quality and properties in comparison to project.

Reduction of greenhouse gases emissions

Reduction of GHG emissions are achieved by reconstruction of steelmaking plant and modernization of rolling plant at Izhstal in comparison to the situation in the absence of the project because of fuel, raw materials and energy consumption decrease for steel billets production used in rolled metal manufacture in Izhstal.

Estimated emission reductions due to the Izhstal project implementation during the crediting period (2010-2012) will amount to 519 251 tons of CO_2-equivalent or an average of about 173 084 tons of CO_2-equivalent per year.

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[2] More detailed information on the project timeline, including the implementation schedule are provided in the section A.4.2 of the PDD.

[3] Protocol of meeting of technical council dated on 29.09.2006; Concept of the JSC Izhstal development in 2007-2011; Protocol of meeting by the general director of CJSC "UC Mechel" dated on 20.12.2006.

[4] Confirmed by the letters between Mechel and consulting companies in 2007-2008.

[5] Agency contract between Mechel JSC and Izhstal #085/M-09-2457sn/A dated on 01.07.2009 about tender organization; Letter #M/0350/MC/06 dated on 26.03.2010 about agency contract implementation.

[6] Contract #49113004 dated on 05.09.2011 about project design documentation elaboration.

A.3. Project participants:

Party involved	Legal entity project participant (as applicable)	Please indicate if the Party involved wishes to be considered as project participant (Yes/No)
Party A Russian Federation (Host Party)	• Izhstal OAO	No
Party B Not determined[7]	• -	-

The written project approval will be received from the Parties involved after the project determination by accredited independent entity (AIE).

A.4. Technical description of the project:

A.4.1. Location of the project:

The project is located in Izhevsk, Udmurt Republic, Russian Federation.

A.4.1.1. Host Party(ies):

Russian Federation

A.4.1.2. Region/State/Province etc.:

Udmurt Republic.

Location of Udmurt Republic on the map of Russian Federation is shown on the fig. A.4-1.

[7] Party B is not determined on the moment of PDD elaboration and will be determined later.

Fig. A.4-1. Russian Federation, Udmurt Republic

A.4.1.3. City/Town/Community etc.:

Izhevsk

A.4.1.4. Detail of physical location, including information allowing the unique identification of the project (maximum one page):

The project is implemented at the site of Izhstal located in Izhevsk.

The details of the project location on a map of the Udmurt Republic are shown on the Fig. A.4-2. Geographical coordinates of the project: 56°50’ N, 53°10’ E.[8]

[8] Source: Google Earth 6.1

Fig. A.4-2. Udmurt Republic, Izhevsk, Izhstal OAO.

A.4.2. Technology(ies) to be employed, or measures, operations or actions to be implemented by the project:

Reconstruction of the steelmaking plant at Izhstal includes the installation of new equipment in the steelmaking plant #23 for the smelting, processing, and continuous casting of steel. The composition of the main technological equipment includes:

- electric arc furnace (EAF-40) with a capacity of smelting 40 tons, 45 MVA transformer, working on the technology of liquid residue (15-25% of the metal and slag from a previous smelting) with the use of process intensifying technologies (blowing oxygen and inert gases, injection carbonaceous materials, the use of gas-oxygen burners);
- ladle-furnace (LF-40) with capacity of 40 tons of liquid steel and 12,3 MVA transformer for steel refining in chemical composition and temperature prior to casting with the use of blowing with inert gases (argon, nitrogen), addition of ferro-alloys, and other loose materials;
- chamber-type vacuum vessel with nominal capacity of 40 tons of liquid steel for refining (reducing the amount of hydrogen, nitrogen, oxygen) and improving the microstructure of steel
- blooms 3-strand radial-type continuous casting machine (CCM) with a system of magnetic stirring of the metal in the mold for casting billets 125x125 mm, 140x180 mm in length of 4-12 m at a speed casting 1,7-3,4 m / min depending on the grade of steel billets and sections;

Main equipment suppliers are Italian companies TECHINT (electric arc furnace, ladle furnace, vacuum vessel) and STS (continuous casting machine).

The technology of steel production on new equipment of steelmaking plant #23 includes the following steps: preparation of metal charge, pre-heating with waste gas and its loading into EAF-40; smelting of intermediate steel product in EAF-40 with the addition of carbonaceous materials, lime and intensification by use of heat; output of intermediate product in the ladle with the addition of alloying and deoxidizing agents; steel refining up the required grades in the ladle furnace and vacuum vessel; transfer of steel ladle on a moving two-position stand of CCM and casting of steel billets with obtaining a given length.

Modernization of rolling plant at Izhstal includes technical re-equipment of rolling mill #250 of rolling plant #30:

– construction of a new heating with walking sole and walking beams, capacity up to 75 tons / hour, heated by natural gas
– installation of water descaling;
– installation of two additional types of roughing stands RR455;
– replacement of the intermediate group of stands of the type RR445;
– replacement of the stands four final groups of small sections of the type RR436;
– equipping the intermediate group, small sections and wire section with devices of interstrands regulation;
– introduction of the process control system;
– installation of the calibrating stand of the type CGS40/50;
– installation of a line of thermo-mechanical hardening of reinforcement;
– installation of a line of the thermo-mechanical rolling between the small sections and intermediate stand groups;
– installation of the system profile measurement «ORBIS»;
– reconstruction of the refrigerator unit with the replacement of shears in front of a refrigerator, refrigerator and cold cutting shears, installation of an abrasive cutting;
– installation the shipping lines with pockets of up to 12 meters, the site of packing and weighing of the finished product.

Supplier of basic technological equipment for the modernization of the mill #250 is an Italian company SIEMENS VAI.

Technology of manufacture of long rolled products in the modernized mill #250 includes following steps: descaling of billet size 100x100 mm, 125x125 mm with abrasive grinding machines (if necessary); landing and heating of billets in the walking beams furnaces; furnace slag descaling with high pressure water; rolling through roughing, intermediate, small and wire stands; thermo-mechanical hardening; steel size measure by the «ORBIS» system; cutting, weighing and labeling of finished products.

Technological equipment, used in the Izhstal project, is **consistent with the modern level of** metallurgical production because utilization of modern electric arc furnace, continuous casting and secondary metallurgy allows for production of high-quality finished products of required range.

Industrial process control and maintenance of metallurgical equipment is performed by the Izhstal properly trained and qualified specialists in accordance with approved procedure and regulations.

The implementation schedule of the project is presented in the diagram A.4-1.

Diagram A.4-1. Implementation schedule of the project.

#	Stage of the project	2007	2008	2009	2010	2011	2012
1.	Reconstruction of the steelmaking plant						
1.1	Design documentation elaboration						
1.2	Construction works						
1.3	Commissioning works						

1.4	Operation						
2.	Modernization of the rolling plant						
2.1	Design documentation elaboration						
2.2	Construction works						
2.3	Commissioning works						
2.4	Operation						

A.4.3. Brief explanation of how the anthropogenic emissions of greenhouse gases by sources are to be reduced by the proposed JI project, including why the emission reductions would not occur in the absence of the proposed project, taking into account national and/or sectoral policies and circumstances:

GHG emissions by iron and steel plants are mainly associated with the use of fossil fuels and carbonaceous feed in manufacture of steel products.

Reduction of GHG emissions are achieved by reconstruction of steelmaking plant and modernization of rolling plant at Izhstal in comparison to the situation in the absence of the project because of fuel, raw materials and energy consumption decrease for steel billets production used in rolled metal manufacture in Izhstal.

Main indicators of steel production and GHG emissions for baseline and project scenarios including leakages are presented in Table A.4.3-1. A detailed description of GHG emissions is set out in Section B and E of the PDD.

Table A.4.3-1. Steel production and CO_2 emissions by Izhstal project implementation (average data for 2010-2012)

#	Parameter	Baseline scenario	Project scenario with leakages	Change
1.	Steel production, t/year	176 907	176 907	-
2.	Specific GHG emissions, tCO_2/t	1,537	0,562	0,974
3.	GHG emissions, tCO_2/ year	271 843	99 507	172 337

The existing legislation of the Russian Federation which regulates GHG emissions does not provide for restriction of business activities which lead to occurrence of GHG emissions. Therefore, the Izhstal project may adopt any of the possible scenarios allowing for acceptable level of production. In the absence of opportunities to attract additional investment through the mechanism of Kyoto protocol, the project would have been developed in accordance with the baseline scenario (the baseline scenario is chosen and justified in the Section B.1-B.2), and this would not have led to a reduction of GHG emissions.

A.4.3.1. Estimated amount of emission reductions over the crediting period:

	Years
Length of the crediting period	3 years (27 months)
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent.
2010	12 036
2011	215 986
2012	291 229
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	519 251
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	173 084

Table A.4.3-1. Estimated amount of emission reductions after the first commitment period.

	Years
Length of the crediting period	8 years (96 months)
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent.
2013	291 229
2014	291 229
2015	291 229
2016	291 229
2017	291 229
2018	291 229
2019	291 229
2020	291 229

Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	2 329 832
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	291 229

A.5. Project approval by the Parties involved:

The Project is not approved by the Parties involved. The Letters of Approval will be received after the project determination by AIE.

According to the Regulations "On Realization of Article 6 of Kyoto Protocol to United Nations Framework Convention on Climate Change" approved by the Government Decree № 780 dated on 15.09.2011 the project shall be approved following the positive determination of the project by an AIE.

SECTION B. Baseline

B.1. Description and justification of the baseline chosen:

Description and justification of the baseline chosen is provided in accordance with Guidance on criteria for baseline setting and monitoring (Version 03).[9]

The **JI specific approach**[10] is used for description and justification of the baseline chosen that includes the following steps:

1. Indication and description of the approach chosen regarding baseline setting
2. Application of the approach chosen

Step 1. Indication and description of the approach chosen regarding baseline setting

The JI specific approach for baseline setting is elaborated in accordance with Appendix B of the JI guidelines[11] and paragraph 23 through 29 of the Guidance on criteria for baseline setting and monitoring (Version 02). The baseline is identified by listing and describing plausible future scenarios on the basis of conservative assumptions and selecting the most plausible one taking into account the key factors that affect a baseline.

The **following steps** are implemented for baseline setting:

1. Identification and description of plausible future scenarios

At this stage the plausible future scenarios are defined and checked if they are in line with the current legislation and if they are available to the project participants.

2. Analysis of the key factors that affect the implementation of the plausible future scenarios

The key factors are directly or indirectly factors to the plausible future scenarios that affect their implementation. The following factors considered as the key factors that affect the plausible future scenarios implementation: financial and investment barriers (the description and application of the mentioned key factors are provided by Step 2 of the approach chosen). The other factors stated in the paragraph 25 of the Guidance on criteria for baseline setting and monitoring (Version 03) cannot be considered as the key factors that affect the baseline.

3. Selecting the most plausible scenario

This stage results in defining of the baseline. The baseline is the most attractive plausible future scenario.

Step 2. Application of the approach chosen

1. Identification and description of plausible future scenarios

The list of the plausible future scenarios shall be developed according to the following terms:

- all plausible future scenarios shall be available to the project participants;
- all plausible future scenarios shall be provide outputs in comparable quantities and with comparable quality and properties.

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[9] Source: http://ji.unfccc.int

[10] In accordance with paragraph 9(a) “Guidance on criteria for baseline setting and monitoring”, (Version 02). The approved CDM methodologies are not used for choice, justification and setting of the baseline.

[11] Source: http://ji.unfccc.int

The list of plausible future scenarios

Plausible future scenario 1. Continuation of the current situation. Operation of steelmaking and rolling plants at the Izhstal without reconstruction and modernization.

Plausible future scenario 2. Project implementation without registration as a JI project. Reconstruction of the steelmaking plant and modernization of the rolling plant at the Izhstal.

Plausible future scenario 3. Output of inefficient steelmaking furnaces at the Izhstal. Production of rolled products at the Izhstal by using the steel billets supplied from the outside.[12]

Description of plausible future scenarios

Plausible future scenario 1.

The plausible future scenario is saving of production facilities existed at the Izhstal prior to the project starting data of steelmaking plant reconstruction: in the steelmaking plant #21 (3 open hearth furnaces with a capacity of 390 t, 3 electric arc furnaces with a capacity of 90 t), in the steelmaking plant #23 (2 electric arc furnaces with a capacity of 60 t), in the rolling plant #20 (mill #850, mill #450, mill #400) and in the rolling plant #30 (mill #250). Steel smelted in the steelmaking furnaces is casted into molds, steel billets are cogged down on the mill #850 mill until billets were ready for further rolling on mill #450, #400, #250). Production capacity in the plausible future scenario 1 is about 400 thousand tons per year.

Plausible future scenario 2. The plausible future scenario 2 is reconstruction of the steelmaking plant by introduction of new equipment for steel billets production in steelmaking plant #23: EAF-40, LF-40, vacuum vessel, CCM. The production capacity of new manufacturing line is 400 thousand tons per year. The main volume of the continuous casted billets are supplied for rolling on the modernized mill #250 of rolling plant #30. The modernization of rolling plant #30 is implemented by construction of new heating furnace, replacement of rolling mill stands, introduction of the process control system and a set of other activities. Implementation of the plausible future scenario 2 provides to the output from the operation of the inefficient steelmaking furnaces in steelmaking plant #21 (3 open hearth furnaces, 3 electric arc furnaces) and in steelmaking plant #23 (1 electric arc furnace).

Plausible future scenario 3. The plausible future scenario 3 is production of rolled products at Izhstal in amount up to 400 thousand tons per year using the steel billets supplied from the outside. The steel billets supplier in the plausible future scenario 3 is Chelyabinsk Metallurgical Plant (ChMK) because of ChMK is incorporated in Mechel Company, specialized in producing high quality and special steels and has the necessary capacity for steel production. In the plausible future scenario 3 the following inefficient steelmaking furnaces would be taken from the operation: in steelmaking plant #21 (3 open hearth furnaces, 3 electric arc furnaces) and in steelmaking plant #23 (1 electric arc furnace). The steel and rolled metal production in the baseline scenario would be provided with in the steelmaking plant #23 (electric arc furnace #6) and in the rolling plant #20 (mill #850, mill #450, mill #400) and in the rolling plant #30 (mill #250).

The description of the plausible future scenarios shows that scenarios 1, 2 and 3 are available to the project participants and provide outputs in comparable quantities and with comparable quality and properties.

Compliance of the chosen scenarios with the current legislation and regulations

The development of metallurgical companies in Russia is determined by the Russian metallurgy development strategy up to 2020, approved by the Ministry of Industry and Trade of the Russian Federation order #150 on March 18, 2009. The primary goal of the development of the metallurgical industry is to satisfy the demand for metallurgical products in terms of the product range, quality and

[12] Further it will be shown that plausible future scenario 2 is a baseline.

quantity, and with regard to increased economic efficiency in the industry, environmental safety, as well as resource and energy conservation.

Implementation of the considered plausible future scenarios (1, 2 and 3) provides to the rolled steel products output in comparable quantities and with comparable quality and properties. Therefore plausible future scenarios are in compliance with the Russian metallurgy development strategy.

There are no laws that restrict GHG emissions at metallurgical companies in Russia. The main documents that regulate GHG emissions in the metallurgical industry are:

- Climate Doctrine of the Russian Federation, approved by the President of the Russian Federation resolution #861on December 17, 2009;
- Russian metallurgy development strategy up to 2020, approved by the Ministry of Industry and Trade of the Russian Federation order #150 on March 18, 2009;
- Russian Government Decree #780 dated on September 15, 2011 “On Realization of Article 6 of Kyoto Protocol to United Nations Framework Convention on Climate Change”.

The mentioned documents envisage the reduction of GHG emissions in the industry through the technological reconstruction, the introduction of energy saving technologies, and the creation of the conditions in which projects can be implemented under the Kyoto Protocol. However, they do not contain any regulatory measures on emissions reduction. Therefore plausible future scenarios 1, 2 and 3 are in compliance with the current regulations in the field of environmental protection.

List of the plausible future scenarios corresponding to the current legislation and available to the project participants

<u>Plausible future scenario 1</u>. Continuation of the current situation. Operation of steelmaking and rolling plants at the Izhstal without reconstruction and modernization.

<u>Plausible future scenario 2</u>. Project implementation without registration as a JI project. Reconstruction of the steelmaking plant and modernization of the rolling plant at the Izhstal.

<u>Plausible future scenario 3</u>. Output of inefficient steelmaking furnaces at the Izhstal. Production of rolled products at the Izhstal by using the steel billets supplied from the outside.

2. Analysis of the key factors that affect the implementation of the plausible future scenarios

The key factors are directly or indirectly factors to the plausible future scenarios that affect their implementation.

The list of the key factors:

- Investment barrier;
- Financial barrier (cost efficiency).

Definition of the key factors

<u>Investment barrier</u>

Investment barrier represents the availability of own or dept capital for financing the project.

<u>Financial barrier (cost efficiency)</u>

The presence of a financial barrier for a specific scenario means that economic parameters of the scenario are not acceptable for the project participants.

The presence of the above barriers for implementation of future scenarios means that they may not be implemented if there is a more profitable scenario or there is no possibility of overcoming them.

Analysis of the key factors that affect the implementation of the plausible future scenarios

Investment barrier

The investment barrier does not affect the implementation of the plausible future scenarios 1 and 3 because this scenario does not require any additional investments.

Attracting the required investments is a significant barrier for plausible future scenario 2: Reconstruction of the steelmaking plant and modernization of the rolling plant at the Izhstal.

Absence of a timely opportunity to attract the required amount of own and dept financing for project implementation has led to a significant increase in the period of project implementation.[13]

Lowering of investment barrier through government support is not possible due to the lack of public investment in the projects of steel companies.[14]

Therefore, *an investment barrier is present for plausible future scenario 2:* Project implementation without registration as a JI project. Reconstruction of the steelmaking plant and modernization of the rolling plant at the Izhstal.

The Russian Metallurgical Industry Development Strategy for the period till 2020 stipulates that metallurgical production reconstruction and construction projects are financed mainly by the enterprises themselves, moreover, income derived from projects implemented under Kyoto Protocol joint implementation mechanism may be used as an additional source of funding. The explanation of how registration of the project as a JI project will reduce the effect of the investment barrier is provided in the section B.2.

Financial barrier (cost efficiency)

The cost efficiency analysis is undertaken for determination of financial barrier for the plausible future scenario 1-3. The financial index for comparison of plausible future scenarios is a levelized cost of rolled metal production at Izhstal. The results of the analysis are provided in the table B.1-1.

Table B.1-1. Results of cost efficiency analysis.[15]

#	Parameter	Plausible future scenario 1	Plausible future scenario 2	Plausible future scenario 3
1.	Investment, million rubles	-	3 627,7	-
2.	Operational costs, million rubles / year	7 231,4	6 773,7	6 895,6
3.	Rolled metal production, thousand tonnes	400	400	400
4.	Levelized cost of rolled metal, rubles / tonne	18 044	18 161	17 206

The results of cost efficiency analysis shows that the more effectiveness scenario of rolled metal production at Izhstal (levelized cost is 17 206 rubles / tonne) is the plausible future scenario 3: Output of inefficient steelmaking furnaces at the Izhstal. Production of rolled products at the Izhstal by using the steel billets supplied from the outside. The levelized costs of rolled metal production in other plausible

[13] Order #51-p of UK "Mechel" dated on 22.10.2008 "On Extension of the Timeline for the Current Investment Projects Implemented at the "UK Mechel"

[14] Russian metallurgic industry development strategy for the period till 2020 approved by the Decree of the Ministry of Industry and Trade of Russia #150 dated 18.03.2009, pp. 42-44.

[15] Calculation is provided in the MS Excel file: Investment analysis_Izhstal.xlsx

future scenarios are above the levelized cost in the plausible future scenario 3: 18 044 rubles / tonne in the plausible future scenario 1 and 18 161 rubles / tonne in the plausible future scenario 2.

The sensitivity analysis confirms the output of financial barrier analysis (table B.1-2).

Table B.1-2. Results of the sensitivity analysis.

#	Change of parameter	Levelized cost of rolled metal production, rubles / tonne		
		Plausible future scenario 1	Plausible future scenario 2	Plausible future scenario 3
1.	Investment (+10%)	18 044	18 287	17 206
2.	Investment (-10%)	18 044	18 035	17 206
3.	Operational costs (+10%)	19 849	19 851	18 927
4.	Operational costs (-10%)	16 240	16 442	15 486

Results of the sensitivity analysis show that if the investment and operating costs deviate within ± 10% plausible future scenario 3 remains the more economical attractive.

3. Choice of the most plausible future scenario – baseline

The results of the performed analysis of the key factors affected the plausible future scenarios make it possible to draw the conclusion that the most plausible future scenario is the plausible future scenario 3: Output of inefficient steelmaking furnaces at the Izhstal. Production of rolled products at the Izhstal by using the steel billets supplied from the outside. The plausible future scenario 3 is the **baseline.**

The baseline GHG emissions are established using the following formulae (according to the section D.1.1.4 of the monitoring plan):

$BE_y = P_{steel,BL,y} * EF_{CO2,SP,BL,y}$

BE_y - baseline emissions, tCO_2

$P_{steel,BL,y}$ - steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario, t

$EF_{CO2,SP,BL,y}$ - CO_2 emission factor for steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario, tCO_2/t

y - year

$P_{steel,BL,y} = P_{billet,EAF,y} + (P_{ingot,EAF,y} / k_{ingot/billet})$

$P_{steel,BL,y}$ - steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario, t

$P_{billet,EAF,y}$ - production of continuous casted billets in EAF-40, t

$P_{ingot,EAF,y}$ - production of steel ingots in EAF-40, t

$k_{ingot/billet}$ - specific ingots consumption for billets production, t / t

y - year

The baseline is established taking into account of uncertainties of parameters and using conservative assumptions. Main parameters used to establish the baseline include:

- Production of continuous casted billets in EAF-40;
- Production of steel ingots in EAF-40;
- Specific ingots consumption for billets production;
- CO_2 emission factor for steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario.

Data / parameter	$P_{billet,EAF,y}$
Data unit	t
Description	Production of continuous casted billets in EAF-40
Time of determination/monitoring	Monthly according to the monitoring plan
Source of data (to be) used	Technical report of plant #23
Value of data (for ex ante calculations/determinations)	Year: t 2010: 4 890 2011: 189 184 2012: 300 000
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Actual data for 2010-2011 and forecasted data for 2012 are prepared by Izhstal.
QA/QC procedures (to be) applied	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies.
Any comment	Uncertainty of the parameter is low. Additional information about monitoring is provided in the section D.

Data / parameter	$P_{ingot,EAF,y}$
Data unit	t
Description	Production of steel ingots in EAF-40
Time of determination/monitoring	Monthly according to the monitoring plan
Source of data (to be) used	Technical report of plant #23

<table>
<tr><td>Value of data
(for ex ante calculations/determinations)</td><td><table><tr><td>Year</td><td>t</td></tr><tr><td>2010</td><td>10 097</td></tr><tr><td>2011</td><td>32 924</td></tr><tr><td>2012</td><td>0</td></tr></table></td></tr>
<tr><td>Justification of the choice of data or description of measurement methods and procedures (to be) applied</td><td>Actual data for 2010-2011 and forecasted data for 2012 are prepared by Izhstal.</td></tr>
<tr><td>QA/QC procedures (to be) applied</td><td>Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies.</td></tr>
<tr><td>Any comment</td><td>Uncertainty of the parameter is low. Additional information about monitoring is provided in the section D.</td></tr>
</table>

Data / parameter	**$k_{ingot/billet}$**
Data unit	t / t
Description	Specific ingots consumption for billets production
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Calculated
Value of data (for ex ante calculations/determinations)	1,174
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Calculated by formula: $k_{ingot/billet} = C_{ingot,y} / P_{billet,y}$ $k_{ingot/billet}$ - specific ingots consumption for billets production, t / t $C_{ingot,y}$ - ingots consumption on mill #850, t $P_{billet,y}$ - billets production on mill #850, t y - year Initial data for calculation are taken from technical reports Izhstal for 2006-2008.
QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	**$EF_{CO2,SP,BL,y}$**
Data unit	tCO_2 / t
Description	CO_2 emission factor for steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Estimated
Value of data (for ex ante calculations/determinations)	1,537
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Estimated based on transparent data of Chermetinformacia about raw materials, fuel and energy resources consumption for steel production at ChMK for 2010 taken into account conservative assumptions: !Baseline emission factor Izhstal_calculation.xlsx, !Baseline emission factor Izhstal_methodology.docx. The similar approach is used for determination of CO_2 emission factor in the baseline scenario in the approved JI project “Construction and implementation of the Casting and Rolling Complex for the production of hot rolled flat products in the Vyksa District, the Nizhny Novgorod Region, the Russian Federation”.
QA/QC procedures (to be) applied	-
Any comment	Value of CO_2 emission factor for steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario is to revised during the monitoring period if the estimated value will be not conservative.

B.2. Description of how the anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the JI project:

JI specific approach is used for demonstration of additionality of the project in accordance with the paragraph 2(a) of the Annex 1 to the “Guidance on criteria for baseline setting and monitoring” (Version 03). The approved CDM methodologies and tools are not used for demonstration of additionality.

The demonstration that the project provides reductions in emissions by sources that are additional to any that would otherwise occur, is provided using the following step-wise approach:

1. Indication and description of the approach applied;
2. Application of the approach chosen;
3. Provision of additionality proofs.

Step 1. Indication and description of the approach applied

A JI-specific approach is chosen for justification of additionality. Guidance on criteria for baseline setting and monitoring prescribes in this case to provide traceable and transparent information showing that the baseline was identified on the basis of conservative assumptions, that the project scenario is not part of the identified baseline scenario and that the project will lead to reductions of anthropogenic emissions by sources.

Step 2. Application of the approach chosen

The analysis provided in the section B.1. clearly demonstrates that the baseline scenario is: Plausible future scenario 3: Output of inefficient steelmaking furnaces at the Izhstal. Production of rolled products at the Izhstal by using the steel billets supplied from the outside.

The project is not a part of the baseline, which can be shown by analyzing the key factors that affect the implementation of the plausible future scenario 2 (Project implementation without registration as a JI project). The results of the key factors analysis demonstrate that the project scenario is not part of the identified baseline (table B.2-1).

Table B.2-1. Impact of the barriers on the plausible future scenarios implementation

#	Scenario	Investment barrier	Financial barrier
1.	Plausible future scenario 1 (continuation of the current situation)	Absent	Present
2.	Plausible future scenario 2 (project implementation without registration as a JI project)	Present	Present
3.	Plausible future scenario 3 (baseline scenario)	Absent	Absent

Common practice analysis

The common practice analysis completes the analysis of the key factors that affect the implementation of the plausible future scenarios and demonstrate additionality of the project.

In 2000-2012 were implemented the similar projects at Russian metallurgical works for introduction of electric arc furnaces and continuous casting instead of steel production in open-hearth furnaces and casting into the molds:

- OJSC “Severstal”;
- OJSC “Nizhneserginsky Metizno-Metallurgichesky Plant”;
- OJSC “Ashinskiy Metallurgical Works”;
- CJSC “Chelyabinsk Tube-Rolling Plant”;
- OJSC “Metallurgical Plant named after A.K. Serov”;
- OJSC “Seversky Pipe Plant”.

All the mentioned similar projects are implemented under JI mechanism of Kyoto protocol[16] and they can be likely excluded from the analysis of common practice.[17] Therefore the project of Izhstal for reconstruction of the metallurgical plant is not a common practice.

Explanation of how registration of the Project as a JI (Joint Implementation) project will reduce the effect of the barriers that prevent the Project being implemented in the absence of the use of the JI mechanism.

The analysis of the barriers showed the presence of investment and financial barriers for the project, including those related to expenditures for their overcoming. Therefore, registering the project as a JI Project and attracting investments by selling emission reduction units (ERU) will assist in overcoming the above barriers and increase the viability of the project.

Therefore the registration of the project as a JI project will help to get over the identified barriers.

Step 3. Provision of additionality proofs

The proofs to support above information are contained in the following documents:

- Protocols of decision of project implementation and other relevant documentation from project participants;
- Cost efficiency analysis of the project;
- Relevant studies;
- Legislation and regulations of metallurgy development and JI projects implementation in Russia.

Explanations of how GHG emission reductions are achieved

Reduction of GHG emissions are achieved by reconstruction of steelmaking plant and modernization of rolling plant at Izhstal in comparison to the situation in the absence of the project because of fuel, raw materials and energy consumption decrease for steel billets production used in rolled metal manufacture in Izhstal.

Estimated emission reductions due to the Izhstal project implementation during the crediting period (2010-2012) will amount to 519 251 tons of CO_2-equivalent or an average of about 173 084 tons of CO_2-equivalent per year. Detailed description of GHG emission reductions are provided in the section E.

B.3. Description of how the definition of the project boundary is applied to the project:

In the project boundaries are included all the facilities of Izhstal connected to the project activities and where GHG emissions occur:

1. Steelmaking plant #23 of Izhstal;

2. Rolling plants of Izhstal;

3. Steel billets production outside Izhstal.

The facilities included in the project boundaries and their impact on GHG emissions is presented in table B.3-1. The sources of GHG emissions as well as the GHGs included in the calculation of the emissions according to the baseline and project scenarios are presented in table B.3-2. Principal scheme of the project boundaries is shown in fig. B.3-1.

[16] Source: http://www.sbrf.ru/moscow/ru/legal/cfinans/ , http://www.carbonunitsregistry.ru/reports-pso.htm

[17] Methodological tool "Combined tool to identify the baseline scenario and demonstrate additionality" (Version 02.2), p. 9. Source: http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v2.2.pdf

Table B.3-1. The objects in the project boundaries and description of their effect on GHG emissions

#	Objects	Description
1.	Steelmaking plant #23 of Izhstal	Steel production in electric arc furnaces is provided by smelting of scrap steel and pig iron using the electricity energy supplied through graphite electrodes. GHG emissions occur as a result of oxidation of pig iron carbon, graphite electrodes and burning of natural gas in furnaces, secondary metallurgy and steel casting units. Ingots and continuous casted steel billets produced at the steelmaking plant #23 are transferred to the rolling plants of Izhstal for further processing.
2.	Rolling plants of Izhstal	By production of rolled metal is used natural gas for heating of steel billets and thermal processing of rolled products. GHG emissions occur due to fuel combustion.
3.	Steel billets production outside Izhstal	Production of steel billets outside the Izhstal is provided by using of carbon raw materials, fuels and energy resources. As result GHG emissions occur as a result of carbon raw materials oxidation and combustion of fuel for technological needs and energy resources generation. Steel billets produced outside Izhstal is used at rolling plants of Izhstal for rolled metal production.

Table B.3-2. Emission sources and GHGs included / excluded in project boundaries

#	Emission sources	Gas[18]	Included / excluded	Description
1.	Steelmaking plant #23 of Izhstal	CO_2	included	Emissions from fuel combustion and oxidation of carbon contained raw materials by steel production.
		CH_4	excluded[19]	Excluded for simplification.
		N_2O	excluded	Excluded for simplification.
2.	Rolling plants of Izhstal	CO_2	included	Excluded for conservative assumption of GHG emission reductions because of the project scenario provides to decrease of steel billets, fuel and electricity consumption in rolling plants Izhstal in comparison to the

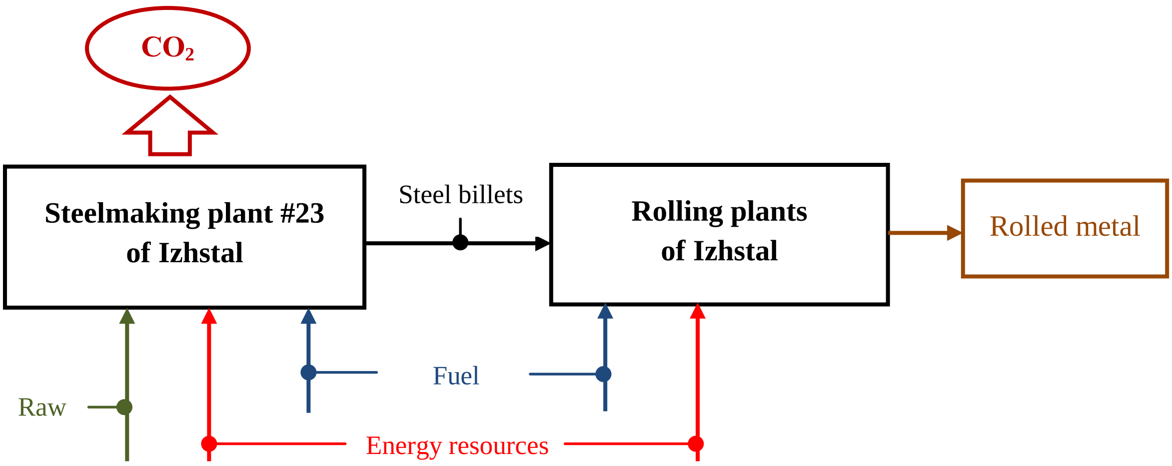
[18] According to Guidance on criteria for baseline setting and monitoring (Version 03) the project must consider all the greenhouse gases included in Annex A of the Kyoto Protocol. However, fuel combustion and oxidation of carbonaceous materials only produces emissions of CO_2, CH_4 and N_2O and therefore emissions of SF_6, PCFs, HFCs are not considered. Source of data: 2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 3. Industrial Processes and Product Use, Chapter 4. Metal Industry Emissions, p. 4.9

[19] CH_4 and N_2O emissions from all emission sources in the project and baseline scenario are not taken into account based on conservative approach to the GHG emission reductions calculation. Comments are provided in the table B.3-3.

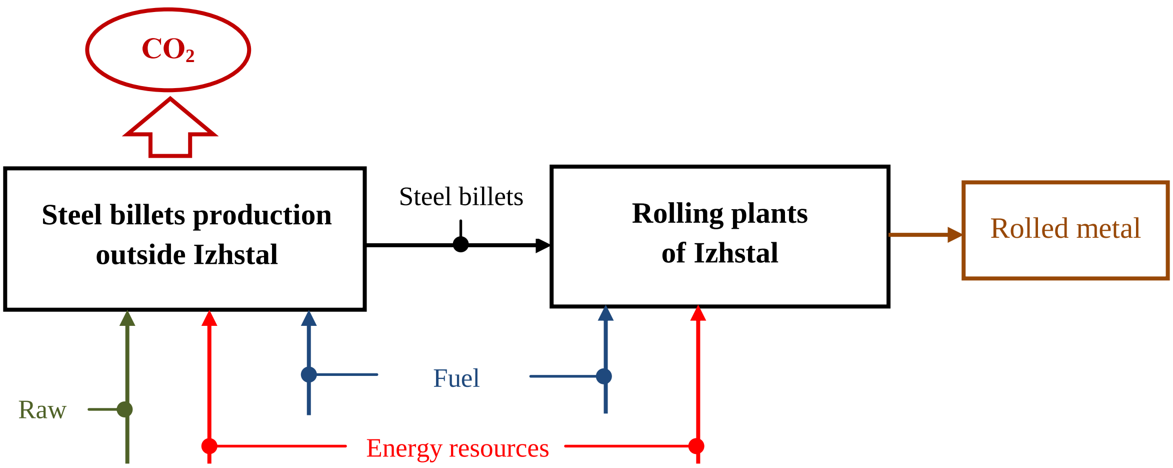
#	Emission sources	Gas[18]	Included / excluded	Description
				baseline scenario.
		CH_4	excluded	Conservative approach.
		N_2O	excluded	Conservative approach.
3.	Steel billets production outside Izhstal	CO_2	included	Emissions from fuel combustion and oxidation of carbon contained raw materials by steel production.
		CH_4	excluded	Conservative approach.
		N_2O	excluded	Conservative approach.

Fig. 3-1. Principal scheme of the project boundaries.

Project scenario:



Baseline scenario:



The GHG emission sources (table B.3-1, B.3-2) are determined according to the requirements of the Guidance on criteria for baseline setting and monitoring (Version 03). The applications of the requirements are provided in the table B.3-3.

Table B.3-3. Requirements for the project boundaries determination

#	Criterion to define the project boundaries	Comments
1.	Under the control of the project participant.	The identified emission sources (steelmaking plant #23 and rolling plant) are under the control of Izhstal as it is the property of the Company and it is directly operated by the Company. Steel billets production outside Izhstal is under the control of project participant as steel billets is to produced according to the demand of steel at Izhstal for rolled metal manufacture.
2.	Reasonably attributable to the project.	Sources of GHG emissions, defined in the table. B.3-1, are connected by energy and material flows with the facilities where the project is implemented (see Figure B.3-1), so they are reasonably attributable to the project.
3.	Significant, i.e., as a rule of thumb, would by each source account on average per year over the crediting period for more than 1 per cent of the annual average anthropogenic emissions by sources of GHGs, or exceed an amount of 2 000 tonnes of CO_2 equivalent, whichever is lower.	Emissions by the considered are significant, they amount is more than 1% and exceed 2,000 t of CO_2 equivalent (see section E.) In the project boundaries are not considered CH_4 and N_2O emissions based on conservative approach to the GHG emission reductions calculation while the project provides to the all GHG emissions reductions as result of fuel, raw materials and energy resources consumption decrease.

Leakage assessment

In accordance with Guidance on criteria for baseline setting and monitoring (Version 03) the leakage is determined as “the net change of anthropogenic emissions by sources and/or removals by sinks of GHGs which occurs outside the project boundary, and that can be measured and is directly attributable to the JI project”. In case the potential leakage is determined the project participants must undertake an assessment of the potential leakage of the proposed JI project and explain which sources of leakage are to be calculated, and which can be neglected.

Main sources of significant leakage as a result of the project implementation include emissions associated with the following processes that occur outside of the project boundaries:

- lime production;
- electricity generation.

Other potential sources of leakages during the project implementation are negligible:

- emissions that occur at the stage of production, processing and transportation of fuel and raw materials used in the manufacture of steel are excluded from consideration because the project implementation leads to a decrease in consumption of raw materials, fuel and energy as compared to the baseline scenario;

- emissions that occur at the stage of production, processing and transportation of fuel to generate energy resources are excluded from consideration because they are negligible, as confirmed by the analysis of methodologies for projects aimed at electricity generation.[20]

B.4. Further baseline information, including the date of baseline setting and the name(s) of the person(s)/entity(ies) setting the baseline:

Date of baseline setting: 24.04.2012

The baseline has been developed by:

CJSC "National Carbon Sequestration Foundation"

Contact person: Mr. Roman Kazakov, principal specialist

Tel.: +7 499 788 78 35 ext. 113

Fax: +7 499 788 78 35 ext. 107

E-mail: kazakovra@ncsf.ru

CJSC "National Carbon Sequestration Foundation" is not a project participant.

[20] Approved consolidated baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 11), p. 11, http://cdm.unfccc.int/UserManagement/FileStorage/HGY3TLRFPQVM016WA4I7XCZD92KE5S

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

03.08.2007

The starting date of the project is determined as date of the contact signing for project equipment supply for electric arc-furnace plant #23 at Izhstal.[21]

C.2. Expected operational lifetime of the project:

15 years (180 months)

The expected operational lifetime of the project is determined as lifetime of the main projects equipment in accordance with Russian regulations.[22]

C.3. Length of the crediting period:

Length of the crediting period: 29.10.2010[23] – 31.12.2020 (11 years, 123 months), including:

- First commitment period: 29.10.2010 – 31.12.2012 (3 years, 27 months);
- Period after the first commitment period: 01.01.2013 – 31.12.2020 (8 years, 96 months).

[21] Contract #9.223-07 dated on 03.08.2007 between TECHINT COMPAGNIA TECNICA INTERNAZIONALE S.p.A. and Izhstal OAO.

[22] Russian Government Decree #1 dated on 01/01/2002 About fixed assets included in depreciation groups (edit. by Decrees of Russian Government # 415 on 09/07/2003, #476 on 08/08/2003, # 697 on 18/11/2006, #676 on 12/09/2008)

[23] The starting date of the crediting period corresponds to the date of steel production in EAF-40 (Certificate of provisional acceptance dated on 29.10.2010)

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

The monitoring plan is elaborated using the following step-wise approach[24]:

Step 1. Indication and description of the approach chosen regarding monitoring;

Step 2. Application of the approach chosen.

The description of the above approach is provided below.

Step 1. Indication and description of the approach chosen regarding monitoring

A JI specific approach is chosen for monitoring plan setting in accordance with paragraph 9 (a) of Guidance on criteria for baseline setting and monitoring (Version 03). The approved CDM baseline and monitoring methodologies and each elements are not used for monitoring.

The chosen JI specific approach is based on paragraph 30 of Guidance on criteria for baseline setting and monitoring (Version 03). The approach chosen includes the following procedures:

- The collection and archiving of all relevant data necessary for estimating or measuring anthropogenic emissions by sources of GHGs occurring within the project boundary during the crediting period;
- The collection and archiving of all relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary during the crediting period;
- The identification of all potential sources of, and the collection and archiving of data on increased anthropogenic emissions by sources of GHGs outside the project boundary that are significant and reasonably attributable to the project during the crediting period;
- The collection and archiving of information on environmental impacts, in accordance with procedures as required by the host Party;
- Quality assurance and control procedures for the monitoring process;
- Procedures for the periodic calculation of the reductions of anthropogenic emissions by sources by the proposed JI project, and for leakage effects.

The application of the above described approach is provided below and in the section D.1 - D.4.

[24] In accordance with Guidelines for users of the joint implementation project design documentation form (Version 04).

Step 2. Application of the approach chosen

Monitoring of GHG emission reductions is based on the emissions monitoring by the following scenarios:

Project scenario. Reconstruction of the steelmaking plant at the Izhstal.

Project scenario is reconstruction of the steelmaking plant by introduction of new equipment for steel billets production in Electric arc furnace plant #23: EAF-40, LF-40, vacuum vessel, CCM. The production capacity of new manufacturing line is 400 thousand tons per year. The main volume of the continuous casted billets are supplied for rolling on the modernized mill #250 of rolling plant #30. The modernization of rolling plant #30 is implemented by construction of new heating furnace, replacement of rolling mill stands, introduction of the process control system and a set of other activities. GHG emissions occur in the project scenario as result of carbon oxidation of raw materials, graphite electrodes and natural gas in steel furnace, aggregates of secondary steel treatment and casting. GHG emissions from fuel combustion in rolling plants in the project scenario are not included in the calculation based on conservative assumption to GHG emission reductions calculation. The detailed characteristic of emission sources in the project scenario is provided in the section B.3. GHG emissions from lime production and electricity generation in the project scenario are considered as leakages.

Baseline scenario. The output of inefficient steelmaking furnaces at Izhstal. Production of rolled products at Izhstal by using the steel billets supplied from the outside.

Baseline scenario is production of rolled products at Izhstal in amount up to 400 thousand tons per year using the steel billets supplied from the outside.

In the absence of the project activity the following inefficient steelmaking furnaces would be taken from the operation: in steelmaking plant #21 (3 open hearth furnaces, 3 electric arc furnaces) and in steelmaking plant #23 (1 electric arc furnace). The steel and rolled metal production in the baseline scenario would be provided with in the steelmaking plant #23 (electric arc furnace #6) and in the rolling plant #20 (mill #850, mill #450, mill #400) and in the rolling plant #30 (mill #250).

GHG emissions in the baseline scenario occur by steel billets production outside the Izhstal boundaries as result of carbon raw materials oxidation and fuel combustion for steel and energy resources production. GHG emissions from fuel combustion in rolling plants in the baseline scenario are not included in the calculation based on conservative assumption to GHG emission reductions calculation. The detailed characteristic of emission sources in the baseline scenario is provided in the section B.3.

Approach for calculation of GHG emissions:

1. Calculation of CO_2 emissions in the project scenario from steelmaking plant #23 is provided based on calculation of carbon oxidation of raw materials and fuel determined as carbon balance between the material flows (scrap steel, pig iron, carbon raw materials, natural gas, electrodes) and product flows (steel). It is assumed that all carbon not fixed in the finished products is oxidized to CO_2. This approach is corresponding to the IPCC Guidelines.

2. Calculation of CO_2 emissions in the baseline scenario is provided based on data of steel billets production for rolled metal manufacture at Izhstal and emission factor of steel billets production outside the Izhstal boundaries.

3. Calculation of CO_2 leakages from lime and electricity production is provided based on consumption data in the project scenario and emission factors from their production outside the project boundaries. The approach for leakages estimation is corresponding to the IPCC Guidelines.

Parameters necessary for GHG calculation in accordance with the above approaches are as follows.

1. Parameters which are continuously monitored during the crediting period:

- scrap steel consumption in EAF-40;
- pig iron consumption in EAF-40;
- carbon raw materials consumption in EAF-40 and LF-40;
- electrodes consumption in EAF-40;
- electrodes consumption in LF-40;
- natural gas consumption in EAF-40 and LF-40;
- natural gas consumption in CCM;
- production of continuous casted billets in EAF-40;
- production of steel ingots in EAF-40;
- net calorific value of natural gas;
- lime consumption in EAF-40 and LF-40;
- electricity consumption in EAF-40;
- electricity consumption in LF-40;
- electricity consumption in CCM;
- oxygen consumption in EAF-40;
- oxygen consumption in CCM;
- electricity consumption for oxygen production;
- oxygen distribution .

These parameters including the information on their recording and archiving are given in tables D.1.1.1, D.1.1.3 and D.1.3.1.

2. Parameters which are determined once and are taken as constants for the whole monitoring period. They are available at the stage of determination:

- carbon content in steel scrap;
- carbon content in steel;
- carbon content in pig iron;
- carbon content in electrodes;
- carbon content in carbon raw materials;
- default carbon content in natural gas;
- conversion factor of calorie into joule;
- specific ingots consumption for billets production;
- CO_2 emission factor for steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario;
- CO_2 emission factor for lime production;
- CO_2 emission factor for electricity generation in the grid.

The above parameters detailed information is provided in the Annex 3 “Monitoring plan”.

3. Parameters which are determined once and are taken as constants during monitoring but are not available at the stage of determination:

Absent.

D.1.1. Option 1 – Monitoring of the emissions in the project scenario and the baseline scenario:

D.1.1.1. Data to be collected in order to monitor emissions from the project, and how these data will be archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
ID-1 $RMC_{scrap,EAF,y}$	scrap steel consumption in EAF-40 in the project scenario	Consolidated technical report of plant #23 in volume and value terms	t	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of planning and economic bureau of plant #23
ID-2 $RMC_{pigiron,EAF,y}$	pig iron consumption in EAF-40 in the project scenario	Consolidated technical report of plant #23 in volume and value terms	t	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of planning and economic bureau of plant #23
ID-3 $RMC_{CM,EAF/LF,y}$	carbon raw materials consumption in EAF-40 and LF-40 in the project scenario	Consolidated technical report of plant #23 in volume and value terms	t	m	Monthly	100%	Electronic and paper	Consumption of coke, high carbonized materials, Расход кокса, высокоуглеродистых материалов, wire with coke breeze. Responsible for recording – Head of planning and economic bureau of plant #23

ID-4 $RMC_{electrode,EAF,y}$	electrodes consumption in EAF-40 in the project scenario	Report of plant #23 operation	t	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of planning and economic bureau of plant #23
ID-5 $RMC_{electrode,LF,y}$	electrodes consumption in LF-40 in the project scenario	Consolidated technical report of plant #23 in volume and value terms	t	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of planning and economic bureau of plant #23
ID-6 $FC_{NG,EAF/LF,y}$	natural gas consumption in EAF-40 and LF-40 in the project scenario	Report of fuel and energy resources consumption by consumers at Izhstal	thousand m^3	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of fuel and energy resources bureau of plant #53
ID-7 $FC_{NG,CCM,y}$	natural gas consumption in CCM in the project scenario	Report of fuel and energy resources consumption by consumers at Izhstal	thousand m^3	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of fuel and energy resources bureau of plant #53
ID-8 $P_{billet,EAF,y}$	production of continuous casted billets in EAF-40	Report of electric arc furnaces operation at plant #23	t	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of planning and economic bureau of plant #23
ID-9 $P_{ingot,EAF,y}$	production of steel ingots in EAF-40	Report of electric arc furnaces operation at plant #23	t	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of planning and economic bureau of plant #23

ID-10 $NCV_{NG,y}$	net calorific value of natural gas	Certificate of natural gas quality	kcal / m^3	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of fuel and energy resources bureau of plant #53
$W_{C,RMi,y}$	carbon content in raw material i	Reference data	tC/t	e	Determined ex ante	100 %	Electronic	Carbon content in scrap steel, pig iron, carbon raw materials, electrodes. Detailed information is provided in the Annex 3.
$W_{C,steel,y}$	carbon content in steel	Reference data	tC/t	e	Determined ex ante	100 %	Electronic	Detailed information is provided in the Annex 3.
$W_{C,NG,default}$	default carbon content in natural gas	Reference data	tC / TJ	e	Determined ex ante	100 %	Electronic	Detailed information is provided in the Annex 3.
$k_{J/cal}$	conversion factor	Reference data	J / cal	e	Determined ex ante	100 %	Electronic	Detailed information is provided in the Annex 3.

D.1.1.2. Description of formulae used to estimate project emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

(1) $PE_y = [\Sigma(RMC_{i,j,y} * W_{C,RMi,y}) + FC_{NG,j,y} * W_{C,NG,y} – (P_{steel,PJ,y} * W_{C,steel,y})] * 44/12$

PE_y - project emissions, tCO_2

$RMC_{i,j,y}$ - raw material i consumption in the project scenario, t

$W_{C,RMi,y}$ - carbon content in raw material i, tC / t

$FC_{NG,PJ,y}$ - natural gas consumption in the project scenario, thousand m^3

$W_{C,NG,y}$ - carbon content in natural gas, tC / thousand m^3

$P_{steel,PJ,y}$ - steel production in the project scenario, t

$W_{C,steel,y}$ - carbon content in steel, tC / t

44/12 - ratio of CO_2 molecular weight to C molecular weight, tCO_2/tC

i - scrap steel, pig iron, carbon raw materials, electrodes

j - EAF-40, LF-40, CCM

y - year

(1.1) $P_{steel,PJ,y} = P_{billet,EAF,y} + P_{ingot,EAF,y}$

$P_{steel,PJ,y}$ - steel production in the project scenario, t

$P_{billet,EAF,y}$ - production of continuous casted billets in EAF-40, t

$P_{ingot,EAF,y}$ - production of steel ingots in EAF-40, t

y - year

(1.2) $W_{C,NG,y} = W_{C,NG,default} * k_{J/cal} * NCV_{NG,y} * 10^{-6}$

$W_{C,NG,y}$ - carbon content in natural gas, tC / thousand m^3

$W_{C,NG,default}$ - default carbon content in natural gas, tC / TJ

$k_{J/cal}$ - conversion factor, J / cal

$NCV_{NG,y}$ - net calorific value of natural gas, kcal / m^3

y - year

D.1.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions of greenhouse gases by sources within the project boundary, and how such data will be collected and archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
ID-8 $P_{billet,EAF,y}$	production of continuous casted billets in EAF-40	Report of electric arc furnaces operation at plant #23	t	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of planning and economic bureau of plant #23
ID-9 $P_{ingot,EAF,y}$	production of steel ingots in EAF-40	Report of electric arc furnaces operation at plant #23	t	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of planning and economic bureau of plant #23
$k_{ingot/billet}$	specific ingots consumption for billets production	Calculated	t / t	c	Determined ex ante	100 %	Electronic	Detailed information is provided in the Annex 3.

$EF_{CO2,SP,BL,y}$	CO_2 emission factor for steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario	Estimated	tCO_2 / t	e	Determined ex ante	100 %	Electronic	Detailed information is provided in the Annex 3.

D.1.1.4. Description of formulae used to estimate baseline emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

(2) $BE_y = P_{steel,BL,y} * EF_{CO2,SP,BL,y}$

BE_y - baseline emissions, tCO_2

$P_{steel,BL,y}$ - steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario, t

$EF_{CO2,SP,BL,y}$ - CO_2 emission factor for steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario, tCO_2/t

y - year

(2.1) $P_{steel,BL,y} = P_{billet,EAF,y} + (P_{ingot,EAF,y} / k_{ingot/billet})$

$P_{steel,BL,y}$ - steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario, t

$P_{billet,EAF,y}$ - production of continuous casted billets in EAF-40, t

$P_{ingot,EAF,y}$ - production of steel ingots in EAF-40, t

$k_{ingot/billet}$ - specific ingots consumption for billets production, t / t

y - year

D.1.2. Option 2 – Direct monitoring of emission reductions from the project (values should be consistent with those in section E.):

Not applicable

D.1.2.1. Data to be collected in order to monitor emission reductions from the project, and how these data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

Not applicable

D.1.2.2. Description of formulae used to calculate emission reductions from the project (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

Not applicable

D.1.3. Treatment of leakage in the monitoring plan:

D.1.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
ID-11 $RMC_{lime,EAF/LF,y}$	lime consumption in EAF-40 and LF-40 in the project scenario	Consolidated technical report of plant #23 in volume and value terms	t	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of planning and economic bureau of plant #23
ID-12 $EC_{EAF,y}$	electricity consumption in EAF-40 in the project scenario	Report of fuel and energy resources consumption by consumers at Izhstal	MWh	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of fuel and energy resources bureau of plant #53
ID-13 $EC_{LF,y}$	electricity consumption in LF-40 in the project scenario	Report of fuel and energy resources consumption by consumers at Izhstal	MWh	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of fuel and energy resources bureau of plant #53
ID-14 $EC_{CCM,y}$	electricity consumption in CCM in the project scenario	Report of fuel and energy resources consumption by consumers at Izhstal	MWh	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of fuel and energy resources bureau of plant #53

ID-15 $OC_{EAF,y}$	oxygen consumption in EAF-40 in the project scenario	Report of fuel and energy resources consumption by consumers at Izhstal	thousand m^3	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of fuel and energy resources bureau of plant #53
ID-16 $OC_{CCM,y}$	oxygen consumption in CCM in the project scenario	Report of fuel and energy resources consumption by consumers at Izhstal	thousand m^3	m	Monthly	100%	Electronic and paper	Responsible for recording – Head of fuel and energy resources bureau of plant #53
ID-17 $EC_{OP,y}$	electricity consumption for oxygen production	Report of fuel and energy resources consumption by consumers at Izhstal	MWh	m	Monthly	100%	Electronic and paper	Responsible for recording – Production and technical department of "Mechel Energo"
ID-18 OD_y	oxygen distribution	Report of fuel and energy resources consumption by consumers at Izhstal	thousand m^3	m	Monthly	100%	Electronic and paper	Responsible for recording – Production and technical department of "Mechel Energo"
$EF_{CO2,lime,y}$	CO_2 emission factor for lime production	Reference data	tCO_2 / t	e	Determined ex ante	100 %	Electronic	Detailed information is provided in the Annex 3.

$EF_{CO2,GRID,y}$	CO_2 emission factor for electricity generation in the grid	Reference data	tCO_2 / MWh	e	Determined ex ante	100 %	Electronic	CO_2 emission factor is determined for Demand-Side. Detailed information is provided in the Annex 3.

D.1.3.2. Description of formulae used to estimate leakage (for each gas, source etc.; emissions in units of CO_2 equivalent):

(3) $LE_y = LE_{lime,y} + LE_{elec,y}$

LE_y - leakages, tCO_2

$LE_{lime,y}$ - leakages from lime production, tCO_2

$LE_{elec,y}$ - leakages from electricity production, tCO_2

y - year

(3.1) $LE_{lime,y} = RMC_{lime,EAF/LF,y} * EF_{CO2,lime,y}$

$LE_{lime,y}$ - leakages from lime production, tCO_2

$RMC_{lime,EAF/LF,y}$ - lime consumption in EAF-40 and LF-40 in the project scenario, t

$EF_{CO2,lime,y}$ - CO_2 emission factor for lime production, tCO_2 / t

y - year

(3.2) $LE_{elec,y} = EC_{PJ,y} * EF_{CO2,GRID,y}$

$LE_{elec,y}$ - leakages from electricity production, tCO_2

$EC_{PJ,y}$ - electricity consumption in the project scenario, MWh

$EF_{CO2,GRID,y}$ - CO_2 emission factor for electricity generation in the grid, tCO_2 / MWh

y - year

(3.2.1) $EC_{PJ,y} = EC_{EAF,y} + EC_{LF,y} + EC_{CCM,y} + EC_{OP,PJ,y}$

$EC_{PJ,y}$ - electricity consumption in the project scenario, MWh

$EC_{EAF,y}$ - electricity consumption in EAF-40 in the project scenario, MWh

$EC_{LF,y}$ - electricity consumption in LF-40 in the project scenario, MWh

$EC_{CCM,y}$ - electricity consumption in CCM in the project scenario, MWh

$EC_{OP,PJ,y}$ - electricity consumption for oxygen production in the project scenario, MWh

y - year

(3.2.2) $EC_{OP,PJ,y} = (OC_{EAF,y} + OC_{CCM,y}) * (EC_{OP,y} / OD_y)$

$EC_{OP,PJ,y}$ - electricity consumption for oxygen production in the project scenario, MWh

$OC_{EAF,y}$ - oxygen consumption in EAF-40 in the project scenario, thousand m^3

$OC_{CCM,y}$ - oxygen consumption in CCM in the project scenario, thousand m^3

$EC_{OP,y}$ - electricity consumption for oxygen production, MWh

OD_y - oxygen distribution, thousand m^3

D.1.4. Description of formulae used to estimate emission reductions for the project (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

(4) $ER_y = BE_y – PE_y – LE_y$

ER_y - emission reductions, tCO_2

BE_y - baseline emissions, tCO_2

PE_y - project emissions, tCO_2

LE_y - leakages, tCO_2

y - year

D.1.5. Where applicable, in accordance with procedures as required by the host Party, information on the collection and archiving of information on the environmental impacts of the project:

The environmental impacts' monitoring includes the quantitative definition of the manufacturing activity impacts on the environment for the current period: pollutant emissions into the atmosphere, waste water release, production and allocation of the manufacturing wastes. The environmental impacts' monitoring of the project is determined by the following basic host party legislation:

- Federal law of the RF "On Protection of the Environment" as of 10.01.2002 No.7-FL;
- Federal law of the RF "On the Protection of Atmospheric Air" as of 04.05.1999 No.96-FL;
- Federal law of the RF "On Production and Consumption Wastes" as of 24.06.1998 No.89-FL.

Environmental monitoring at Izhstal is performed by the Environmental Protection and Water Disposal Department in accordance with the Regulation "On Environmental Protection and Water Disposal Department ". The information on the environmental impact of the project activities is to be stored at Izhstal and to be provided as statistical report forms to Federal Service for State Statistics and Federal Service for Ecological, Technical and Atomic Supervision.

D.2. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored:		
Data *(Indicate table and ID number)*	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
Table D.1.1.1 ID-1: $RMC_{scrap,EAF,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.1.1 ID-2: $RMC_{pigiron,EAF,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.1.1 ID-3: $RMC_{CM,EAF/LF,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.1.1 ID-4: $RMC_{electrode,EAF,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.1.1 ID-5: $RMC_{electrode,LF,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.1.1 ID-6: $FC_{NG,EAF/LF,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.1.1 ID-7: $FC_{NG,CCM,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.1.1, D.1.1.3 ID-8: $P_{billet,EAF,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.1.1, D.1.1.3 ID-9: $P_{ingot,EAF,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.1.1 ID-10: $NCV_{NG,y}$	low	Certificate of natural gas quality is provided by CJSC “Gazprom transgas Chaikovski”. Procedures of quality assurance and quality control of the measured parameter are included in the management system of fuel supplier. Additional procedures of quality assurance and quality control are not required.
Table D.1.3.1 ID-11: $RMC_{lime,EAF/LF,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.

Table D.1.3.1 ID-12: $EC_{EAF,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.3.1 ID-13: $EC_{LF,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.3.1 ID-14: $EC_{CCM,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.3.1 ID-15: $OC_{EAF,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.3.1 ID-16: $OC_{CCM,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in-plant standards and approved methodologies. Responsible department – Metrological department Izhstal.
Table D.1.3.1 ID-17: $EC_{OP,y}$	low	Report of fuel and energy resources consumption is provided by Production and technical department of "Mechel Energo". Procedures of quality assurance and quality control of the measured parameter are included in the management system of oxygen supplier. Additional procedures of quality assurance and quality control are not required.
Table D.1.3.1 ID-18: OD_y	low	Report of fuel and energy resources consumption is provided by Production and technical department of "Mechel Energo". Procedures of quality assurance and quality control of the measured parameter are included in the management system of oxygen supplier. Additional procedures of quality assurance and quality control are not required.

D.3. Please describe the operational and management structure that the project operator will apply in implementing the monitoring plan:

Initial data for GHG emissions monitoring according to the tables (D.1.1.1, D.1.1.3, D.1.3.1) are prepared annually by planning and economic bureau of plant #23 and Head of fuel and energy resources bureau of plant #53 and transferred to Izhstal Environmental Protection and Water Disposal Department.

If the primary sources of monitoring parameters' data (results of measurements and calculations) are not available during the current monitoring period, the monitoring parameters shall be registered according to the redundant measuring instruments installed inside or outside of the project framework (applicable for the parameters that are weighed) or shall be calculated according to the established procedure and approved methodologies for recording of energy resources consumption (Order #47 of Head power engineer of Izhstal about energy consumption recoding dated on 11.04.2012).

If the electronic data storage systems are not functioning during the monitoring period, the monitoring data for the previous and current periods shall be available in hard copy in the form of reports. Initial monitoring data shall be recorded and stored in the following documents:

- Consolidated technical report of plant #23 in volume and value terms;
- Report of electric arc furnaces operation at plant #23;
- Reports of fuel and energy resources consumption by consumers at Izhstal;
- Report of plant #23 operation;
- Certificates of natural gas quality.

These reports and certificates are prepared and archived in electronic and paper form which allows for access to the necessary data during the whole monitoring period.

Izhstal Environmental Protection and Water Disposal Department submits annually initial monitoring data to CJSC «National Carbon Sequestration Foundation» in order to calculate GHG emission reductions, as well as stores the monitoring data in electronic and paper form. Calculation of actual GHG emission reductions is performed annually by CJSC «National Carbon Sequestration Foundation» in accordance with the formulas given in Sections D.1.1.2, D.1.1.4, D.1.3.2. Calculation model in the MS Excel format is used to monitoring. Monitoring report is compiled by CJSC «National Carbon Sequestration Foundation» and approved by Izhstal.

Procedures for collecting, processing, transfer and storage of the initial monitoring data, as well as procedures for quality assurance and quality control will be incorporated into the existing management system of Izhstal. Initial monitoring data and the monitoring results will be archived in electronic and paper form by Izhstal Environmental Protection and Water Disposal Department during the crediting period and two years after the last transaction within ERUs.

D.4. Name of person(s)/entity(ies) establishing the monitoring plan:

The monitoring plan has been developed by:

CJSC "National Carbon Sequestration Foundation"

Contact person: Mr. Roman Kazakov, principal specialist

Tel.: +7 499 788 78 35 ext. 113

Fax: +7 499 788 78 35 ext. 107

E-mail: kazakovra@ncsf.ru

CJSC "National Carbon Sequestration Foundation" is not a project participant.

SECTION E. Estimation of greenhouse gas emission reductions

Estimation of GHG emissions in the project and baseline scenario and GHG emission reductions is made based on actual data for 2010-2011 and forecasted data for 2012-2020 using the formulae given in the section D.[25]

E.1. Estimated project emissions:

Table E.1-1. Estimated project emissions during the first commitment period

#	Emission source	Unit	Year		
			2010	2011	2012
1.	Steelmaking plant #23	tCO_2 equivalent	1 746	24 360	36 700
2.	Total	tCO_2 equivalent	1 746	24 360	36 700

Table E.1-2. Estimated project emissions after the first commitment period in 2013-2016

#	Emission source	Unit	Year			
			2013	2014	2015	2016
1.	Steelmaking plant #23	tCO_2 equivalent	36 700	36 700	36 700	36 700
2.	Total	tCO_2 equivalent	36 700	36 700	36 700	36 700

Table E.1-3. Estimated project emissions after the first commitment period in 2017-2020

#	Emission source	Unit	Year			
			2017	2018	2019	2020
1.	Steelmaking plant #23	tCO_2 equivalent	36 700	36 700	36 700	36 700
2.	Total	tCO_2 equivalent	36 700	36 700	36 700	36 700

[25] Calculation of GHG emission reductions including initial data is attached in Excel file: 2012-04-23_GHG Estimation_Izhstal_ver.02.xlsx

E.2. Estimated leakage:

Table E.2-1. Estimated leakages during the first commitment period

#	Emission source	Unit	Year		
			2010	2011	2012
1.	Lime production	tCO_2 equivalent	1 211	18 383	24 532
2.	Electricity production	tCO_2 equivalent	5 738	75 075	108 534
3.	Total	tCO_2 equivalent	6 949	93 458	133 066

Table E.2-2. Estimated leakages after the first commitment period in 2013-2016

#	Emission source	Unit	Year			
			2013	2014	2015	2016
1.	Lime production	tCO_2 equivalent	24 532	24 532	24 532	24 532
2.	Electricity production	tCO_2 equivalent	108 534	108 534	108 534	108 534
3.	Total	tCO_2 equivalent	133 066	133 066	133 066	133 066

Table E.2-3. Estimated leakages after the first commitment period in 2017-2020

#	Emission source	Unit	Year			
			2017	2018	2019	2020
1.	Lime production	tCO_2 equivalent	24 532	24 532	24 532	24 532
2.	Electricity production	tCO_2 equivalent	108 534	108 534	108 534	108 534
3.	Total	tCO_2 equivalent	133 066	133 066	133 066	133 066

E.3. The sum of E.1. and E.2.:

Table E.3-1. Estimated project emissions and leakages during the first commitment period

#	Parameter	Unit	Year		
			2010	2011	2012
1.	Project emissions	tCO_2 equivalent	1 746	24 360	36 700
2.	Leakages	tCO_2 equivalent	6 949	93 458	133 066
3.	Total	tCO_2 equivalent	8 695	117 818	169 766

Table E.3-2. Estimated project emissions and leakages after the first commitment period 2013-2016

#	Parameter	Unit	Year			
			2013	2014	2015	2016
1.	Project emissions	tCO_2 equivalent	36 700	36 700	36 700	36 700
2.	Leakages	tCO_2 equivalent	133 066	133 066	133 066	133 066
3.	Total	tCO_2 equivalent	169 766	169 766	169 766	169 766

Table E.3-3. Estimated project emissions and leakages after the first commitment period 2017-2020

#	Parameter	Unit	Year			
			2017	2018	2019	2020
1.	Project emissions	tCO_2 equivalent	36 700	36 700	36 700	36 700
2.	Leakages	tCO_2 equivalent	133 066	133 066	133 066	133 066
3.	Total	tCO_2 equivalent	169 766	169 766	169 766	169 766

E.4. Estimated baseline emissions:

Table E.4-1. Estimated baseline emissions during the first commitment period

#	Parameter	Unit	Year		
			2010	2011	2012
1.	Steel billets production used by rolled metal manufacture in Izhstal	tCO_2 equivalent	20 731	333 804	460 995
2.	Total	tCO_2 equivalent	20 731	333 804	460 995

Table E.4-2. Estimated baseline emissions after the first commitment period in 2013-2016

#	Parameter	Unit	Year			
			2013	2014	2015	2016
1.	Steel billets production used by rolled metal manufacture in Izhstal	tCO_2 equivalent	460 995	460 995	460 995	460 995
2.	Total	tCO_2 equivalent	460 995	460 995	460 995	460 995

Table E.4-3. Estimated baseline emissions after the first commitment period in 2017-2020

#	Parameter	Unit	Year			
			2017	2018	2019	2020
1.	Steel billets production used by rolled metal manufacture in Izhstal	tCO_2 equivalent	460 995	460 995	460 995	460 995
2.	Total	tCO_2 equivalent	460 995	460 995	460 995	460 995

E.5. Difference between E.4. and E.3. representing the emission reductions of the project:

Table E.5-1. Estimated emission reductions during the first commitment period

#	Parameter	Unit	Year		
			2010	2011	2012
1.	Difference between E.4. and E.3. representing the emission reductions of the project	tCO_2 equivalent	12 036	215 986	291 229

Table E.5-2. Estimated emission reductions after the first commitment period in 2013-2016

#	Parameter	Unit	Year			
			2013	2014	2015	2016
1.	Difference between E.4. and E.3. representing the emission reductions of the project	tCO_2 equivalent	291 229	291 229	291 229	291 229

Table E.5-3. Estimated emission reductions after the first commitment period in 2017-2020

#	Parameter	Unit	Year			
			2017	2018	2019	2020
1.	Difference between E.4. and E.3. representing the emission reductions of the project	tCO_2 equivalent	291 229	291 229	291 229	291 229

E.6. Table providing values obtained when applying formulae above:

Table E.6-1. Table containing results of emission reductions estimation during the first commitment period

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO_2 equivalent)
2010	1 746	6 949	20 731	12 036
2011	24 360	93 458	333 804	215 986
2012	36 700	133 066	460 995	291 229
Total (tonnes of CO_2 equivalent)	62 806	233 473	815 530	519 251

Table E.6-2. Table containing results of emission reductions estimation after the first commitment period

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO_2 equivalent)
2013	36 700	133 066	460 995	291 229
2014	36 700	133 066	460 995	291 229
2015	36 700	133 066	460 995	291 229
2016	36 700	133 066	460 995	291 229
2017	36 700	133 066	460 995	291 229
2018	36 700	133 066	460 995	291 229
2019	36 700	133 066	460 995	291 229
2020	36 700	133 066	460 995	291 229
Total (tonnes of CO_2 equivalent)	293 600	1 064 528	3 687 960	2 329 832

SECTION F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts of the project, including transboundary impacts, in accordance with procedures as determined by the host Party:

An environment impact assessment is an integral and indispensable part of the project documentation for the construction, expansion, reconstruction, etc. of commercial or industrial facilities.

The environment impact assessment of Izhstal projects is made in accordance with the applicable legislation of the Russian Federation (RF) related to the planned commercial (and other) activities:

- Federal law of the RF “On Protection of the Environment” as of 10.01.2002 #7-FL;
- Federal law of the RF “On Ecological Examinations” as of 25.11.1995 #174-FL;
- Federal law of the RF “On the Sanitary and Epidemiological Safety of the Population” as of 30.03.1999 #52-FL;
- Federal law of the RF “On the Protection of Atmospheric Air” as of 04.05.1999 #96-FL;
- Federal law of the RF “On Production and Consumption Wastes” as of 24.06.1998 #89-FL;
- Sanitary Regulations and Standards 2.2.1/2/1/1200-03 “Sanitary Protection Zones and Sanitary Classification of Companies, Buildings and other Facilities”;
- Sanitary Regulations and Standards “Instructions on the development, coordination, approval and composition of design estimate documentation”;
- Regulation on the evaluation of planned commercial and other activities on the environment in the Russian Federation approved by the order of the State Committee for Environmental Protection #372 as of 16.05.2000.

Materials on the environmental impact assessment of the project are presented in the project documentation:

- Reconstruction of steelmaking plant #23 Izhstal. Volume 18.1. Environmental protection. // CJSC “Kazan Giproniiaviaprom”, 2008;
- Modernization (technical re-equipment) of rolling mill #250 Izhstal. Volume 18. Environmental protection measures. // CJSC “Kazan Giproniiaviaprom”, 2010.

On the whole, assessment of results with regard to the project's impact on the environment shows that the project implementation will not result in a significant impact on the environment and trans-boundary effects.[26]

Izhstal has the necessary permissions with regard to the project's impact on the environment for the duration of the crediting period.

Permissions for air pollutant emissions:

- Permission for air pollutant emissions #141 dated on 19.12.2007 issued by the Directorate for Technological and Ecological Supervision of the Rostekhnadzor for Udmurt Republic for the period from 01.12.2007 to 19.12.2011;
- Permission for air pollutant emissions #141 dated on 17.11.2011 issued by the Directorate of Federal Service for Supervision of Natural Resources (Rosprirodnadzor) in Udmurt Republic for the period from 17.11.2011 to 20.10.2016.

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[26] Pollutant emissions calculations are provided as a part of the detailed design documentation.

Permissions for discharge of pollutants into bodies of water:

- Permission #210/1 for discharge of pollutants into the environment dated on 01.11.2006 issued by the Directorate for Technological and Ecological Supervision of the Rostekhnadzor for Udmurt Republic for the period from 01.11.2006 to 01.12.2009;
- Permission #9 for discharge of pollutants into the environment dated on 01.12.2009 issued by the West-Ural Directorate for Technological, Ecological and Nuclear Supervision for the period from 01.12.2009 to 01.12.2010;
- Permission #3 for discharge of pollutants into the environment dated on 13.11.2010 issued by the Directorate of Federal Service for Supervision of Natural Resources (Rosprirodnadzor) in Udmurt Republic for the period from 13.11.2010 to 13.11.2011;
- Permission #9 for discharge of pollutants into the environment dated on 23.12.2010 issued by the Directorate of Federal Service for Supervision of Natural Resources (Rosprirodnadzor) in Udmurt Republic for the period from 23.12.2010 to 23.12.2011;
- Permission #6 for discharge of pollutants into the environment dated on 09.12.2011 issued by the Directorate of Federal Service for Supervision of Natural Resources (Rosprirodnadzor) in Udmurt Republic for the period from 09.12.2011 to 09.12.2012.

Permissions for disposal and recovery of waste materials:

- License to carry out activities of hazardous waste collection, use, deactivation, transportation and disposal #OT-46-000828(18) dated on 03.03.2009 issued by the Directorate for Technological and Ecological Supervision of the Rostekhnadzor for Udmurt Republic for the period from 03.03.2009 to 03.03.2014;
- Limits for waste disposal #100-1 dated on 01.07.2007 issued by the Directorate for Technological and Ecological Supervision of the Rostekhnadzor for Udmurt Republic for the period from 01.07.2007 to 01.04.2011;
- Limits for waste disposal dated on 01.04.2011 issued by the Directorate of Federal Service for Supervision of Natural Resources (Rosprirodnadzor) in Udmurt Republic for the period from 01.04.2011 to 01.07.2012.

F.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to supporting documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

Project documentation for reconstruction of steelmaking plant and modernization of rolling plant at Izhstal has passed the necessary expert review:

- Positive conclusion of the State Expert Review #0291-09/KGE-0535/04 for project “Izhstal. Reconstruction of rolling plant #23” issued by FSI GLAVGOSEXPERTIZA OF RUSSIA dated on 14.08.2009;
- Conclusion of industrial safety expertise #46 PD-04259 for project documentation of technical re-equipment of dangerous facility of metallurgical plant: Work design documentation “Modernization (technical re-equipment) of rolling mill #250 Izhstal” issued by CJSC “Engineering and Consulting Centre for the operation and safety of technical facilities “Alton” dated on 29.08.2011.

Positive conclusions of the expert review confirm compliance of the Izhstal project activities with the current Russian legislation in the field of environmental protection and technical regulations.

SECTION G. Stakeholders' comments

G.1. Information on stakeholders' comments on the project, as appropriate:

Information of Izhstal steelmaking plant #23 reconstruction and rolling plant #30 modernization was published for obtain the stakeholders' comments.[27]

Comments and proposal on the implementation of the Izhstal projects from the stakeholders was not obtained.[28]

[27] Newspaper «Udmurtskaya pravda» dated on 10.10.2007 #117 (24204).

[28] Letter of Administration of Leninski district of Izhevsk #01-15-1237 dated on 24.10.2007.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

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Represented by:	Pleshakov Sergey
Title:	Head of Environmental Protection and Water Disposal Department
Salutation:	Mr.
Last name:	Pleshakov
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CJSC “National Carbon Sequestration Foundation” is not a project participant.

Annex 2

BASELINE INFORMATION

Table containing the key elements of the baseline[29]

<table>
<tr><th>#</th><th>Parameter</th><th>Description</th><th>Source</th><th>Comment</th></tr>
<tr><td>1.</td><td>$P_{billet,EAF,y}$</td><td>production of continuous casted billets in EAF-40</td><td><table><tr><td>Year</td><td>t</td></tr><tr><td>2010</td><td>4 890</td></tr><tr><td>2011</td><td>189 184</td></tr><tr><td>2012</td><td>300 000</td></tr></table></td><td>Technical reports of plant #23 and forecasted data provided by Izhstal</td></tr>
<tr><td>2.</td><td>$P_{ingot,EAF,y}$</td><td>production of steel ingots in EAF-40</td><td><table><tr><td>Year</td><td>t</td></tr><tr><td>2010</td><td>10 097</td></tr><tr><td>2011</td><td>32 924</td></tr><tr><td>2012</td><td>0</td></tr></table></td><td>Technical reports of plant #23 and forecasted data provided by Izhstal</td></tr>
<tr><td>3.</td><td>$k_{ingot/billet}$</td><td>specific ingots consumption for billets production</td><td>1,174 t / t</td><td>Calculated.</td></tr>
<tr><td>4.</td><td>$EF_{CO2,SP,BL,y}$</td><td>CO_2 emission factor for steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario</td><td>1,537 tCO_2 / t</td><td>Calculated.</td></tr>
</table>

[29] Detailed information about choice and justification of key elements is provided in the section B.1 of the PDD.

Annex 3

MONITORING PLAN

Parameters which are determined once and are taken as constants for the whole monitoring period and are available at the stage of determination.

Data / parameter	$W_{C,steel\ scrap,y}$
Data unit	tC/t
Description	carbon content in scrap steel
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 3. Industrial Processes and Product Use, Chapter 4. Metal Industry Emissions, Table. 4.3, p. 4.27
Value of data (for ex ante calculations/determinations)	0,01
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The carbon content in scrap steel cannot be measured at Izhstal. Therefore the default value is used.
QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	$W_{C,steel,y}$
Data unit	tC/t
Description	carbon content in steel
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 3. Industrial Processes and Product Use, Chapter 4. Metal Industry Emissions, Table. 4.3, p. 4.27

Value of data (for ex ante calculations/determinations)	0,01
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The average value of carbon content in steel produced at Izhstal is less than default value. Therefore the use of default value (0,01 tC/t) provides to the conservative assumption of GHG emissions reductions.
QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	$W_{C,pig\ iron,y}$
Data unit	tC/t
Description	carbon content in pig iron
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 3. Industrial Processes and Product Use, Chapter 4. Metal Industry Emissions, Table. 4.3, p. 4.27
Value of data (for ex ante calculations/determinations)	0,04
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The carbon content in pig iron cannot be measured at Izhstal. Therefore the default value is used.
QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	$W_{C,electrodes,y}$
Data unit	tC/t
Description	carbon content in electrodes
Time of determination/monitoring	Determined ex ante

Source of data (to be) used	2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 3. Industrial Processes and Product Use, Chapter 4. Metal Industry Emissions, Table. 4.3, p. 4.27
Value of data (for ex ante calculations/determinations)	0,82
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The carbon content in electrodes cannot be measured at Izhstal. Therefore the default value is used.
QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	$\mathbf{W_{C,carb.mat.,y}}$
Data unit	tC/t
Description	carbon content in carbon raw materials
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 3. Industrial Processes and Product Use, Chapter 4. Metal Industry Emissions, Table. 4.3, p. 4.27
Value of data (for ex ante calculations/determinations)	0,83
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The carbon content in carbon raw materials cannot be measured at Izhstal. Therefore the default value is used.
QA/QC procedures (to be) applied	-
Any comment	The value for carbon content in coke is chosen.

Data / parameter	$\mathbf{W_{C,NG,default}}$
Data unit	tC/TJ

Description	Default carbon content in natural gas
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 2. Energy, Chapter 1. Introduction, Table. 1.4, p. 1.23-1.24
Value of data (for ex ante calculations/determinations)	15,30
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The certificates of natural gas provided from gas supplier have not information about chemical composition of fuel. Therefore the default value is used.
QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	**$k_{J/cal}$**
Data unit	J/cal
Description	Conversion factor
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Foundations of Modern Power Industry: A course of lectures for managers of energy companies. In two parts / Under the general supervision of Corr. RAS E.V. Ametistov. – Part 1. Truchnij A.D., Makarov A.A., Klimenko V.V. – Moscow: Publishing House of MEI, 2002. - 368 p.
Value of data (for ex ante calculations/determinations)	4,1862
Justification of the choice of data or description of measurement methods and procedures (to be) applied	-
QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	$\mathbf{k_{ingot/billet}}$
Data unit	t / t
Description	Specific ingots consumption for billets production
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Calculated
Value of data (for ex ante calculations/determinations)	1,174
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Calculated by formula: $k_{ingot/billet} = C_{ingot,y} / P_{billet,y}$ $k_{ingot/billet}$ - specific ingots consumption for billets production, t / t $C_{ingot,y}$ - ingots consumption on mill #850, t $P_{billet,y}$ - billets production on mill #850, t y - year Initial data for calculation are taken from technical reports Izhstal for 2006-2008.
QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	$\mathbf{EF_{CO2,SP,BL,y}}$
Data unit	tCO_2 / t
Description	CO_2 emission factor for steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Estimated
Value of data (for ex ante calculations/determinations)	1,537

Justification of the choice of data or description of measurement methods and procedures (to be) applied	Estimated based on transparent data of Chermetinformacia about raw materials, fuel and energy resources consumption for steel production at ChMK for 2010 taken into account conservative assumptions: !Baseline emission factor Izhstal_calculation.xlsx, !Baseline emission factor Izhstal_methodology.docx. The similar approach is used for determination of CO_2 emission factor in the baseline scenario in the approved JI project “Construction and implementation of the Casting and Rolling Complex for the production of hot rolled flat products in the Vyksa District, the Nizhny Novgorod Region, the Russian Federation”.
QA/QC procedures (to be) applied	-
Any comment	Value of CO_2 emission factor for steel billets production used by rolled metal manufacture in Izhstal in the baseline scenario is to revised during the monitoring period if the estimated value will be not conservative.

Data / parameter	**$EF_{CO2,lime,y}$**
Data unit	tCO_2/t
Description	CO_2 emission factor for lime production
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Reference Document on Best Available Techniques in the Cement, Lime and Magnesium Oxide Manufacturing Industries, European Commission, May 2010. – Table 2.24, p. 246.
Value of data (for ex ante calculations/determinations)	1,481
Justification of the choice of data or description of measurement methods and procedures (to be) applied	CO_2 emission factor cannot be directly monitored as the lime production is not under the control of project participants. The value of emission factor is determined for the European enterprises that are mainly more efficiency than the Russian. Therefore the value chosen provides to the conservative assumption of GHG emission reductions.

QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	**$EF_{CO2,GRID,y}$**
Data unit	tCO_2/MWh
Description	CO_2 emission factor for electricity generation in the grid
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Operational Guidelines for Project Design Documents of Joint Implementation Projects. Volume 1: General guidelines. Version 2.3. - Ministry of Economic Affairs of the Netherlands, 2004, p.43
Value of data (for ex ante calculations/determinations)	2010: 0,550 2011: 0,542 2012: 0,534
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The provided values of CO_2 emission factor for electricity generation in the grid is used in the JI projects determined by the accredited independent entity (AIE) and approved by Russian Federation. E.g., Reconstruction of the steelmaking at JSC "Ashinskiy Metallurgical Works", Asha, Russian Federation.
QA/QC procedures (to be) applied	-
Any comment	-