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

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Annexes

SECTION A. General description of the project

A.1. Title of the 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

Sectoral scope: (9) Metal production

Version: 04.1

Date: 23/08/2011

A.2. Description of the project:

The project to construct and implement the Casting and Rolling Complex in the Vyksa District, the Nizhny Novgorod Region, the Russian Federation, is being carried out by the OJSC OMK-Steel.[1] The project is aimed at establishing a modern metallurgical works which produces high-quality hot rolled flat products using state-of-the art technologies to ensure high energy production efficiency and low emissions of pollutants.

The OJSC OMK-Steel is a part of United Metallurgical Company (OMK) that is one of Russia's largest producers of pipes, railroad wheels, and other metal products for energy, transport, and industrial companies. The OMK Pipe-Rolling Division includes Vyksa Steel Works (Nizhny Novgorod region), the Almetyevsk Pipe Plant (Republic of Tatarstan) and the Trubodetal plant (Chelyabinsk region), and the OMK Metallurgical Division includes the Casting and Rolling complex (Nizhny Novgorod region). In 2010 OMK accounted for 24% of the production of pipes by Russian companies, including 42% of large-diameter pipes and 64% of railroad wheels. Among the main consumers of OMK products are leading Russian and foreign companies. OMK’s products are exported to 20 countries. OMK’s companies have more than 25,000 employees.

Project scenario

The project scenario is the construction of a Casting and Rolling Complex for the production of hot rolled flat products with a capacity up to 1.2 million tonnes per year with the possibility for expansion up to 3 million tonnes per year. The Casting and Rolling Complex includes a Meltshop (Electric Arc Furnace, Ladle-Furnace, Vacuum Degasser and Slab caster) as well as a Hot Strip Mill and Complex of auxiliary and energy facilities. The implementation of the Casting and Rolling Complex enabled OMK to produce small- and medium-diameter pipes at Vyksa Steel Works and the Almetyevsk Pipe Plant with its own pipe stock.

History of the project

OMK decided to construct the Casting and Rolling Complex in 2003.[2] The technical project documentation for the construction of the Casting and Rolling Complex was prepared by the state company Ukrgipromez (Ukranian State Institute for Designing Metallurgical Works) in 2004-2008. Construction work was performed by GAMA (Turkey) in 2005-2009. Pre-commissioning of the primary equipment supplied by DANIELI (Italia) was carried out in 2008. The Casting and Rolling Complex was put into operation in September, 2008.

[1] Casting and Rolling Complex is a subsidiary of the OJSC OMK-Steel.

[2] Declaration OMK dated on 24/12/2003 about construction of industrial works.

Decisions on the implementation and financing of the project to construct the Casting and Rolling Complex were taken with regards to the development of the project within the joint implementation of the Kyoto protocol in order to attract additional investment.[3]

Situation existing prior to the starting date of the project

Before the project implementation the production of small- and medium-diameter pipes in OMK was carried out at Vyksa Steel Works and Almetyevsk Pipe Plant using the pipe stock supplied by Russian metallurgical works not incorporated into OMK (e.g. Marnitogorsk Metallurgical Works and Cherepovets Metallurgical Works).

The main indicators of Vyksa Steel Works and Almetyevsk Pipe Plant before project implementation are presented in the table A.2-1.

Table A.2-1. Pipe production in OMK in 2005-2008[4], tonnes

#	Parameter	2005	2006	2007	2008
1.	Vyksa Steel Works	1,000,772	1,536,193	1,708,475	1,395,183
2.	Almetyevsk Pipe Plant	97,343	124,930	140,069	139,313

Baseline scenario

The baseline scenario is the continuation of the situation existing before the project implementation: the production of hot rolled flat products at metallurgical works not incorporated into OMK. The production of hot rolled flat products at the required quantity and quality is carried out at Russian integrated metallurgical works (e.g. Marnitogorsk Metallurgical Works, Severstal). This can be seen from the extensive experience that Vyksa Steel Works and the Almetyevsk Pipe Plant has gained in producing small- and medium-diameter pipes using pipe stock supplied by the integrated metallurgical works.

Reduction of greenhouse gases emissions

The reduction of greenhouse gases emissions as a result of the project is achieved through the application of modern and more efficient technologies and equipment for the production of steel and hot rolled flat products in the Casting and Rolling complex compared to other metallurgical works producing similar products. The main characteristics of Casting and Rolling Complex that provide to high energy efficiency by hot rolled metal production are:

- Exception of metallurgical stages as iron ore agglomeration, coke and pig iron production mainly by using of scrap metal for steel melting;
- Application of modern equipment in Meltshop and Hot Strip Mill as high-power electric arc furnace, out of furnace processing equipment, casting and rolling equipment ensures the operation parameters corresponding to the advanced world experience;
- Combination of continuous casting of steel into thin slabs and rolling slabs minimizes technological steps and eliminates the reheating of slabs for rolling;
- Full automation of the production process optimizes consumption of energy resources and ensures the increase of finished products.

[3] Protocol of OMK meeting dated on 02/09/2004.

[4] Source: OMK website – http://www.omk.ru/

Total energy consumption for rolled metal production in Casting and Rolling Complex is about 10 GJ/t[5] while the industry average power consumption of rolled steel is about 22 GJ/t.[6]

The estimated GHG emission reductions over the crediting period (2009-2012) are about 4,347 th. tCO_2 equivalent or in average 1,086.7 th. tCO_2 equivalent per year.

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)	• OMK-Steel Open Joint-Stock Company	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 the Vyksa District, the Nizhny Novgorod Region, the Russian Federation.

A.4.1.1. Host Party(ies):

Russian Federation

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

Nizhny Novgorod Region

Location of Nizhny Novgorod Region on the map of Russian Federation is shown on the fig. A.4-1.

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[5] Calculation of energy consumption for rolled metal production includes the energy consumption for resources production supplied to the Casting and Rolling Complex (pig iron, hot briquetted iron, electricity). The calculation is provided in the Excel file: 2011-08-18_OMK_Estimation of energy consumption for flat products_ver.01.2.xls

[6] Source: Jusfin J.S., Leontiev L.I., Chernousov P.I. Industry and Environment. - Moscow.: IKC «Akademkniga», 2002. – p. 380.

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

Fig. A.4-1. Russian Federation, Nizhny Novgorod Region

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

Vyksa District

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

Fig. A.4-2 shows the location of the project on a map of the Nizhny Novgorod Region. The geographical coordinates of the project are as follows: 55°23' northern latitude, 42°10' east longitude.[8]

The Vyksa District, where the Casting and Rolling Complex is located, lies in the south-west of the Nizhny Novgorod Region in the basin of the Oka and borders the Ryazan Region to the south and the Vladimir Region to the west. To the north and north-east the district borders the Navashino and Kulebaki regions, and to the east and south-east it borders the Ardatov and Voznesensk regions. The distance from Vyksa to the regional center Nizhny Novgorod is approximately 186 km.

[8] Source: Google Earth 6.0.2

Fig. A.4-2. Nizhny Novgorod Region, Casting and Rolling Complex

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

Casting and Rolling Complex includes:

1. Meltshop;
2. Hot Strip Mill;
3. Complex of auxiliary and energy facilities.

Meltshop comprises two departments: the arc-furnace melting department (AFMD) and the continuous-casting department (CCD). The Meltshop has the following major technological equipment:

- Electric Arc Furnace EAF-160/190 with tapping weight of 160 tonnes and a 140+10 % MVA transformer, operating under liquid start (10-15% of the metal and tap slag of the previous melting is left in the furnace) and with the application of melting intensification (the “DANARC” system);
- Two-position Ladle-Furnace with a 25+20% MVA transformer – for the complex chemical and thermal finishing of steel in a ladle before casting, as well as for the desulfurization of important steel grades before evacuation by moving the refinery slag;

- Twin-tank Vacuum Degasser for refining steel with increased purity demands in a ladle in a deep vacuum to improve its micro- and macrostructure;
- Single strand thin slab caster to obtain slabs with the following parameters: 800÷1800 mm wide, 110(90) mm thick after molding, 90(70) mm thick after soft reduction, with a maximum length of 37.5 meters.

Hot Strip Mill includes:

- Slab warming area comprising a roller tunnel furnace with a length of 200 meters. The tunnel furnace accommodates up to 5 slabs with a maximum length of 37.5 meters, creating, if necessary, a buffer tank, enabling continuous steel casting in the event of a work roll changer stoppage;
- Continuous roughing train area consisting of a water descaler providing water pressure up to 220 bar, a vertical mill stand with rolls 900÷1020 mm in diameter driven by two 250 kW motors, two four-high mill stands with work rolls 1100÷1220 mm in diameter and backup rolls 1350÷1450 mm in diameter with 9000 kW of power for each stand, and an intermediate cooling system with 8 collectors;
- Finishing train area, consisting of a heated transfer table, a start-stop drum cutter, a water descaler providing water pressure up to 220 bar, a vertical mill stand with rolls 760÷860 mm in diameter each driven by a 150 kW electromotor, four four-high mill stands with work rolls 810÷730 mm in diameter and backup rolls 1320÷1470 mm in diameter with 9000 kW of power for each stand, one four-high mill stand with work rolls 630÷700 mm in diameter and backup rolls 1320÷1450 mm in diameter powered by a 7000 kW electromotor, and a strip laminar cooling system with 23 tidal wave collectors;
- Area for reeling, inspecting, weighting, marking and banding of coils consisting of a downcoiler enabling the reeling of coils with a maximum full diameter of 2300 mm and a maximum reeling speed of 16.5 m/s, walking beam conveyers, coil banding machines, a coil weighting station, coil marking machines, coil inspecting and sampling lines as well as a chain conveyer;
- Finished-products storage area serviced by traveling cranes with a weight-carrying power of 50/12.5 tonnes equipped with mechanical crossheads to transport coils.

Complex of auxiliary and energy facilities includes:

- Scrap-processing shop to receive and store scrap steel and pig iron, to screen and process off-size scrap, to load scrap and cast iron into the charging bay of the open-hearth furnace. The shop consists of a crushing house and a house for scrap conditioning and metal stock loading (scrap and cast iron);
- Limekiln shop to provide the steel industry with freshly burned lime. There are two double-stack down- and upflow regenerative MAERZ limekilns each having a daily capacity of 160 tonnes to ensure the production of lime. The shop includes production lines and facilities: a limestone storehouse with a cut line and limestone delivery to the storehouse; a line to prepare limestone for calcining; a unit integrating two PPR-160 furnaces; a lime processing line;
- Slag house for slag processing. It consists of a slag yard for the primary processing of slag with crane trestle equipped with a magnetic grabbing crane, a crushing and screening plant. The house produces fractional slag crush stone. Slag is delivered to the slag yard by slag cars. 5-20 and 20-40 mm slag crush stone is used in road building. 0-5 mm slag crush stone can be used for the production of cement, cementing materials, asphaltic concrete and lime bricks. Recovered scrap material is returned to the scrap-processing shop;
- Heat and power facility to produce heat and steam there will be a steam and water boiler plant consisting of one steam boiler with a capacity of 22 tonnes of steam per hour and two water-

healing boilers (both functional) with a heating capacity of 10 Gkal/h. The boilers are supposed to be natural gas fired. To provide Casting and Rolling Complex with compressed air it is planned to construct a compressor station (three compressors with capacity of 225 m³/min) equipped with an air drier. The facilities of the Casting and Rolling Complex are to be powered by the existing 500/110/10 kV substation of the electric power system “Радуга” (SS “Радуга”) through the main 110/35-10 kV substation, which is planned to be integrated into the Complex;

– Gas facility to supply the Complex with natural gas, oxygen, argon and nitrogen. The Casting and Rolling Complex demand for air separation products is met by an integrated oxygen plant comprising an air separation house, receivers (accumulators) for light-end air separation products, an oxygen regulating station, a system of storage and gasification of liquid air separation products.

The provision of Casting and Rolling Complex with main energy resources (electricity, natural gas) is provided from the current infrastructure (transmission facilities, gas pipeline)[9], scrap steel – the main part of metal charge is supplied by new founded company CJSC “Metallolomnaya Company OMK-EcoMetal”, other types of raw materials as pig iron, hot briquetted iron, ferroalloys, etc. are supplied from the other metallurgical works.

The supplier of the main equipment (Electric Arc Furnace, Two-position Ladle-Furnace, Twin-tank Vacuum Degasser, Single strand thin slab caster, Hot strip mill) is the company DANIELI (Italy).

The Casting and Rolling Complex technological equipment **conforms to the modern standards** of the steel and rolling industry and ensures the production of high-quality finished products with the required properties. The installed equipment is integrated into a single production line with the sequential arrangement of equipment, and this is the optimal solution which corresponds to international practice. The main successive production stages are metal stock preparation and loading into the EAF, semi-finished product smelting in the EAF, secondary refining, continuous steel casting and slabs rolling to a coil.

Production control and equipment maintenance is carried out by trained and appropriately qualified labors of the Casting and Rolling Complex in accordance with the approved regulations and instructions.

The implementation schedule of the project is presented below in the diagram A.4.2-1.

Diagram A.4.2-1. Implementation schedule of the project

#	Stage	2004	2005	2006	2007	2008	2009
1.	Project documentation preparation						
2.	Construction works						
3.	Pre-commissioning works						
4.	Operation						

The technical project documentation for the construction of the Casting and Rolling Complex was prepared by the state company “Ukrgipromez” (Ukranian State Institute for Designing Metallurgical Works) from 13.08.2004 to 16.10.2008.[10] Construction work was performed by GAMA (Turkey) from

[9] Source: Casting and Rolling Complex. Working draft. Approvals package. Volume 1-4. // Ukrgipromez - Dnepropetrovsk, 2005. - Arch. No. 1200-RP1 – 1200-RP4.

[10] Project Implementation Contract No. 69/492 dated 13.08.2004, Construction Documentation Delivery and Acceptance Certificate No. 10 in accordance with the Addendum Agreement No. 12 to the Contract No.69/492 dated 13.08.2004.

08.07.2005 to 20.04.2009.[11] Pre-commissioning of the main equipment supplied by DANIELI (Italia) was carried out from 12.05.2008 to 01.11.2008.[12]. The Casting and Rolling Complex was commissioned on September 30, 2008.[13]

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:

Greenhouse gases emissions occur at metallurgical works due to the use of carbonaceous feeds and fossil fuels in technological processes. The application in the Casting and Rolling Complex of modern and efficient technologies and equipment for the production of steel and hot rolled flat products (section A.2, A.4.2) provides to the less feeds, fuels and energy resources consumption in comparison to other metallurgical works producing similar products.

The main indicators of production and GHG emissions in Casting and Rolling Complex are stated in the table A.4.3-1. The detailed description of GHG emissions reductions is provided in the section B and E PDD.

Table A.4.3-1. Production of hot rolled flat products and CO_2 emissions (average data for 2009-2012)[14]

#	Parameter	Baseline scenario	Project scenario	Leakage	Change
1.	Production of hot rolled flat products, t/year	1,019,349	1,019,349	1,019,349	-
2.	Specific GHG emissions, tCO_2/t	2.025	0.645	0.314	1.066
3.	GHG emissions, tCO_2/year	2,064,181	657,200	320,315	1,086,667

The law of the Russian Federation concerning anthropogenic emissions of greenhouse gases does not restrict operations leading to greenhouse gas emissions. Thus, the construction and implementation of the Casting and Rolling Complex for production of hot rolled flat products in the Vyksa District, the Nizhny Novgorod Region, the Russian Federation can be developed in accordance with any of the potential scenarios which ensure an acceptable level of production for the company. In the absence of opportunities to attract additional investment through the Kyoto protocol, the Project would have been developed in accordance with the baseline scenario (the baseline scenario selection is chosen and justified in the Section B.1-B.2), and this would not have led to a reduction in greenhouse gases emissions.

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[11] Payment order No. 326 dated 08.07.2005, Certificate of Practical Completion No.1 dated 20.04.2009.

[12] Certificate of Equipment Acceptance after Individual Testing by the Working Committee dated 12.05.2008, Provisional Acceptance Certificate dated 01.11.2008.

[13] Commissioning Certificate No. ru 52517306-47/KS-08 dated 30.09.2008.

[14] Initial data and calculation are provided in the attached Excel file: 2011-08-23_OMK_GHG Estimation_ver.04.1.xls

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

	Years
Length of the crediting period	4 years (48 months)
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent.
2009	746,863
2010	1,049,484
2011	1,288,889
2012	1,261,433
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	4,346,669
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	1,086,667

Table A.4.3-2. 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	1,273,635
2014	1,269,568
2015	1,262,450
2016	1,265,500
2017	1,221,774
2018	1,199,402
2019	1,194,318
2020	1,190,250

Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	9,876,897
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	1,234,612

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 Russian Federation Government Decree № 843 "On Measures of Realization of Article 6 of Kyoto Protocol to United Nations Framework Convention on Climate Change" dated on 28.10.2009 and Regulations "On Realization of Article 6 of Kyoto Protocol to United Nations Framework Convention on Climate Change" approved by the Government Decree № 843 dated on 28.10.2009 the project shall be approved following the positive determination of the project by an expert organization.

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 02).[15]

The **JI specific approach**[16] 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[17] 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: technological barriers, 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 02) 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.

[15] Source: http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf

[16] 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.

[17] Source: http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=2

The list of plausible future scenarios

Plausible future scenario 1. Project implementation without registration as a JI project. The construction of the Casting and Rolling Complex for the production of hot rolled flat products.

Plausible future scenario 2. Continuation of the current situation.[18] Production of hot rolled flat products at metallurgical works not incorporated into OMK.

Description of plausible future scenarios

Plausible future scenario 1

The Casting and Rolling Complex involves the construction of a Meltshop (Electric Arc Furnace, Ladle-Furnace, Vacuum Degasser and Slab caster) as well as a Hot Strip Mill and Complex of auxiliary and energy facilities. The Casting and Rolling Complex production capacity is up to 1.2 million tonnes a year. Bringing the Casting and Rolling Complex into operation would allow OMK to produce small- and medium-diameter pipes at Vyksa Steel Works and the Almetyevsk Pipe Plant with its own pipe stock. Finished products at Casting and Rolling Complex includes hot-rolled coils, hot-rolled sheets and strips of steel grades: Carbon 10; Carbon 20; St3sp; St2ps; 08ps; 09G2S; 17G1S-U; 13G1S-U; 22GU; 09GSF; X60; NT-60ULE; N80; X65; X70.[19]

Plausible future scenario 2

The production of hot rolled flat products at Russian metallurgical works which are not incorporated into OMK is carried out at integrated metallurgical works (e.g. Marnitogorsk Metallurgical Works, Severstal Metallurgical Works, Novolipetsk Metallurgical Works, Chelyabinsk Metallurgical Works, Ural Steel Metallurgical Works[20]). The production of hot rolled flat products at the integrated works is the continuation of the situation existing before the project implementation. Hot rolled flat products can be produced at the companies not incorporated into OMK at the quantity and quality required by the market. This can be seen from the extensive experience that Vyksa Steel Works and the Almetyevsk Pipe Plant has gained in producing small- and medium-diameter pipes using pipe stock supplied by the integrated metallurgical works.[21] The steel grades of flat products at metallurgical works not incorporated into OMK are corresponding to the products of Casting and Rolling Complex (stated in the description of the plausible future scenario 1).[22]

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

Other alternative scenarios of the project (e.g. Production of hot rolled flat products at the OMK metallurgical works without any reconstruction; Construction of a rolling mill or a steel-melting furnace for the production of hot rolled flat products at the OMK metallurgical plants) cannot be considered as

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

[19] Source: http://lpk.omk.ru/ru/products/

[20] Source: Determination of CO_2 emission factor for hot rolled products production in Russian metallurgical works in the absence of the 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" – CJSC "New metallurgical technology", Moscow, 2011. – 35 p.

[21] The structure of a hot rolled product supply to the Vyksa Steel Works and the Almetyevsk Pipe Plant in 2007-2010 is as following: Marnitogorsk Metallurgical Works 31-79%, Severstal Metallurgical Works 6-61%, Ural Steel Metallurgical Works 6-13%. Source: Letter of OJSC OMK-Steel about pipe stock supply to the Vyksa Steel Works and the Almetyevsk Pipe Plant in 2007-2010.

[22] Source: http://chermk.djem.msk.stalcom.net/rus/products/catalogue/index.phtml, http://www.mmk.ru/for_buyers/index.php, http://metalloinvest.com/rus/potrebitelam/prodykcia/

plausible future scenarios of the project as they don't provide to the hot rolled flat products production at the required quality and quantity in comparison to other plausible future scenarios. The main industrial facilities of OMK (Vyksa Steel Works, Almetyevsk Pipe Plant and Trubodetal Works) do not have their own steel-melting furnaces for pipe stock production and rolling mills for hot flat products production.

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

This means that the production of hot rolled flat products according to any scenario that ensures the quantity and quality of production necessary for manufacturing pipe products conforms to the development strategy goals and objectives. Plausible future scenarios 1 and 2 are in compliance with the current legislation.

There are no laws that restrict greenhouse gases emissions at metallurgical companies in Russia. The main documents that regulate greenhouse gas 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 Resolution #843 on October 28, 2009 "On Measures to Implement Article 6 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change".

The mentioned documents envisage the reduction of greenhouse gas 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 and 2 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> Project implementation without registration as a JI project. The construction of the Casting and Rolling Complex for the production of hot rolled flat products.

<u>Plausible future scenario 2.</u> Continuation of the current situation. Production of hot rolled flat products at metallurgical works not incorporated into OMK.

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[23]

1) Investment barrier.

[23] The factors that are not provided in the list of the key factors (including factors provided in the paragraph 25 of Guidance on criteria for baseline setting and monitoring (Version 02)) have not an influence on plausible future scenarios implementation.

2) Technological barriers:

   2.1) Lack of infrastructure for the project implementation;

   2.2) Absence of prevailing practice («first of its kind»);

   2.3) Absence of skilled and/or properly trained labour.

3) Financial barrier (cost efficiency).

Definition of the key factors

Investment barrier

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

Lack of infrastructure for the project implementation

This barrier represents the absence of an infrastructure (pipelines, transmission lines, etc.) allowing the supply of raw materials, fuel, power, etc. for production according to the project and within appropriate amounts and quality.

Absence of prevailing practice («first of its kind»)

The use of equipment, technologies or production methods that are not a prevailing practice in the relevant geographical area represents a high technological risk. The new equipment, technology or production methods are defined in this case as "first of its kind".

Absence of skilled and/or properly trained labour

Absence of skilled and/or properly trained labour to control and maintain the process (equipment) represents a high risk of equipment malfunction and outage due to human error.

Financial barrier (cost efficiency)

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 raising of the required investment amounting to about 31.1 billion rubles[24] was a substantial barrier to the construction and implementation of the Casting and Rolling Complex (plausible future scenario 1). The main characteristics of the investment barrier are as follows:

- volume of investment for the project is substantial compared to the size of the Company as of the date of the implementation of the project, which meant that the majority of the funds had to be borrowed (about 73%), with unfavorable lending terms: the high cost of the loan, exchange rate risks due to the lack of long-term ruble resources and other risks (table B.1-1), the need for additional guarantees to foreign creditors on the part of Sberbank, which increases financial expenditure;
- lack of government investment into metallurgical company development projects.[25]

[24] Addendum to the Business Plan "Casting and Rolling Complex. First stage"- OMK CJSC, Moscow, 2009. – p.10.

Table B.1-1. Investment risk analysis of plausible future scenario 1

#	Parameter	Value, %
1.	Project risk[26]	15.0
2.	Country risk[27]	3.2
3.	Inflation rouble [28]	12.9
4.	Inflation euro[29]	1.9

The presence of a substantial investment barrier has been demonstrated through experience – the inability to organize project financing in the given period due to the complicated financial structuring of the project resulted in the extension of the Contract terms with the major equipment supplier (DANIELI), and additional organizational and financial efforts to overcome the investment barrier.

Thus, there is an investment barrier to the plausible future scenario 1: Project implementation without registration as a JI project. The construction of the Casting and Rolling Complex for the production of hot rolled flat products.

The Russian metallurgy development strategy up to 2020 determines that projects for the reconstruction of metallurgical works, and the construction of new facilities are basically financed from company funds, but an additional source is the possibility of implementing projects under the joint implementation of the Kyoto Protocol.[30] 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.

The investment barrier does not affect the implementation of the plausible future scenario 2 (Continuation of the current situation), as this scenario does not require additional investment.

Technological barriers

Lack of infrastructure for the project implementation

Plausible future scenario 1 envisages steelmaking in an electric arc furnace using mainly scrap steel as the raw material. To ensure the design productivity of the Casting and Rolling Complex, more than 1 million tonnes of scrap is annually required. Due to the current lack of a collecting, transporting and scrap conditioning system, plausible future scenario 1 has a significant technological barrier.

Overcoming the identified barrier regarding the provision of the necessary amount of raw materials is possible by organizing an enterprise network for the collection of scrap metal, and developing the transport and processing infrastructure. Thus, the creation of the required infrastructure for plausible future scenario 1 leads to significant organizational difficulties and financial expenses.

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[25] The development strategy of the metallurgical industry of Russia up to 2020, approved by the order of the Ministry of Industry and Trade of Russia #150 on 18.03.2009, pp. 42-44.

[26] Source: Investment management: Volume 2. / V.V. Sheremet, V.M. Pavluchenko, V.D. Shapiro. – M.: Higher school, 1998. – p. 151

[27] Estimated taking into account Russian interest rate.

[28] Source: http://www.gks.ru/bgd/regl/brus05/IssWWW.exe/Stg/01-01.htm. The average value for 2002-2004 is presented.

[29] Source: Eurostat. The average value in Eurozone for 1998-2004 is presented.

[30] The development strategy of the metallurgical industry of Russia up to 2020, approved by the order of the Ministry of Industry and Trade of Russia No. 150 on 18.03.2009, pp. 42-45

The actual consumption of raw materials in the metallurgical industry is characterized by the involvement of a significant proportion of secondary resources (scrap metal) in the production cycle, which means that less power is consumed and the production costs of the finished goods are lower. Because of this, in the future we should expect the reduction of scrap resources and the deterioration of its quality. The possible restriction of access to raw scrap resources along with the absence of OMK's own facilities for steelmaking production from iron ore raw materials is a significant barrier for the plausible future scenario 1.

The provision of other types of raw materials, fuel and electricity is possible with the current infrastructure[31] and is not a barrier for the plausible future scenario 1.

The necessary infrastructure is present for the plausible future scenario 2, including the supply of raw materials (iron ore, limestone, etc.), fuel (natural gas, coke, coal, etc.) and energy resources (electricity, etc.), since this plausible future scenario is the continuation of the current situation and does not lead to changes in the structure and values of raw materials, fuel and energy resources consumption.

Absence of prevailing practice («first of its kind»)

Plausible future scenario 1 envisages the construction and operation of the first Russian metallurgical complex for the production of hot rolled flat products by combining the technologies of continuous steel casting and rolling. The use of modern equipment and steelmaking technologies, out-of-furnace processing, and casting and rolling ensures a production quality that previously was achieved only by integrated works. Therefore, the plausible future scenario 1 (the construction of the Casting and Rolling Complex) can be defined as the “first of its kind”. The lack of common practice of similar projects in Russia (section B.2) leads to additional technological risks during the implementation of the plausible future scenario 1.

Plausible future scenario 2 is the continuation of the current situation and therefore cannot be considered as the “first of its kind”.

Absence of skilled and/or properly trained labour

Plausible future scenario 1 requires the training of qualified labour to operate and service the equipment as the proposed equipment and the production technology are new (“first of its kind”) for the metallurgical industry in Russia. Taking into account that the Casting and Rolling Complex is a new plant and does not involve the development or modernization of the current production facilities, plausible future scenario 1 envisages the training and involvement of all the specialists that are required to operate the facility.

Plausible future scenario 1 envisages the use of production technologies and equipment with no practical application in the relevant geographical area (Russian metallurgical works). Thus, in the event of technical failures during the operation of the equipment (including as a result of the lack of skilled and/or properly trained labour) which cannot be promptly resolved, there is no opportunity to quickly involve third party specialists and equipment suppliers to solve the problem.

The introduction of the Casting and Rolling Complex required the training of more than 800 specialists in the leading industrial and training centers in Russia and abroad, which requires significant financing.

With the development of the project according to the plausible future scenario 2, the training of labour is not required as this scenario does not involve changes to the processes management. The company specialists have extensive experience with using the current equipment.

[31] Casting and Rolling Complex. Working draft. Approvals package. Volume 1-4. // Ukrgipromez - Dnepropetrovsk, 2005. - Arch. No. 1200-RP1 – 1200-RP4.

Financial barrier (cost efficiency)

To estimate the impact of the financial barrier an analysis of the economic efficiency of investment costs for the plausible future scenario 1 has been carried out. Plausible future scenario 2 does not require additional investment since it is a continuation of the current situation. There is no financial barrier to plausible future scenario 2.

The results of economic efficiency analysis of Casting and Rolling Complex construction undertaken on the initial stage of the project implementation show that the plausible future scenario 1 is not attractive: IRR (7.5-9.4%) is less than assessed discount rate (12%).[32] The results of the actual economic efficiency analysis are presented in the Table B.1-2. The calculation of the economic efficiency of plausible future scenario 1 is performed in Excel and submitted as part of the project business plan.[33]

Table B.1-2. Results of cost efficiency analysis of the plausible future scenario 1

#	Parameter	Value
1.	Investment, million rubles	31,134
2.	Discount rate, %	10.0
3.	Internal Rate of Return, %	15.46
4.	Discount payback period	12 years 9 months
5.	Net Present Value, million rubles	9,447

The cost efficiency of plausible future scenario 1 is unacceptable for OMK as the payback period of the project exceeds the time frame for the consideration and acceptance of large investment projects established by the Company - not more than 7 years.

In addition, the economic efficiency of plausible future scenario 1 (Table B.1-2.) is calculated taking into account the discount rate of 10% without correction for the country risk, the risk of reliability of the project participants, the risk of not receiving income from the project. The application of these corrections allows a significant increase of discount rate. In this case, the discounted payback period exceeds the lifetime of the project, and the net present value will be negative.

Therefore, the analysis of the cost efficiency of plausible future scenario 1 shows that this scenario is not a commercially attractive scenario, Therefore a significant financial barrier exists for plausible future scenario 1.

The project is efficient and financially stable if the economic indexes of the project remain positive at all the possible development outcomes.[34] For confirmation of the efficiency analysis issues is undertaken the sensitivity analysis of the plausible future scenario 1 (table B.1-3).[35]

[32] Support of investment for Casting and Rolling Complex construction. Volume 1. - OMK CJSC, Moscow, 2003. – p. 71.

[33] Addendum to the Business Plan "Casting and Rolling Complex. First stage"- OMK CJSC, Moscow, 2009. – p.10. Excel file: 2011-06-20_OMK_Investment analysis.xls

[34] Methodological recommendations for the evaluation of investment projects, approved by the Ministry of Economy of Russia, Ministry of Finance of Russia and Rosstroy of Russia on June 21, 1999 No BK 477, p. 75.

Table B.1-3. Results of the sensitivity analysis

#	Parameter	Operational costs		Investment	
		- 10%	+ 10%	- 10%	+ 10%
1.	Discount payback period	9 years 12 months	Not determined	11 years 5 months	13 years 7 months

The results of the sensitivity analysis show that in the event of a change in the investment and operational costs alternative scenario 1 is not 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 2: Continuation of the current situation. Production of hot rolled flat products at metallurgical works not incorporated into OMK. The plausible future scenario 2 is the **baseline.**

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

$BE_y = \Sigma (P_{HRP,CRC,m} * EF_{CO2,SP,OUT,y})$

BE_y - baseline emissions, tCO_2

$P_{HRP,CRC,m}$ - production of finished hot rolled products in Casting and Rolling Complex, t

$EF_{CO2,SP,OUT,y}$ - CO_2 emission factor for hot rolled flat products production at Russian metallurgical works, tCO_2/t

y - year

m - month

The baseline is established taking into account of uncertainties and using conservative assumptions as stated in the description of baseline parameters:

- production of finished hot rolled products in Casting and Rolling Complex;
- CO_2 emission factor for hot rolled flat products production in Russian metallurgical works.

Data / parameter	$\mathbf{P_{HRP,CRC,m}}$
Data unit	t
Description	production of finished hot rolled products in Casting and Rolling Complex
Time of determination/monitoring	Monthly according to the monitoring plan
Source of data (to be) used	Technical reports of Casting and Rolling Complex and Forecast

[35] The calculation is attached in Excel files: 2011-06-20_OMK_Investment analysis_Investment costs +10%.xls; 2011-06-20_OMK_Investment analysis_Investment costs -10%.xls; 2011-06-20_OMK_Investment analysis_Operational costs +10%.xls; 2011-06-20_OMK_Investment analysis_Operational costs -10%.xls

Value of data (for ex ante calculations/determinations)	<table><tr><td>Year</td><td>tonnes</td></tr><tr><td>2009</td><td>704,662</td></tr><tr><td>2010</td><td>972,732</td></tr><tr><td>2011</td><td>1,200,000</td></tr><tr><td>2012</td><td>1,200,000</td></tr></table>
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Actual data for period 2009-2010 and forecasted data for 2011-2012 prepared by OJSC OMK-Steel
QA/QC procedures (to be) applied	Measuring devices for recording hot rolled metal production are calibrated/verified in compliance with the state regulation, in- plant standards and approved methodologies.
Any comment	The uncertainties of measuring data is low. The additional information is provided in the section D.1.1.3 and D.2 of the PDD.

Data / parameter	**$EF_{CO2,SP,OUT,y}$**
Data unit	tCO_2/t
Description	CO_2 emission factor for hot rolled flat products production in Russian metallurgical works
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Determination of CO_2 emission factor for hot rolled products production in Russian metallurgical works in the absence of the 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” – CJSC “New metallurgical technology”, Moscow, 2011. – 35 p.
Value of data (for ex ante calculations/determinations)	2.025
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The approach used for emission factor calculation includes the following stages of metal production: pellet, sinter, coke, pig iron production, hot rolling and auxiliary processes of additional raw materials preparation and energy resources consumption. The parameter is determined based on transparent data and conservative assumptions as clearly

	described in the provided study.
QA/QC procedures (to be) applied	-
Any comment	The mentioned study is completed by experts in area of metallurgy and environmental impact of metallurgical works.

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 02). 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 2. Continuation of the current situation. Production of hot rolled flat products at metallurgical works not incorporated into OMK.

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 1 (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	Technological barriers			Financial barrier
			Lack of infrastruc-ture	Absence of prevailing practice	Absence of trained labour	
1.	Plausible future scenario 1 (Project implementation without registration as a JI project)	+	+	+	+	+

2.	Plausible future scenario 2 (baseline)	–	–	–	–	–

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 the last years (2000-2011) the some projects are implemented or underway for implementation in area of electric arc furnaces and continuous casting machines introduction and/or modernization. The similar activities are undertaken in OJSC "Magnitogorsk Iron and Steel Works", OJSC "Ural steel", OJSC "Seversky Pipe Plant", OJSC "Pervouralsky novotrubny works", OJSC "Nizhneserginsky Metizno-Metallurgichesky Plant", etc.[36] All the mentioned similar projects are implemented under JI mechanism of Kyoto protocol therefore they can be likely excluded from the analysis of common practice.[37]

The project of the OJSC OMK-Steel is the first of its kind as this project includes the construction and operation of the first Russian metallurgical complex for the production of hot rolled flat products by combining the technologies of continuous steel casting and rolling. The quality of Casting and Rolling Complex productions was previously achieved only by integrated works. Therefore the project is not a common practice.

The analysis of the key factors affected plausible future scenarios implementation and analysis of the common practice shows that the project activity is not the baseline scenario. Therefore the reduction of emissions obtained in the course of project implementation is additional to the baseline.

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, financial and technological 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:

- improve credit conditions and provide coverage of debt rate;
- alleviate the financial expenditures because of technological barriers (lack of infrastructure for the project implementation[38], absence of prevailing practice, absence of skilled and/or properly trained labour);
- improve the financial efficiency of the project.

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

[36] Source: http://ji.unfccc.int/JI_Projects/DeterAndVerif/Verification/PDD/index.html, http://www.sbrf.ru/tula/ru/concurs/2010/index.php?from114=1&id114=11002977

[37] Based on a provision for common practice analysis of 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

[38] The increase of financial expenditure because of scrap resources reduction and costs for scrap collection and preparation can be alleviated by additional financing of the project. Therefore the project registration as a JI project alleviates the technological barrier connected with scrap availability.

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

The reduction of greenhouse gases emissions are achieved because of fuel, raw materials and energy resources consumption decrease by hot rolled flat products production as a result of the project implementation. The estimated GHG emission reductions over the crediting period (2009-2012) are about 4,347 th. tCO_2 equivalent or in average 1,086.7 th. tCO_2 equivalent per year. The detailed description of the GHG emissions reductions is provided in the section E of the PDD.

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

The project boundaries include all the facilities where greenhouse gas emissions occur as a result of the project. They include:

1. Casting and Rolling Complex;
2. Metallurgical works not incorporated into OMK;
3. Electricity system.

The facilities included in the project boundaries and their impact on greenhouse gas emissions is presented in table B.3-1. The sources of greenhouse gas emissions, as well as the greenhouse gases included in the calculation of the emissions according to the baseline and project scenarios are presented in table B.3-2. A diagram of the project boundaries is shown in fig. B.3-1.

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

#	Facilities	Description
1.	Casting and Rolling Complex	The production of hot rolled flat products at the Casting and Rolling Complex includes steelmaking in an electric arc furnace, out-of-furnace processing, casting and rolling as well as auxiliary processes (calcination, heat production, etc.). Greenhouse gas emissions occur at the Casting and Rolling Complex as a result of fuel combustion and use of carbonaceous materials.
2.	Metallurgical works not incorporated into OMK	The production of hot rolled flat products at the metallurgical works not incorporated into OMK includes the preparation stages of raw materials, steelmaking, casting and rolling of steel as well as auxiliary processes. Greenhouse gases are emitted at all metallurgical stages as a result of fuel combustion and use of carbonaceous materials.
3.	Electricity system	Electricity consumed at the Casting and Rolling Complex is produced by Russian power generation plants using fossil fuels (natural gas, coal, etc.). The combustion of fuel leads to greenhouse gas emissions.

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

#	Emission sources	Gas[39]	Included / excluded	Description
1.	Casting and Rolling Complex	CO_2	included	Emissions from fuel combustion and use of carbonaceous materials by hot rolled flat products production.
		CH_4	excluded[40]	Excluded for simplification.
		N_2O	excluded[41]	Excluded for simplification.
2.	Metallurgical works not incorporated into OMK	CO_2	included	Emissions from fuel combustion and use of carbonaceous materials by hot rolled products production.
		CH_4	excluded	Excluded for conservative assumption.
		N_2O	excluded	Excluded for conservative assumption.
3.	Electricity system	CO_2	included	Emissions from fossil fuel combustion by electricity production.
		CH_4	excluded	Excluded for simplification.
		N_2O	excluded	Excluded for simplification.

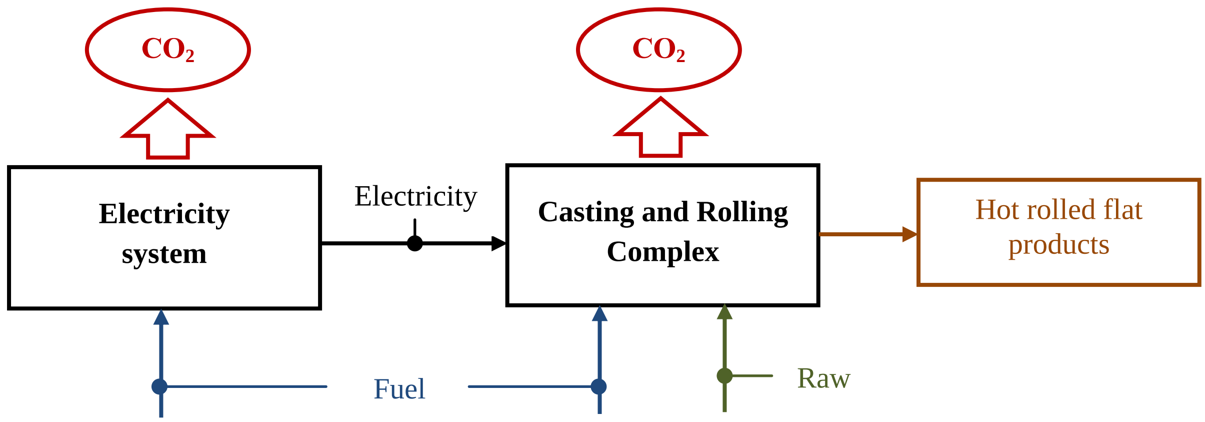
[39] According to Guidance on criteria for baseline setting and monitoring (Version 02) the project must consider all the greenhouse gases included in Annex A of the Kyoto Protocol. However, fuel combustion and oxidation of carbonaceous materials only produces emissions of CO_2, CH_4 and N_2O and therefore 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

[40] CH_4 emissions from all emission sources in the project and baseline scenario are not taken into account as they are negligible. Comments are provided in the table B.3-3.

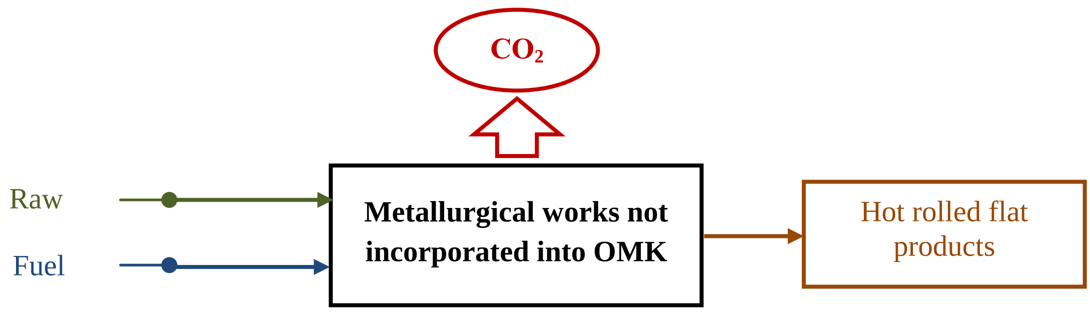
[41] N_2O emissions from all emission sources in the project and baseline scenario are not taken into account as they are negligible. Comments are provided in the table B.3-3.

Fig. B.3-1. Principal scheme of the project boundary

Project scenario:



Baseline:



The GHG emission sources are determined according requirements of the Guidance on criteria for baseline setting and monitoring Version 02 (Table B.3-3.).

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

#	Criterion to define the project boundaries	Comments
1.	Under the control of the project participant.	*Casting and Rolling Complex* is under the control of OJSC OMK-Steel as it is the property of the Company and it is directly controlled by the Company. *Electricity system* produces and delivers electricity to the Casting and Rolling Complex. *Metallurgical works not incorporated into OMK* produce hot rolled steel coils in the absence of the Casting and Rolling Complex. Thus, the operation of the Casting and Rolling Complex has an impact on the energy system and on the metallurgical works not incorporated into OMK.

2.	Reasonably attributable to the project.	The sources of greenhouse gas emissions determined in table B.3-1 are connected by energy and material flows with the production of hot rolled flat products, therefore it is reasonable 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 sources (Casting and Rolling Complex, Electricity system, Metallurgical works not incorporated into OMK) are significant, they amount is more than 1% and exceed 2,000 t of CO_2 equivalent (see section E.) CH_4 and N_2O emissions are not considered in the project boundaries as their total emissions are not significant in the project and baseline scenarios (less than 1% of the annual average anthropogenic emissions and not exceed an amount of 2,000 t of CO_2 equivalent).[42]

Leakage assessment

In accordance with Guidance on criteria for baseline setting and monitoring (Version 02) 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”.

The main emissions potentially giving rise to leakage in the context of the project are:

- emissions arising from fuel and raw materials use (e.g. extraction, processing, transport) for production of hot rolled flat products;
- emissions arising from fuel use (e.g. extraction, processing, transport) for electricity production in Electricity system.

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.[43]

Production of hot rolled flat products in Casting and Rolling Complex is provided by use of following main raw materials and fuel: steel scrap, pig iron, hot briquetted iron, limestone, natural gas.

The project provides to more effective use of fuel and energy resources in comparison to the baseline scenario as demonstrated in the section A.4.3 by analysis of energy consumption for rolled metal production in Casting and Rolling Complex and in the metallurgy industry. Therefore as result of the project implementation the leakage decrease by use of fuel (natural gas) is achieved. The leakage from natural gas use is excluded from consideration for conservative assumption of emission reductions.

The average energy consumption by metal production connected to the steel scrap and limestone use is insignificant as confirmed by relevant studies.[44] Therefore the leakage from the steel scrap and limestone use (extraction, collection, transport, processing) can be also assessed as negligible and neglected from calculation of emission reductions.

[42] The calculation of CH_4 and N_2O emissions is attached.

[43] In accordance with the paragraph 18 of the Guidance on criteria for baseline setting and monitoring (Version 02).

[44] Source: Lisienko V.G., Shelokov J.M., Ladigichev M.G. Energy saving: Reference book: In 2 books. Book 1 / Edited by Lisienko V.G.. – Moscow: Teplotechnik, 2005. – 688 p.

The potential leakage from pig iron and hot briquetted iron production used in Casting and Rolling Complex by steel melting in Electric arc furnace are significant (assessment is provided in the section E). GHG emissions are arising by pig iron and hot briquetted iron production as result of fuel and raw materials use. This leakage is included in GHG emissions calculation (section D).

The project provides to the increase of electricity consumption as a result of Electric arc furnace, Ladle furnace and other equipment operation, therefore the potential leakage from fossil fuel use (e.g. extraction, processing, transport) for electricity production in the Electricity system will be also increase. But the leakage arising from fossil fuel use (e.g. extraction, processing, transport) for electricity generation can be assessed as negligible based on analysis of methodology for electricity project.[45]

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: 23/08/2011

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.

[45] Source: 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:

27/06/2005

The starting date of the project is determined as date of financing begins.[46]

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 (electric arc furnace and continuous casting machine) in accordance with Russian regulations.[47]

C.3. Length of the crediting period:

Length of the crediting period: 01/01/2009[48] – 31/12/2020 (12 years, 144 months), including:

- First commitment period: 01/01/2009 – 31/12/2012 (4 years, 48 months);
- Period after the first commitment period: 01/01/2013 – 31/12/2020 (8 years, 96 months).

[46] Order CJSC OMK #44 dated on 09/09/2005

[47] 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)

[48] The starting date of the crediting period is determined since 01/01/2009 after the date the first emission reductions in accordance with paragraph 19 Guidance on criteria for baseline setting and monitoring (Version 02).

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

The monitoring plan is elaborated using the following step-wise approach[49]:

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 02). 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 02). 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.1.1-D.4.

[49] In accordance with Guidelines for users of the joint implementation project design documentation form Version 04. Source: http://ji.unfccc.int/Ref/Documents/Guidelines.pdf

Step 2. Application of the approach chosen

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

Project scenario. The project scenario is the construction of a Casting and Rolling Complex for the production of hot rolled flat products

The project scenario includes steelmaking in an electric arc furnace, out-of-furnace processing, steel casting and rolling. The operation of Casting and Rolling Complex is supported with auxiliary processes (limestone calcining, heat production, etc.) and electricity supply from the Electricity system. Greenhouse gases emissions occur in the project scenario at the Casting and Rolling Complex as a result of fuel combustion and use of carbonaceous materials and in the Electricity system from the fuel combustion for electricity generation. The emissions arising from pig iron and hot briquetted iron production out of the Casting and Rolling Complex boundaries are determined as leakage because of fuel combustion and use of carbonaceous materials use for production of materials used in the project boundaries.

Baseline scenario. Continuation of the current situation. Production of hot rolled flat products at metallurgical works not incorporated into OMK.

In the baseline scenario hot rolled flat products are produced at the metallurgical works not incorporated into OMK including the preparation stages of raw materials, steelmaking, casting and rolling of steel as well as auxiliary processes. Greenhouse gases are emitted at all metallurgical stages as a result of fuel combustion and use of carbonaceous materials.

Approach for calculation of GHG emissions in the project scenario

1. Calculation of CO_2 emissions from fuel (natural gas) combustion in Casting and Rolling Complex is provided based on data of fuel combustion and emission factor from natural gas combustion. The oxidation factor of fuel is estimated equal 1 (or 100%) for conservative assumption of emissions. This approach is corresponding to the IPCC Guidelines.

2. Calculation of CO_2 emissions from oxidation of carbonaceous raw materials is provided based on carbon material balance between the raw flows (steel scrap, pig iron, hot briquetted iron, carbonaceous raw materials (graphite, coke, carbonaceous materials) electrodes, limestone) and product flows (hot rolled flat products). 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.

3. Calculation of CO_2emissions from fuel combustion for electricity generation is provided based on data of electricity consumption in Casting and Rolling Complex and emission factor from electricity generation in the Electricity system for the project consumed electricity.

4. CO_2 emissions from limestone calcination by lime production used in the electric arc furnace and ladle furnace is arisen in the limekiln shop of Casting and Rolling Complex. These emissions are included in the carbon material balance according to the p.2 of the approach for calculation of GHG emissions in the project scenario.

Approach for calculation of GHG emissions in the baseline and leakage

1. Calculation of CO_2 emissions in the baseline is provided based on data of hot rolled flat products production in Casting and Rolling Complex and emission factor from hot rolled flat products production at metallurgical works not incorporated into OMK. The CO_2 leakage calculation is provided based on data of pig iron and hot briquetted iron consumption in Casting and Rolling Complex and emission factors from pig iron and hot briquetted iron production out of the project boundary. This approach is corresponding to the IPCC Guidelines.

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

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

- production of steel slabs in Casting and Rolling Complex;
- production of finished hot rolled products in Casting and Rolling Complex;
- steel scrap consumption in Casting and Rolling Complex;
- pig iron consumption in Casting and Rolling Complex;
- hot briquetted iron consumption in Casting and Rolling Complex;
- natural gas consumption in Casting and Rolling Complex;
- electricity consumption in Casting and Rolling Complex;
- electrodes consumption in Casting and Rolling Complex;
- graphite materials consumption in Casting and Rolling Complex;
- coke consumption in Casting and Rolling Complex;
- carbonaceous materials consumption in Casting and Rolling Complex;
- limestone consumption in Casting and Rolling Complex.

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. The principle scheme of the monitoring points' location is given at the figure D.1-1.

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

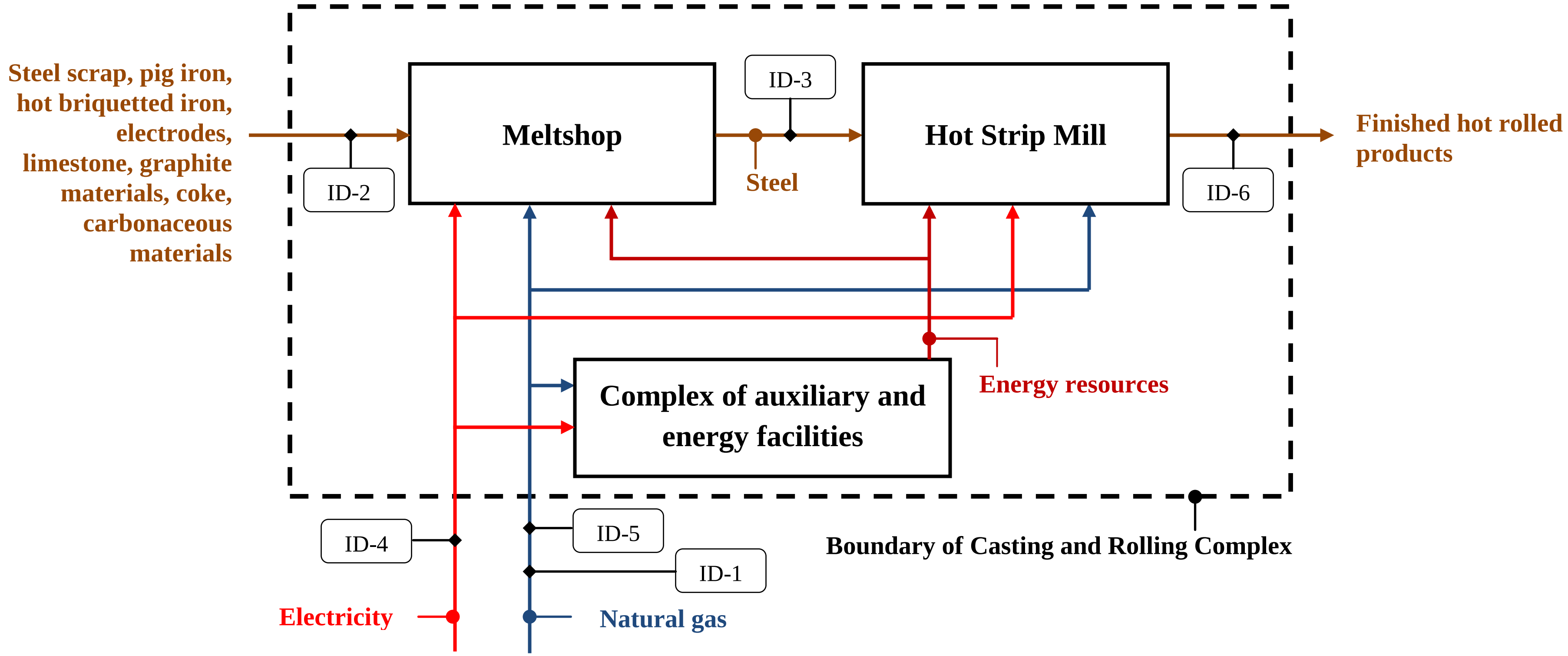
- carbon content in steel scrap;
- carbon content in steel;
- carbon content in pig iron;
- carbon content in hot briquetted iron;
- carbon content in electrodes;
- carbon content in graphite materials;
- carbon content in coke;
- carbon content in carbonaceous materials;
- carbon content in limestone;
- CO_2 emission factor for hot rolled flat products production at Russian metallurgical works;
- CO_2 emission factor for electricity generation in Electricity system;
- CO_2 emission factor for pig iron production at metallurgical plants;
- CO_2 emission factor for hot briquetted iron production at metallurgical plants.

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.

Fig. D.1-1. Principal scheme of monitoring point location



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 $FC_{NG,CRC,m}$	natural gas consumption in Casting and Rolling Complex	Structure of energy resources distribution of Gaseous station	th. m^3	m	Monthly	100%	Electronic and paper	Recorded by Engineer of energy resources recording
ID-2 $RMC_{i,CRC,m}$	carbonaceous raw materials (i) consumption in Casting and Rolling Complex	Technical report of OJSC OMK-Steel Subsidiary	t	m	Monthly	100%	Electronic and paper	Consumption of steel scrap, pig iron, hot briquetted iron, electrodes, graphite materials, coke, carbonaceous materials, limestone. The new materials with high carbon content are to include in the monitoring if they will be used. Recorded by Record controller of Meltshop

ID-3 $P_{STEEL,CRC,m}$	production of steel slabs in Casting and Rolling Complex	Technical report of OJSC OMK-Steel Subsidiary	t	m	Monthly	100%	Electronic and paper	Recorded by Record controller of Meltshop
ID-4 $EC_{GRID,m}$	electricity consumption in Casting and Rolling Complex	Structure of energy resources distribution of Substation and network plant	MWh	m	Monthly	100%	Electronic and paper	Recorded by Engineer of energy resources recording
ID-5 $W_{j,NG,m}$	volume fraction of j-component of natural gas	Certificate of natural gas quality	fraction	m	monthly	100 %	Electronic and paper	Certificate of natural gas quality is delivered by the gas supplier.
$W_{C,RMi}$	carbon content in carbonaceous raw materials (i)	Reference data	tC/t	e	Determined ex ante	100%	Electronic	Carbon content in steel scrap, pig iron, hot briquetted iron, electrodes, graphite materials, coke, carbonaceous materials, limestone. Detailed information is provided in the Annex 3
$W_{C,STEEL}$	carbon content in steel	Reference data	tC/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 Electricity system	Reference data	tCO_2/MWh	e	Determined ex ante	100%	Electronic	CO_2 emission factor is determined for the Demand-Side in the Electricity system IPS Volga. Detailed information is provided in the Annex 3
$n_{C,j}$	number of the carbon moles per mole of natural gas j-component	Reference data	-	e	Determined ex ante	100 %	Electronic	Detailed information is provided in the Annex 3.
ρ_{CO2}	CO_2 density under the standard conditions (293 K, 101.3 kPa)	Reference data	kg/m^3	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) $PE_y = \Sigma (PE_{CRC,m} + PE_{GRID,m})$

PE_y - project emissions, tCO_2

$PE_{CRC,y}$ - emissions in Casting and Rolling Complex in project scenario, tCO_2

$PE_{GRID,y}$ - emissions in Electricity system in project scenario, tCO_2

y - year

m - month

(1.1) $PE_{CRC,m} = FC_{NG,CRC,m} * EF_{CO2,NG,m} + [\Sigma(RMC_{i,CRC,m} * W_{C,RMi}) - (P_{STEEL,CRC,m} * W_{C,STEEL})] * 44/12$

$PE_{CRC,m}$ - emissions in Casting and Rolling Complex in project scenario, tCO_2

$FC_{NG,CRC,m}$ - natural gas consumption in Casting and Rolling Complex, th. m^3

$EF_{CO2,NG,m}$ - CO_2 emission factor from natural gas combustion, tCO_2/th. m^3

$RMC_{i,CRC,m}$ - carbonaceous raw materials (i) consumption in Casting and Rolling Complex, t

$W_{C,RMi}$ - carbon content in carbonaceous raw materials (i), tC/t

$P_{STEEL,CRC,m}$ - production of steel slabs in Casting and Rolling Complex, t

$W_{C,STEEL}$ - carbon content in finished hot rolled products, tC/t

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

i - steel scrap, pig iron, hot briquetted iron, electrodes, graphite materials, coke, carbonaceous materials, limestone

m - month

(1.1.1) $EF_{CO2,NG,m} = \Sigma (W_{j,NG,m} * n_{C,j} * \rho_{CO2})$

$EF_{CO2,NG,m}$ - CO_2 emission factor from natural gas combustion, tCO_2/th. m^3

$W_{j,NG,m}$ - volume fraction of j-component of natural gas, fraction

$n_{C,j}$ - number of the carbon moles per mole of natural gas j-component

ρ_{CO2} - CO_2 density under the standard conditions (293 K, 101.3 kPa), kg/m^3

j - CH_4, C_2H_6, C_3H_8, C_4H_{10}, C_5H_{12}, CO_2, N_2, O_2, He

m - month

The consumption of carbonaceous raw materials (i) in Casting and Rolling Complex (ID-2, $RMC_{i,CRC,m}$) is determined based on Technical report of OJSC OMK-Steel Subsidiary as following:

$RMC_{limestone,CRC,m} = (C_{limestone,LCF,m} - S_{limestone,LCF,m}) + C_{limestone,EAF,m}$

$RMC_{limestone,CRC,m}$ - limestone consumption in Casting and Rolling Complex, t

$C_{limestone,LCF,m}$ - limestone feed to lime calcining furnaces, t

$S_{limestone,LCF,m}$ - limestone separated before lime calcining furnaces, t

$C_{limestone,EAF,m}$ - limestone consumption in electric arc furnace, t

m - month

$RMC_{graphite\ materials,CRC,m} = \Sigma\ (RMC_{graphite\ material(i),CRC,m})$

$RMC_{graphite\ materials,CRC,m}$ - graphite materials consumption in Casting and Rolling Complex, t

$RMC_{graphite\ material(i),CRC,m}$ - graphite material (i) consumption in Casting and Rolling Complex, t

i - graphite in granules, synthetic graphite, other types of graphite

m - month

$RMC_{coke,CRC,m} = \Sigma\ (RMC_{coke(i),CRC,m})$

$RMC_{coke,CRC,m}$ - coke consumption in Casting and Rolling Complex, t

$RMC_{coke(i),CRC,m}$ - coke (i) consumption in Casting and Rolling Complex, t

i - blast-furnace coke, foundry coke, other types of coke

m - month

$RMC_{carbonaceous\ materials,CRC,m} = \Sigma\ (RMC_{carbonaceous\ material(i),CRC,m})$

$RMC_{carbonaceous\ materials,CRC,m}$ - carbonaceous materials consumption in Casting and Rolling Complex, t

$RMC_{carbonaceous\ material(i),CRC,m}$ - carbonaceous material (i) consumption in Casting and Rolling Complex, t

i - high carbonized materials, other types of carbonized material with carbon content more than 0.93 tC/t
m - month

(1.2) $PE_{GRID,m} = EC_{GRID,PJ,m} * EF_{CO2,GRID,y}$
$PE_{GRID,m}$ - emissions in Electricity system in project scenario, tCO_2
$EC_{GRID,m}$ - electricity consumption in Casting and Rolling Complex, MWh
$EF_{CO2,GRID,y}$ - CO_2 emission factor for electricity generation in Electricity system, tCO_2/MWh
m - month
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-6 $P_{HRP,CRC,m}$	production of finished hot rolled products in Casting and Rolling Complex	Technical report of OJSC OMK-Steel Subsidiary	t	m	Monthly	100%	Electronic and paper	Recorded by Record controller of Hot strip mill

$EF_{CO2,SP,OUT,y}$	CO_2 emission factor for hot rolled flat products production at Russian metallurgical works	Reference data	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) $BE_y = \Sigma (P_{HRP,CRC,m} * EF_{CO2,SP,OUT,y})$

BE_y - baseline emissions, tCO_2

$P_{HRP,CRC,m}$ - production of finished hot rolled products in Casting and Rolling Complex, t

$EF_{CO2,SP,OUT,y}$ - CO_2 emission factor for hot rolled flat products production at Russian metallurgical works, tCO_2/t

y - year

m - month

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-2 $RMC_{i,CRC,m}$	carbonaceous raw materials (i) consumption in Casting and Rolling Complex	Technical report of OJSC OMK-Steel Subsidiary	t	m	Monthly	100%	Electronic and paper	Consumption of pig iron, hot briquetted iron. Recorded by Record controller of Meltshop
$EF_{CO2,RMi,OUT}$	CO_2 emission factor for carbonaceous raw materials (i) production at metallurgical plants	Reference data	tCO_2/t	e	Determined ex ante	100%	Electronic	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) $LE_y = \Sigma (RMC_{i,CRC,m} * EF_{CO2,RMi,OUT})$

LE_y - leakage, tCO_2

$RMC_{i,CRC,m}$ - carbonaceous raw materials (i) consumption in Casting and Rolling Complex, t

$EF_{CO2,RMi,OUT}$ - CO_2 emission factor for carbonaceous raw materials (i) production at metallurgical plants, tCO_2/t

i - pig iron, hot briquetted iron

y - year

m - month

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 - leakage, 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 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.

The project environmental impacts will be recorded by the Direction of labor, industrial, environmental and civil safety of Casting and Rolling Complex in compliance with the existing procedures:

- Regulation “About labor, industrial, environmental and civil safety”;
- Instructions “Industrial environmental control in Environmental management system of Casting and Rolling Complex OJSC OMK-Steel;
- Job description of environmental manager.

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 record of the data on the project environmental impacts will be done based on instrumental measuring performed by an accredited analytical laboratory and based on calculation methods approved for application.

The information on the environmental impact of project activities is to be stored in the Casting and Rolling Complex 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: $FC_{NG,CRC,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in- plant standards and approved methodologies.
Table D.1.1.1, D.1.3.1 ID-2: $RMC_{i,CRC,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in- plant standards and approved methodologies.
Table D.1.1.1, D.1.1.3 ID-3: $P_{STEEL,CRC,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in- plant standards and approved methodologies.
Table D.1.1.1, ID-4: $EC_{GRID,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in- plant standards and approved methodologies.

Table D.1.1.1 ID-5: $W_{j,NG,m}$	low	The natural gas supplier provides certificates of natural gas quality. Additional procedures of quality control are not foreseen.
Table D.1.1.1, D.1.1.3 ID-6: $P_{HRP,CRC,y}$	low	Measuring devices are calibrated/verified in compliance with the state regulation, in- plant standards and approved methodologies.

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 monthly in Casting and Rolling Complex by Head power engineer department, Meltshop and Hot strip mill and provided to the Direction of labor, industrial, environmental and civil safety.

If the expected monitoring parameters are unavailable from the primary data sources during the current monitoring period, they are to be determined based on data from replicated meters installed in or out of the project boundary or to be calculated according to the job instructions and approved methodologies for data recording. If the expected monitoring data are unavailable as result of failure of computer-aided information systems, the data for previous and current monitoring period are available from the technical reports on paper. The monitoring data are recorded and archived in the following documents:

- Technical reports of OJSC OMK-Steel Subsidiary (archived at Production department of Casting and Rolling Complex);
- Reports of Structure of energy resources distribution (archived at Head power engineer department).

The mentioned reports are prepared and archived in electronic and paper format. That is a good practice for ensure the monitoring data availability during the whole monitoring period.

Direction of labor, industrial, environmental and civil safety of Casting and Rolling Complex provides monthly the monitoring data to the CJSC “National Carbon Sequestration Foundation” for GHG emission reductions calculation and storages the achieved data in electronic and paper format. The calculation of the actual reduction of the GHG emissions will be provided monthly by CJSC “National Carbon Sequestration Foundation” in compliance with the formulae given in the sections D.1.1.2, D.1.1.4, D.1.3.2. To monitor the reduction of the GHG emissions a calculation model will be used, it is elaborated in Excel. The monitoring report will be prepared yearly by CJSC “National Carbon Sequestration Foundation” and approved by Casting and Rolling Complex.

The procedures of the initial data collection for the reduction of the GHG emissions monitoring, the data delivering and processing, GHG reduction calculation and monitoring report preparation will be included to the existing management system of Casting and Rolling Complex. The initial data to calculate the reduction of the GHG emissions and the results of the calculations will be archived at Direction of labor, industrial, environmental and civil safety during the crediting period and two years after the last transfer of ERUs for the project.

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 project and baseline scenario and GHG emission reductions is made based on actual data for 2009-2010 and forecasted data for 2011-2020 using the formulae given in the section D.[50]

E.1. Estimated project emissions:

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

#	Emission source	Unit	Year			
			2009	2010	2011	2012
1.	Casting and Rolling Complex	tCO_2 equivalent	223,875	280,247	360,646	360,646
2.	Electricity system	tCO_2 equivalent	249,694	312,718	406,758	434,214
3.	Total	tCO_2 equivalent	473,569	592,965	767,404	794,860

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

#	Emission source	Unit	Year			
			2013	2014	2015	2016
1.	Casting and Rolling Complex	tCO_2 equivalent	360,646	360,646	360,646	360,646
2.	Electricity system	tCO_2 equivalent	422,012	426,079	433,197	430,147
3.	Total	tCO_2 equivalent	782,658	786,725	793,843	790,793

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

#	Emission source	Unit	Year			
			2017	2018	2019	2020
1.	Casting and Rolling Complex	tCO_2 equivalent	360,646	360,646	360,646	360,646
2.	Electricity system	tCO_2 equivalent	473,873	496,245	501,329	505,397
3.	Total	tCO_2 equivalent	834,519	856,891	861,975	866,043

[50] Calculation of GHG emission reductions including initial data is attached in Excel file: 2011-08-23_ОМК_GHG Estimation_ver.04.1.xls

E.2. Estimated leakage:

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

#	Emission source	Unit	Year			
			2009	2010	2011	2012
1.	Pig iron production	tCO_2 equivalent	175,751	283,235	321,304	321,304
2.	Hot briquetted iron production	tCO_2 equivalent	30,759	44,099	52,403	52,403
3.	Total	tCO_2 equivalent	206,510	327,334	373,707	373,707

Table E.2-2. Estimated leakage after the first commitment period

#	Emission source	Unit	Year			
			2013	2014	2015	2016
1.	Pig iron production	tCO_2 equivalent	321,304	321,304	321,304	321,304
2.	Hot briquetted iron production	tCO_2 equivalent	52,403	52,403	52,403	52,403
3.	Total	tCO_2 equivalent	373,707	373,707	373,707	373,707

Table E.2-3. Estimated leakage after the first commitment period

#	Emission source	Unit	Year			
			2017	2018	2019	2020
1.	Pig iron production	tCO_2 equivalent	321,304	321,304	321,304	321,304
2.	Hot briquetted iron production	tCO_2 equivalent	52,403	52,403	52,403	52,403
3.	Total	tCO_2 equivalent	373,707	373,707	373,707	373,707

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

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

#	Parameter	Unit	Year			
			2009	2010	2011	2012
1.	Project emissions	tCO_2 equivalent	473,569	592,965	767,404	794,860
2.	Leakage	tCO_2 equivalent	206,510	327,334	373,707	373,707
3.	Total	tCO_2 equivalent	680,079	920,299	1,141,111	1,168,567

Table E.3-2. Estimated project emissions and leakage after the first commitment period

#	Parameter	Unit	Year			
			2013	2014	2015	2016
1.	Project emissions	tCO_2 equivalent	782,658	786,725	793,843	790,793
2.	Leakage	tCO_2 equivalent	373,707	373,707	373,707	373,707
3.	Total	tCO_2 equivalent	1,156,365	1,160,432	1,167,550	1,164,500

Table E.3-3. Estimated project emissions and leakage after the first commitment period

#	Parameter	Unit	Year			
			2017	2018	2019	2020
1.	Project emissions	tCO_2 equivalent	834,519	856,891	861,975	866,043
2.	Leakage	tCO_2 equivalent	373,707	373,707	373,707	373,707
3.	Total	tCO_2 equivalent	1,208,226	1,230,598	1,235,682	1,239,750

E.4. Estimated baseline emissions:

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

#	Emission source	Unit	Year			
			2009	2010	2011	2012
1.	Metallurgical works not incorporated into OMK	tCO_2 equivalent	1,426,942	1,969,783	2,430,000	2,430,000

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

#	Emission source	Unit	Year			
			2013	2014	2015	2016
1.	Metallurgical works not incorporated into OMK	tCO_2 equivalent.	2,430,000	2,430,000	2,430,000	2,430,000

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

#	Emission source	Unit	Year			
			2017	2018	2019	2020
1.	Metallurgical works not incorporated into OMK	tCO_2 equivalent	2,430,000	2,430,000	2,430,000	2,430,000

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			
			2009	2010	2011	2012
1.	Difference between E.4. and E.3. representing the emission reductions of the project	tCO_2 equivalent	746,863	1,049,484	1,288,889	1,261,433

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

#	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	1,273,635	1,269,568	1,262,450	1,265,500

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

#	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	1,221,774	1,199,402	1,194,318	1,190,250

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)
2009	473,569	206,510	1,426,942	746,863
2010	592,965	327,334	1,969,783	1,049,484
2011	767,404	373,707	2,430,000	1,288,889
2012	794,860	373,707	2,430,000	1,261,433
Total (tonnes of CO_2 equivalent)	2,628,798	1,281,258	8,256,725	4,346,669

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	782,658	373,707	2,430,000	1,273,635
2014	786,725	373,707	2,430,000	1,269,568
2015	793,843	373,707	2,430,000	1,262,450
2016	790,793	373,707	2,430,000	1,265,500
2017	834,519	373,707	2,430,000	1,221,774

2018	856,891	373,707	2,430,000	1,199,402
2019	861,975	373,707	2,430,000	1,194,318
2020	866,043	373,707	2,430,000	1,190,250
Total (tonnes of CO_2 equivalent)	6,573,447	2,989,656	19,440,000	9,876,897

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 (EIA) 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 (EIA) of the Casting and Rolling Complex construction project 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 No.7-FL;
- Federal law of the RF “On Ecological Examinations” as of 25/11/1995 No.174-FL;
- Federal law of the RF “On the Sanitary and Epidemiological Safety of the Population” as of 30/03/1999 No.52-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;
- 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 No. 372 as of 16/05/2000.

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

- Casting and Rolling Complex. Working draft. Approvals package. Volume 5. Environmental impact assessment (EIA). / / SE “Vyksa Environmental Center” - Vyksa, 2005. - Arch. No. 1200 RP-5.

The main sources of pollutant emissions are the electric arc furnace, the ladle furnace, the vacuum unit, the drying and heating stations of the steel teeming ladles, the roll-mill preheating furnace, the lime-burning kiln, the steam and hot water boilers. The main pollutants are nitrogen oxides, carbon monoxide, sulfur dioxide, inorganic dust and iron oxides.

Water for the Casting and Rolling Complex for industrial, drinking and fire protection purposes will be provided from surface water and groundwater. There is no discharge of industrial waste. The service-utility and storm sewages require cleaning.

The main types of wastes generated as a result of the Casting and Rolling Complex are steelmaking slag, dross, scrap, crops, refractories, gas cleaning dust, sludge, etc. Over 60% of the waste is recycled.

The main sources of noise and vibration in the Casting and Rolling Complex are the shredder unit, the production equipment of the electric steelmaking division, the continuous steel casting division, the rolling division, the pumping compressor and ventilating equipment, and the transportation equipment.

There are no other harmful factors resulting from the project, such as electromagnetic and ionizing radiation, ultrasound, etc.

The measures to be taken to reduce the negative impact of the Casting and Rolling Complex on the environment and to ensure that allowable exposure limits are not exceeded include:

Air quality protective measures:

- Protection from dust-creating equipment and overturning with the installation of aspiration systems, equipped with dust-trapping units;
- The reduction of emissions from the Meltshop lamp room space by installing hoods to capture fugitive emissions from the electric arc furnace created during the loading of scrap into the electric arc furnace through electrode gaps during the melting and steel production processes;
- The greatest possible centralization of wastewater scouring systems (combined gas cleaning for furnaces, the ladle-furnace, the loading system of the working chargers and for fugitive emissions from the electric arc furnace);
- The use of high-efficient dust cleaning units (bag filter) that can reduce the emission of pollutants into the atmosphere by an average of 99%.

Measures to protect the water basins:

- The closed reversible circuit of the industrial water supplied to the Casting and Rolling Complex excluding the discharge of industrial wastewater into the water basin;
- The removal of waste water to the existing wastewater sewage and household waste purification works situated in the area of the river Zmeika;
- The advanced treatment of storm sewage and the discharge of treated sewage according to the requirements of the II Category fishery water bodies in the Ivoylovka creek;
- Part of the treated rainfall runoff will be used for additional charging of the reversible circuits of the industrial water supply.

Production waste management measures:

- The processing of steelmaking slag into fractionated rubble, which can be used in road construction, as well as in the production of cement, binders, asphalt and sand-lime brick;
- The use of refractory products for repairing heating furnaces;
- Collection and disposal in the scrap-processing department in order to reuse the dried scale, trim, short measure, and the scrap from industrial scoops;
- Sludge from the treatment facilities and dust captured by the Meltshop gas treatment facilities is sent to the dehydration facility and then to the briquetting facility and after that it is sent back into production;
- Household and industrial waste is transported to the landfills of the JSC VMZ for disposal;

Usage of land resources:

- The proposed circuit layout of the plant means that the facilities and sections are arranged close-together;
- Landscaping and site finishing of the plant is provided.

Noise and vibration impact mitigating measures:

- Protection from the Zerdirator shredder, room acoustic insulation located in areas with high noise levels;
- The installation of ventilation equipment in special rooms or the installation of special noise hoods for protection;

- The installation of fans and pumps on the antivibration mountings;
- The usage of flexible inserts where the air ducts are connected to the fans;
- The usage of special supports for the pipelines which vibrate.

In general, the results of the environmental impact assessment of the project, taking into account the measures to reduce the negative impact of the plant show that the implementation of the project will not result in significant environmental impacts and transboundary effect.[51]

The Casting and Rolling Complex has all the necessary permits regarding the project's impact on the environment:

- Permit for the release of hazardous pollutants into the atmospheric air No. 3608 as of 01/07/2010 from 01/07/2010 to 30/06/2015, issued by the Volga-Oka Federal Service for Ecological, Technological and Nuclear Supervision.
- Decision to grant full use of the water body No. 52-09.01.03.012-Р-РСБХ-С-2010-00452/00 as of 14/12/2010 from 14/12/2010 to 14/12/2011.
- Waste disposal limit Reg. No3982 as of 29/12/2009 from 29/12/2009 to 10/07/2014, issued by the Volga-Oka Federal Service for Ecological, Technological and Nuclear Supervision.

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:

Results of the environmental impact assessment of the planned commercial and other activities are subject to a state environmental review (Federal Law "On Ecological Expertise" as of 25/11/95 No 174-FL).[52]

Environmental approval is the establishment of compliance between the planned commercial and other activities with the environmental requirements, and the determination of the feasibility of the project under approval in order to prevent possible adverse effects on the environment and the related social, economic and other consequences that the project may bring.

The Casting and Rolling Complex construction project is received positive findings from a State ecological expertise:

- Conclusion of the state ecological expert commission as of 30/03/2004, approved by the order of the Chief of the Main Department of Natural Resources and Environmental Protection of the Nizhny Novgorod region No. 472-Э as of 30/03/2004.

The positive conclusion of the state ecological expertise proves the compliance of the project with current Russian environmental protection legislation, i.e. it confirms that the impact of the project is acceptable on the air quality, surface water bodies and ground waters, including the impact of production and consumption waste, land resources, and flora and fauna resources. This refers to all stages of the project from construction to decommissioning.

[51] Calculations of the dispersion of pollutants in the atmosphere (given in the documentation - Volume 5 EIA) confirm that the concentration of pollutants at the boundary of the sanitary protection zone does not exceed the maximum allowable value, thus the project does not result in transboundary effect.

[52] Links to the developed materials of the EIA project and regulatory legal acts are given in Section F.1.

SECTION G. Stakeholders' comments

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

The Casting and Rolling Complex construction project has passed public consultations and received positive approval from the parties involved. There are not negative comments of the stakeholders.[53]

In the public consultations of the project implementation have participated:

- Residents of the city Vyksa and the Vyksa District of Nizhny Novgorod region,
- Representatives of Vyksa District Administration (Head of District),
- Representatives of executive authorities (District Committee of Ecological Control, State Fire Safety, District Sanitary Inspector),
- Representatives of the project owner (Vice-president of CSJC "OMK"),
- Representatives of the project designer (OSJC "Ukrgipromez", NP "Ecocenter"),
- Representatives of rural and village organizations (Vyksa District Assembly, Vyksa Veteran Council),
- Interested organizations (OSJC "Vyksa Steel Works", Vyksa leshoz).

During the public consultations were reviewed the technical, environmental and economic issues of the project. The importance of the Casting and Rolling Complex construction project for the improvement of the socio-economic situation in the region was pointed out: the creation of new jobs, the development of the transportation infrastructure, the increase of payments into the budget, the fact that there would be no negative impact on public health and the environment.

[53] Protocol of the public hearings on the construction of the Casting and Rolling Complex of United Metallurgical Company JSC as of 06/02/2004.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Organisation:	ZAO "United Metallurgical Company"
Street/P.O.Box:	Ozerkovskaya naberezhnaya
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URL:	http://www.omk.ru/
Represented by:	Tarasov Oleg
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Salutation:	-
Last name:	Tarasov
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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[54]

<table>
<tr><th>#</th><th>Parameter</th><th>Description</th><th>Source</th><th>Parameter</th></tr>
<tr><td>1.</td><td>$P_{HRP,CRC,m}$</td><td>Production of finished hot rolled products in Casting and Rolling Complex</td><td><table><tr><td>Year</td><td>t</td></tr><tr><td>2009</td><td>704,662</td></tr><tr><td>2010</td><td>972,732</td></tr><tr><td>2011</td><td>1,200,000</td></tr><tr><td>2012</td><td>1,200,000</td></tr></table></td><td>Technical reports of Casting and Rolling Complex and Forecast</td></tr>
<tr><td>2.</td><td>$EF_{CO2,SP,OUT,y}$</td><td>CO_2 emission factor for hot rolled flat products production in Russian metallurgical works</td><td>2.025 tCO_2 / t</td><td>Reference data</td></tr>
</table>

[54] 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	$W_{C,STEEL}$
Data unit	tC/t
Description	carbon content in steel
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Determined as average value of carbon content in steel grades produced in Casting and Rolling Complex. The initial data of carbon content in raw materials are provided by OJSC OMK-Steel.
Value of data (for ex ante calculations/determinations)	0.0010
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The actual value of carbon content in steel (0.0005 – 0.0021 tC/t)
QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	$W_{C,steel\ scrap}$
Data unit	tC/t
Description	carbon content in steel scrap
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Determined as maximum value of carbon content in steel scrap used in Casting and Rolling Complex. The initial data of carbon content in raw materials are provided by OJSC OMK-Steel.
Value of data (for ex ante calculations/determinations)	0.0025

Justification of the choice of data or description of measurement methods and procedures (to be) applied	Used the maximum rate of carbon content in steel scrap (0.0020 – 0.0025 tC/t) for conservative GHG emission reductions assumption.
QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	$W_{C,pig\ iron}$
Data unit	tC/t
Description	carbon content in pig iron
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Determined as average value of carbon content in pig iron used in Casting and Rolling Complex. The initial data of carbon content in raw materials are provided by OJSC OMK-Steel
Value of data (for ex ante calculations/determinations)	0.043
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The conservativeness of the chosen value confirmed by actual certificates for pig iron supplied to the Casting and Rolling Complex
QA/QC procedures (to be) applied	-
Any comment	The chosen value is corresponding to the National Inventory Report about GHG emissions by sources and removals by sinks for the period 1990-2007, 2009

Data / parameter	$W_{C,hot\ briquetted\ iron}$
Data unit	tC/t
Description	carbon content in hot briquetted iron
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Catalog of Lebedinsky GOK products, Metalloinvest Mining Devision – p.35. Source: http://www.metinvest.com/rus/potrebitelam/

	prodykcia/
Value of data (for ex ante calculations/determinations)	0.0124
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The value of carbon content in hot briquetted iron determined by OJSC OMK-Steel is not more than reference data. The initial data of carbon content in raw materials are provided by OJSC OMK-Steel.
QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	**$W_{C,graphite\ materials}$**
Data unit	tC/t
Description	carbon content in graphite materials
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	The initial data of carbon content in raw materials are provided by OJSC OMK-Steel
Value of data (for ex ante calculations/determinations)	0.835
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Confirmed by sectoral regulations
QA/QC procedures (to be) applied	-
Any comment	The graphite materials include graphite in granules, synthetic graphite and other types of graphite.

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

Source of data (to be) used	The initial data of carbon content in raw materials are provided by OJSC OMK-Steel
Value of data (for ex ante calculations/determinations)	0.835
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Confirmed by sectoral regulations
QA/QC procedures (to be) applied	-
Any comment	Coke includes blast-furnace coke, foundry coke and other types of coke. The determined value is more than IPCC default data (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)

Data / parameter	$\mathbf{W_{C,carbonaceous\ materials}}$
Data unit	tC/t
Description	carbon content in carbonaceous materials
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	The initial data of carbon content in raw materials are provided by OJSC OMK-Steel.
Value of data (for ex ante calculations/determinations)	0.95
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Confirmed by sectoral regulations.
QA/QC procedures (to be) applied	-
Any comment	The carbonaceous materials include the high carbonized materials with carbon content more than 0.93 tC/t.

Data / parameter	**$W_{C,electrodes}$**
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 actual value of carbon content in electrodes in not provided in quality certificates and cannot be measured in Casting and Rolling Complex. Therefore the reference data are chosen.
QA/QC procedures (to be) applied	-
Any comment	-

Data / parameter	**$W_{C,limestone}$**
Data unit	tC/t
Description	carbon content in limestone
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)	0.12
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	**$EF_{CO2,GRID,y}$**
Data unit	tCO_2/MWh
Description	CO_2 emission factor for electricity generation in Electricity system
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Development of the electricity carbon emission factors for Russia. Baseline Study for Russia. Final report // European Bank for Reconstruction and Development, Lahmeyer international, 2010. – Table 5.2, p. 5-3.
Value of data (for ex ante calculations/determinations)	Year: tCO_2/MWh 2009: 0.394 2010: 0.397 2011: 0.400 2012: 0.427
Justification of the choice of data or description of measurement methods and procedures (to be) applied	CO_2 emission factor is determined for the Demand-Side in the Electricity system IPS Volga. Casting and Rolling Complex is located in Nizhny Novgorod Region and connected with IPS Volga by Substation “Радуга” (see technical description of the project in the section A.4.2 and characteristic of IPS Volga – http://www.odusv.so-cdu.ru/catalog/index.php?cid=42&pid=449).
QA/QC procedures (to be) applied	-
Any comment	Determined CO_2 emission factor for electricity generation in Electricity system includes the emissions connected with technical losses by transportation of electricity

Data / parameter	**$EF_{CO2,pig\ iron,OUT}$**
Data unit	tCO_2/t
Description	CO_2 emission factor for pig iron production at metallurgical plants
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Determination of CO_2 emission factor for hot rolled products production in Russian

	metallurgical works in the absence of the 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" – CJSC "New metallurgical technology", Moscow, 2011. – 35 p.
Value of data (for ex ante calculations/determinations)	2.034
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The parameter is determined as average value of CO_2 emission factor for pig iron production in the baseline scenario. The emission factor includes the emissions from pellet, sinter and coke production and auxiliary emissions from additional raw materials preparation and energy resources consumption.
QA/QC procedures (to be) applied	-
Any comment	The approach used for CO_2 emission factor for pig iron production at metallurgical plants in project scenario is the same as for the baseline scenario. This provides to the comparable data in the project and baseline scenario.

Data / parameter	**$EF_{CO2,hot\ briquetted\ iron,OUT}$**
Data unit	tCO_2/t
Description	CO_2 emission factor for hot briquetted iron production at metallurgical plants
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. 4.1, p. 4.25
Value of data (for ex ante calculations/determinations)	0.700
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The conservativeness of the chosen parameter is confirmed by relevant publication: Lisienko V.G., Lapteva A.V., Chesnokov A.V. Comparative analysis of GHG emissions from alternative cokeless metallurgical processes. – Metallurg #7, 2011.

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

Data / parameter	**$EF_{CO2,SP,OUT,y}$**
Data unit	tCO_2/t
Description	CO_2 emission factor for hot rolled flat products production in Russian metallurgical works
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Determination of CO_2 emission factor for hot rolled products production in Russian metallurgical works in the absence of the 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” – CJSC “New metallurgical technology”, Moscow, 2011. – 35 p.
Value of data (for ex ante calculations/determinations)	2.025
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The approach used for emission factor calculation includes the following stages of metal production: pellet, sinter, coke, pig iron production, hot rolling and auxiliary processes of additional raw materials preparation and energy resources consumption. The parameter is determined based on transparent data and conservative assumptions as clearly described in the provided study.
QA/QC procedures (to be) applied	-
Any comment	The mentioned study is completed by experts in area of metallurgy and environmental impact of metallurgical works.

Data / parameter	**$n_{C,j}$**
Data unit	-
Description	Number of the carbon moles per mole of natural

	gas j-component
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	IPCC Guidelines for National Greenhouse Gas Inventories, 2006 – Volume 2: Energy, Chapter 4: Fugitive Emissions, p. 4.45
Value of data (for ex ante calculations/determinations)	$n_{C,CH4}$ = 1; $n_{C,C2H6}$ = 2; $n_{C,C3H8}$ = 3; $n_{C,C4H10}$ = 4; $n_{C,C5H12}$ = 5; $n_{C,C6H14}$ = 6; $n_{C,CO2}$ = 1; $n_{C,N2}$ = 0; $n_{C,O2}$ = 0; $n_{C,He}$ = 0.
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	ρ_{CO2}
Data unit	kg/m^3
Description	CO_2 density under the standard conditions (293 K, 101.3 kPa)
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	Methodology of the calculation of the pollution emissions into the atmosphere during the associated petroleum gas flaring, Research institute “Atmosphere”, 1998.
Value of data (for ex ante calculations/determinations)	1.831
Justification of the choice of data or description of measurement methods and procedures (to be) applied	-
QA/QC procedures (to be) applied	-
Any comment	-