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

CONTENTS

SECTION A. General description of the project

A.1. Title of the project:

Installation of CCGT unit at the Dzerzhinskaya HPS, Russian Federation

Sectoral scope: 1 – Energy (renewable/non-renewable sources)

Version: 02.

Data: 23/12/2011

A.2. Description of the project:

Project objectives:
- to increase the efficiency of electric power production
- to improve environmental conditions
- to decrease the emission of greenhouse gases

Project tasks:
- to introduce the CCGT Unit
- to build a gas infrastructure (gas compressor unit, on-site gas pipeline)
- to reconstruct the main building
- to build an engineering infrastructure

The situation existing prior to the project
The installed capacity of the OJSC Dzerzhinskaya HPS (Heat and Power Station) before the project was as follows:
Electric capacity - 485 MW
Thermal capacity - 1349 Gcal
Primary fuel of the Dzerzhinskaya HPS was fuel oil and natural gas.
The increase in consumer demand for heat and power energy led to the need to increase the heat and electric power capacity of the Dzerzhinskaya HPS.

Baseline scenario

In the absence of the Project, turbine No.3 P-50 would be taken out of operation and boiler No.9 BKZ-420 that would use the fuel oil 85% and natural gas 15% as a fuel and turbine No. 7 PT-140/165/ would be installed. The baseline GHG emissions would be equal to **5 184 209 tons of CO2 between 2008 and 2012.**
Baseline scenario assumes continuation of a project that was starting to plan in 1990.

Project scenario

It is proposed to take boiler No.3 TGM-88 ,turbine No.3 R-50 and No.4 R-50 out of operation, and replace them with a combined cycle gas turbine unit (CCGT unit) in the following configuration:
- a 150 MW power Siemens gas turbine unit, type V94.2
- a waste-heat boiler from the Machine Building Factory of the Podolsk PR-310-1.5-275
- a steam-generating set T-30/45-145

Existing capacity of natural gas at Dzerzhinskaya HPS is not enough for supplying of implemented CCP. Therefore, construction of additional gas infrastructure was necessary. That is:

- gas compressor station
- additional high pressure gas pipeline 600 meters long with a gas metering skids.

Project scenario assumes continuation of a project that was starting to plan in 1994.

In the event of the implementation of the project the emissions would be equal to **2 784 599 tons of CO2 between 2008 and 2012.**
The implementation of the project will lead to a decrease of **2 399 610 tons of CO2 between 2008 and 2012.**

Project background

The discussion regarding the reconstruction of the Dzerzhinskaya HPS began in 1990. The reconstruction plan envisaged the further development of generation according to the baseline scenario with the application of the established design. This design included the combined generation of heat and electric power by a steam turbine using the fuel oil in the unit's boiler. For these purposes it was planned to install an additional boiler No.9 BKZ-420 and a turbine unit No.7 GN-140*165-130 at the Dzerzhinskaya HPS and to take turbine No.3 out of operation. The plan was to carry out the reconstruction between 1993 and 1996. However, because of the collapse of the USSR in 1991 and the subsequent privatizations the reconstruction was halted.

In January 1994 the new owner of the HPS (OJSC Nizhnovenergo) returned to the issue of reconstruction. The offer from Siemens AG was considered and accepted. The proposal was to install the steam and gas unit No.3. The sources of financing, which included internal funds of the OJSC Nizhnovenergo and funds raised from the RAO UES and the budget of the Nizhny Novgorod Region, were selected. In March 1994 an agreement was signed, according to which the installation of unit No.3 was planned for November 1996. Because of the problems with funding that began in 1996 the project was halted. In 1997 due to the beginning of the structural reform in electrical power engineering[1] the present project was eliminated from the development plans of the RAO UES. Thus, the project was deprived of a significant source of financing from the electric-power holding company. As a result the agreement with Siemens AG was annulled and the project was frozen.

Interest reemerged to this project in 2001 when the company management at the meeting as of 25/02/2001 took the decision to implement the project with the application of the mechanism of the Joint Implementation of the Kyoto Protocol[2]

From 2001 to 2004 the engineering data was updated, permits and agreements were received and funding sources for the project were sought out. The only funding source was a loan from the OJSC Sberbank of the Russian Federation. The bank lent the entire sum of the investment. In May 2004 the project received its first funds. In December 2005 the steam and gas unit No.3 was put into operation.

A.3. Project participants:

Party involved	**Legal entity project participant (as applicable)**	**Please indicate if the Party involved wishes to be considered as project**

[1] Decree of the President of the Russian Federation №497Concerning the Basic Regulations of the structural reform in the field of natural monopolies" as of April 28, 1997

[2] Minutes №18 as of 25.02.2001

		participant (Yes/No)
Party A - Russian Federation (Host Party)	JSC "TGK-6"	No
Party B – no	-	-

The Open Joint Stock Company Territorial Generating Company No.6 (OJSC TGC-6) was established in accordance with the decision of the President of the OJSC RAO UES as of 25.04.2005 No.103p on the basis of the generating suppliers, located in the Nizhny Novgorod, Vladimir, Ivanovo, and Penza regions as well as the Republic of Mordovia. The executive personnel are located in Nizhny Novgorod. The primary activity of the company is the production of heat and electric power. In the six affiliates of the OJSC TGC-6 there are 14 HPS, 1 State District Power Station (SDPS), and 3 boiler houses. The total installed electric capacity is 3 132.5 MW. The total installed heat power is 10 277 Gcal/h. The total length of the main heat network (including the leased ones) is over 900 km.

The Dzerzhinsky affiliate of the OJSC TGC-6 was created as part of the OJSC Dzerzhinskaya HPS and is a separate production unit of the OJSC TGC-6. The primary activity of the affiliate is the production of heat and electric power, equipment operation, heat networks, buildings and constructions in accordance with the acting quality standards. The installed electric power of the station is 565 MW, the installed heat power is 1 474 Gcal/h.

A.4. Technical description of the project:

A.4.1. Location of the project:

The project is implemented at the Dzerzhinskaya HPS in the city of Dzerzhinsk located in the Nizhny Novgorod region, the Russian Federation.

A.4.1.1. Host Party(ies):

The Russian Federation

Figure A.1. Russia on the world map

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

The Nizhny Novgorod Region is located in the centre of the European part of the Russian Federation. The administrative center is Nizhny Novgorod.

Picture A.2. Nizhny Novgorod Region on the map of Russia

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

The city of Dzerzhinsk is located 30 kilometers to the West of Nizhny Novgorod

Figure A.3. Dzerzhinsk city on the map of the Nizhny Novgorod Region

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

The project is implemented at the industrial site of Dzerzhinskaya HPS, TGK-6.

Address: Dzerzhinskaya HPS, 606000, Russian Federation, Nizhegorodskaya oblast, the city of Dzerzhinsk. Coordinates: 40°65′ 31″ N,114°33′23″ E

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

The project envisages the replacement of the facilities and the transfer to another fuel

General technologies

Composition of the primary facilities

In place of the steam-power facilities of the turbine unit No.3, type R-50-130/13 (capacity 50 MW) and boiler unit No.3, type TGM-88 (steam generating capacity – 420 t/h) the following new facilities are installed:

- a V94.2 Siemens gas-turbine unit with a capacity of 150MW
- a waste-heat boiler from the Machine Building Factory of the Podolsk PR-310-1.5-275
- a steam-generating set T-30/45-145

The Siemens V94.2 gas-turbine unit with a nominal capacity of 150MW is installed according to a simple single schematic without intermediate air-cooling, and it has two combustion chambers located on each side. The combustion chambers are equipped with eight built-in vertical burners, the construction of which makes it impossible for the flame to directly hit the turbine blades. The decisions taken concerning the combustion chamber with the application of the combined burners, enable the Siemens company to ensure that the permissible emission of NO is not exceeded when the chamber is dry and within the wide range of the load . The general specifications of the V94.2 gas-turbine:

- nominal capacity - 150 MW on generator lugs
- maximum capacity - 173 MW
- air consumption - 500 kg/sec
- gas consumption by nominal capacity - 50 thousand n/m2
- rated speed - 3000 rad/sec
- combustion chamber temperature - 1050 degrees C
- efficiency - 34.4 %.

A waste-heat boiler is a single-bottom vertical boiler with a single-drum, with the heating area suspended to its frame. The producer of the waste-heat boiler is the JSC Machine Building Factory of Podolsk. The steam-generating circuit is made with forced medium flow with the application of recycle pumps. The operative range of the efficiency control of the boiler is 50-100%. The steam temperature at start-up can be controlled by either using overheater bypasses or by using a starting injection. The waste-heat boiler efficiency is 300 t/h, the exit steam conditions: pressure – 15 at, temperature - 280°C.

Electrical part

The power delivery is envisaged according to the following scheme: generator-transformer unit – 110 kV High Voltage transmission line –to the Transformer Station "Oka". The unit contains the following primary electrical facilities:

- generator TLR I-108/36 with a capacity of 149 MW, with air cooling, stator lead voltage – 10.5 kV, produced by Siemens
- Step-up transformer TDZ-200000/110, 121/10.5 kV with a capacity of 200MW, produced by the JSC Zaporozhtransformator;
- High-voltage switch BMT-110Б-40/2000, breaking current is 40 kA, rated current 2000 A.

The connection of the turbo-generator with the step-up transformer unit is made by the shielded current distributor set. Within the turbine hall to line "A" the current distributor is provided by Siemens, and then till the transformer – JSC Moselectroshchit. A Siemens switch is installed in the generator circuit.

Time schedule of the project implementation

Dzerzhinskaya HPS	**30.05.2004 – 21.12.2005**
Facilities delivery	11.11.2004 - 15.05.2005
Dismantling of the old facilities	27.11.2004 - 03.01.2005
Installation of the gas-turbine unit	18.04.2005 - 11.12.2005
Generator installation	28.04.2005 - 06.09.2005
Waste-heat boiler installation	23.01.2005 - 06.09.2005
Automatic System Control installation	28.05.2005 - 30.11.2005
Electric facilities installation	03.06.2005 - 06.09.2005
Pre-commissioning	05.10.2005 - 30.11.2005
Staff training	04.04.2005 – 04.09.2005

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:

The result of the project is the production of heat and electric power with the application of natural gas at the CCGT unit. Generating energy with the use of CCGT unit rather than using a conventional steam turbine (as it would be under the baseline) is a more efficient way in terms of fuel consumption as less fuel is needed for the output of 1 kWh of electric power and 1 Gcal of heat. Besides, the project leads to replacement of 85% fuel with high carbon content fuel oil with fuel with low carbon content (natural gas). As a result GHG emission reduction will occur, because in the generation of the same amount of electric power and heat less greenhouse gases will be produced. The reduction of greenhouse gas emissions can only be achieved through the project and cannot be achieved under baseline scenario.

While making a decision concerning the Project the Company considered the option of a power boiler using the natural gas and fuel oil. The transition to natural gas became viable due to opportunities offered by the mechanism of the Joint Implementation of the Kyoto protocol. Therefore, in the absence of the project it would be impossible to reduce greenhouse gas emissions.

A detailed calculation of the emissions is presented in Section A.4.3.1.

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

	Years

Length of the crediting period	5
Year	Estimate of annual emission reductions in tonnes of CO_2equivalent
2008	**449 113**
2009	**432 412**
2010	**477 153**
2011	**551 752**
2012	**489 178**
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**2 399 610**
Annual average of emission reductions over the crediting period (tonnes of CO_2 equivalent)	**479 922**

A.5. Project approval by the Parties involved:

On September 15, 2011 the Resolution of the Government of the Russian Federation "Concerning the measures on the implementation of Article 6 of the Kyoto protocol to the UN FCCC concerning climate changes" was adopted. This document approves the Regulations concerning the implementation of Article 6 of the Kyoto protocol. In accordance with item 8 of the Regulations Projects shall be approved by the ministry of Economic Development of the Russian Federation based on the results of the competitive selection of applications. The competitive selection of applications is made by the operator of carbon units (Sberbank of Russia) in accordance with item 5 of the Resolution of the Government of the Russian Federation No.780.

The application should contain "a positive expert opinion regarding the project documentation, prepared in accordance with international requirements by an independent body, chosen by the applicant". Thus, in accordance with the applicable laws of the Russian Federation in the implementation of CO projects, Project approval is possible only after a positive opinion is received from the determining company.

The project approval by a Party involved other than the host Party is absent at the time of the determination. The party involved other than the host Party will be determined after the approved by the Ministry of Economic Development and Trade of the Russian Federation.

SECTION B. Baseline

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

As appropriate, project participants may, but are not obliged to, apply approved clean development mechanism (CDM) baseline and monitoring methodologies. Based on that a JI specific approach regarding baseline setting is used. This approach is based on the provisions of Guidelines for users of the JI PDD Form (Version 03) [3] and includes the following steps:

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

The following is a detailed presentation of the two steps:

Step. 1. Indication and Description of the Approach Chosen Regarding the Baseline Setting

The baseline is determined through considerations of various alternative scenarios with regard to the proposed project activity. As criteria for choosing the baseline scenario the key factors will be determined. All alternatives will be considered in terms of influence on them of these factors. The alternative scenario, which is the least negatively influenced by the key factors, will be chosen as the baseline. Therefore, the following stages of determining the baseline scenarios are envisaged:

a) Identification of alternative scenarios.
b) Description of the key factors.
c) Analysis of the influence of the key factors on the alternatives.
d) Choosing the most plausible alternative scenario.

Step. 2. Application of the Scenario Chosen

Identification of alternative scenarios

At this stage the alternative scenarios are defined and checked for compliance with the applicable law.

There are two alternative scenarios:

Alternative scenario 1. Decommission of turbine No.3 with the installation of boiler No.9 and turbine No.7

This alternative supposes the decommission of turbine No.7. Type R-50-130/13, capacity – 50 MW, and the installation of the following facility:
- Boiler No.9 BKZ-420-140 NGM, steam-generating capacity 420 t/h;
- Turbine No.3 PT-140/165-130/15, capacity – 140 MW

The fuel used is fuel oil 85% and natural gas 15%. Existing capacity of natural gas at Dzerzhinskaya HPS can cover only 15% of the fuel need for realization of alternative scenario 1. The rest part fuel need will be covered by fuel oil.

This alternative demands solutions to the environmental problems resulting from exceeding the maximum permissible emissions when combusting of fuel oil. For this a Denox filter was purchased and installed next to the proposed installation place of boiler No.9. A substructure was built at the proposed installation place of boiler No.9.

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

Alternative scenario 2. The Project itself without being registered as a JI project activity that is commissioning of CCGT plant

This alternative supposes the decommission of the current facilities:
- Boiler No.3 TGM-88, steam-generating capacity 420 t/h;
- Turbine No.3 P-50-130/13, capacity 50 MW;
- Turbine No.4 P-50-130/13, capacity 50 MW

Installation of the following facility:
- V94.2 Siemens gas-turbine unit with a capacity of 150MW
- Waste-heat boiler from the Machine Building Factory of the Podolsk PR-310-1.5-275;
- Steam turbine T-30/45-1.45

The fuel used is the natural gas. Existing capacity of natural gas at Dzerzhinskaya HPS is not enough for supplying of implemented CCP.
Therefore, construction of additional gas infrastructure was necessary. That is:
- gas compressor station
- additional high pressure gas pipeline 600 meters long with a gas metering skids.

To implement this alternative it would be necessary not only to purchase and install the facilities, but to conclude an agreement for servicing the turbines. Besides that the original project that included the Siemens gas turbine unit and waste-heat boiler was reconsidered – and a steam turbine was added.
For servicing the turbines a separate department to manage and service the CCGT unit was created in the Dzerzhinskaya HPS.

Analysis of the influence of the key factors on the alternatives

In this section the impact of factors on the alternative scenarios is considered. The key factor analysis is performed in accordance with item 25 "Guidance on criteria for baseline setting and monitoring". At this stage the impact of the following key factors on the development of the alternative scenarios chosen at the first stage is considered:
- Sectoral reform policies and legislation;
- Economic situation and availability of funds (including investment barrier);
- Local availability of technologies, equipment, experience and know-how;
- Price and availability of fuel

Below the analysis of the impact of key factors on the specified alternatives is provided:

<table>
<tr><td colspan="2">*Factor* – Sectoral reform policies and legislation</td></tr>
<tr><td>1. Decommision of turbine No.3 with the installation of boiler No.9 and turbine No.7</td><td rowspan="2">Minimal Impact

The general situation in this industry was characterized by the fact that there were electric power irregularities across some regions, there was an energy crises, the system of state control over the industry was changing, and the competitive market in the power industry was developing.
Sectoral reform policies is not influence at these alternatives.
Both alternatives do not contradict the current effective laws.</td></tr>
<tr><td>2. The Project itself without being registered as a JI project activity that is commissioning</td></tr>
</table>

of CCGT plant	

Factor - Economic situation and availability of funds (including investment barriers)	
1. Decommission of turbine No.3 with the installation of boiler No.9 and turbine No.7	Minimal impact According to investment analysis provided in section B2. This alternative have most pleasant economic effectiveness.
2. The Project itself without being registered as a JI project activity that is commissioning of CCGT plant	Substantial impact. According to investment analysis provided in section B2. This alternative have not best indexes of economic effectiveness. This alternative assumes the biggest investment cost.

Factor - Local availability of technologies, equipment, experience and know-how	
1. Decommission of turbine No.3 with the installation of boiler No.9 and turbine No.7	Minimal impact. This scenario assumes integrated system in to the Dzerzhinskaya HPS. The proposed configuration would let the HPS increase the reliability of its operations and flexibility in regard to heat and power output. The installed facilities are typical for HPS. No staff training is needed.
2. The Project itself without being registered as a JI project activity that is commissioning of CCGT plant	Substantial impact This scenario assumes separate CCGT unit. So, it can operate only as a separate system of the Dzerzhinskay HPS. This fact can complicate operation of Dzerzhinskay HPS. Technology and equipment, provided in this alternative are not prevalenced in Russia. Additional training is needed.

Factor - Price and availability of fuel	
1. Decommission of turbine No.3 with the installation of boiler No.9 and turbine No.7	Minimal impact This alternative assumes use 85% of fuel oil and 15% of natural gas as a fuel at new equipment. The delivery method was organized when the HPS began to operate. The fuel oil and gas infrastructure is operational. Fuel oil price is higher than natural gas price, but investment analysis provided in section B.2 shows that this fact is not influence at economic attractiveness of this alternative.
2. The Project itself without being registered as a JI project activity that is commissioning of CCGT plant	Substantial impact The Dzerzhinskaya HPS faced the problem of providing the gas-turbine unit with natural gas. To implement project it was necessary to build new gas infrastructure to increase natural gas capacity and coordinate gas limits with the gas-supplying company. Natural gas price is lower than fuel oil price, but investment analysis provided in section B.2 shows that this fact is not influence at economic unattractiveness of this alternative.

Stage 3. *Choosing the most plausible alternative scenario*

Based on the analysis, it is obvious that the key factors favor the implementation of Alternative Scenario 1 and have a negative impact on Alternative Scenario 2. Therefore, Alternative Scenario 1, namely *the decommission of turbine No.3 with the installation of boiler No.9 and turbine No.7* is the **baseline scenario**.

Key information and data to establish baseline

The formulas to establish baseline as well as the key information and data are provided below:

(B 1.1) $BE_y = BE_{NG} + BE_{FO}$
where:
BE_y - total GHG baseline emissions, t CO2-eq
$BE_{NG,y}$ - GHG baseline emissions from natural gas consumption, t CO2-eq
$BE_{FO,y}$ - GHG baseline emissions from fuel oil consumption, t CO2-eq

(B.1.2) $BE_{NG} = FC_{BE\,NG} * EF_{NG}$
where:
$FC_{BE\,NG}$ - baseline natural gas consumption, TJ
EF_{NG} - CO2 emission factor for natural gas, equal to 56.1 t CO2/TJ

(B.1.3) $FC_{BE\,NG} = (V_{lim}-V_{hist}) * NCV_{NG} * 4.1868*10^{-6}$
where:
V_{lim} - baseline natural gas capacity, ths.m^3
V_{hist} - minimal natural gas consumption by Dzerzhinskaya HPS for the period 2002-2004, ths.m^3
NCV_{NG} - net calorific value of natural gas at Dzerzhinskaya HPS

(B.1.4) $BE_{FO} = FC_{BE\,FO} * EF_{FO}$
where:
$FC_{BE\,FO}$ - baseline fuel oil consumption, TJ
EF_{FO} - CO2 emission factor for fuel oil, equal to 77.4 t CO2/TJ

(B.1.5) $FC_{BE\,FO} = FC_{BE} - FC_{BE\,NG}$
where:
FC_{BE} - total baseline fuel consumption, TJ

(B.1.6) $FC_{BE} = ((HO_{CCGT} * SFC_h) + (EO * SFC_e)) * 7000*4.1868*10^{-9}$
where:
HO_{CCGT} - heat energy output from the CCGT, Gcal.
SFC_h - specific fuel consumption for heat output, Kg.e.f./Gcal
EO_{CCGT} - electricity output from the CCGT, ths. kWh
SFC_e - specific fuel consumption for electricity output, g.e.f./kWh
7000 Kcal/kg f. e. – conversion factor from kg f.e. to Kcal
4.1868*10^-9 – conversion factor from Kcal to TJ
(B.1.7) $EO = EG_{CCGT} - EC_{aux\,CCGT}$
where:
EG_{CCGT} - electric power generation at CCGT, ths.kWh.
$EC_{aux\,CCGT}$ - consumption of electric power for the CCGT auxiliaries, ths.kWh.

Data/Parameter 1	$HO_{CCGT,y}$
Data unit	Gcal
Description	Output of heat energy from CCGT
Time of determination/monitoring	Every month
Source of data (to be) used	Technical report of Dzerzhinskay HPS

Value of data applied (for ex ante calculations/determinations)	2008 – 321 525 Gkal 2009 – 346 534 Gkal 2010 – 625 971 Gkal 2011 – 719 370 Gkal 2012 – 702 110 Gkal
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Calculated as sum of daily heat output from CCGT. Calculation is made by the Lead engineer of Technical department on the base of measured parameters of overheated steam consumption, steam pressure and temperature. These parameters are measured by measurement devices Metran 100-DD, Metran 100-DN, THA Metran 201-320, RP-160, IRT 5920, RP-160M. Data for 2008-2010 – fact, data for 2011-2012 – forecast.
QA/QC procedures (to be) applied	All calculations are based on the measured data presented in the annual reports. All measurements are made by the calibrated measuring devices in accordance with the standards in the energy industry.
Any comment	-

Data/Parameter 2	EG_{CCGT}
Data unit	MWh
Description	Electricity generation by CCGT
Time of determination/monitoring	Constantly
Source of data (to be) used	Technical report of Dzerzhinskay HPS
Value of data applied (for ex ante calculations/determinations)	2008 – 1 254 695 MWh 2009 – 1 261 631 MWh 2010 – 1 037 006 MWh 2011 – 1 169 826 MWh 2012 – 1 101 048 MWh
Justification of the choice of data or description of measurement methods and procedures (to be) applied	All data is measured with electricity meters SET-4, the measurement results are transferred to the central server of Automated measuring and information system for electric power fiscal accounting. Data for 2008-2010 – fact, data for 2011-2012 – forecast.
QA/QC procedures (to be) applied	The electric supply meters are calibrated every 10 and 12 years. The Automated measuring and information system for electric power fiscal accountingis certified and is checked every 5 years. All measurements are made by the calibrated measuring devices in accordance with the standards in the energy industry.
Any comment	

Data/Parameter 3	$EC_{aux\ CCGT}$
Data unit	MWh
Description	Consumption of electric power for the CCGT auxiliaries
Time of determination/monitoring	Constantly
Source of data (to be) used	Technical report of Dzerzhinskay HPS

Value of data applied (for ex ante calculations/determinations)	2008 – 36 331 MWh 2009 – 41 103 MWh 2010 – 34 975 MWh 2011 – 31 506 MWh 2012 – 42 825 MWh
Justification of the choice of data or description of measurement methods and procedures (to be) applied	All data is measured with electricity meters PSCH- 4TM.05 and PSCH-4-1 the measurement results are transferred to the central server of Automated measuring and information system for electric power fiscal accounting Data for 2008-2010 – fact, data for 2011-2012 – forecast
QA/QC procedures (to be) applied	The electric supply meters are calibrated every 6 and 12 years. The Automated measuring and information system for electric power fiscal accountingis certified and is checked every 5 years. All measurements are made by the calibrated measuring devices in accordance with the standards in the energy industry.
Any comment	

Data/Parameter 4	SFC_e
Data unit	t.e.f/MWh
Description	Specific fuel consumption for electricity output under the baseline
Time of determination/monitoring	Determined once
Source of data (to be) used	6TP form for the period 2002-2004
Value of data applied (for ex ante calculations/determinations)	0.353
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Calculated as average specific fuel consumption for electricity output for the period 2002-2004.
QA/QC procedures (to be) applied	6 TP form is official statistic form.
Any comment	-

Data/Parameter 5	SFC_h
Data unit	t.e.f/Gkal
Description	Specific fuel consumption for heat output under the baseline
Time of determination/monitoring	Determined once
Source of data (to be) used	6TP form for the period 2002-2004
Value of data applied (for ex ante calculations/determinations)	0.153
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Calculated as average specific fuel consumption for heat output for the period 2002-2004.

QA/QC procedures (to be) applied	6 TP form is official statistic form.
Any comment	-

Data/Parameter 6	V_{lim}
Data unit	ths.m^3/year
Description	Baseline natural gas capacity
Time of determination/monitoring	Determined once
Source of data (to be) used	Calculated on the base of natural gas capacity of Gas-distributing station №1 (Passport of Gas-distributing station)
Value of data applied (for ex ante calculations/determinations)	700800 ths.m^3
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Calculation was made by multiplying of natural gas capacity of Gas-distributing station №1 per hour on number of hour in a year – (80000 m^3 * 8760 hours = 700800 ths.m^3).
QA/QC procedures (to be) applied	-
Any comment	-

Data/Parameter 7	V_{his}
Data unit	ths.m^3/year
Description	Minimal natural gas consumption by Dzerzhinskaya HPS for the period 2002-2004,
Time of determination/monitoring	Determined once
Source of data (to be) used	6TP form for the period 2002-2004
Value of data applied (for ex ante calculations/determinations)	625 049 ths.m^3
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Minimal value of natural gas consumption at Dzerzhinskaya HPS for the period 2002-2004.
QA/QC procedures (to be) applied	6 TP form is official statistic form.
Any comment	-

Data/Parameter 8	NCV_{NG}
Data unit	Kcal/m^3
Description	Natural gas caloric value.
Time of determination/monitoring	Every 5 days
Source of data (to be) used	Test report of natural gas from JSC “Inspection of natural gas and peat quality at Nizhniy Novgorod region “INSTOP”.

Value of data applied (for ex ante calculations/determinations)	2008 – 7989 Kcal/m^3 2009 – 8007 Kcal/m^3 2010 – 8009 Kcal/m^3 2011 – 8009 Kcal/m^3 2012 - 8009 Kcal/m^3
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Provided by the JSC "Inspection of natural gas and peat quality at Nizhniy Novgorod region "INSTOP". Data for 2008-2010 – fact, data for 2011-2012 – forecast
QA/QC procedures (to be) applied	This parameter is provided with by an independent certified laboratory.
Any comment	-

Data/Parameter 8	EF_{NG}
Data unit	t CO2/TJ
Description	CO2 emission factor for natural gas
Time of determination/monitoring	Determined once
Source of data (to be) used	This parameter is provided in 2006 IPCC Guidelness for National Greenhouse Gas Inventories, Table 1.4.
Value of data applied (for ex ante calculations/determinations)	56.1
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 9	EF_{FO}
Data unit	t CO2/TJ
Description	CO2 emission factor for fuel oil
Time of determination/monitoring	Determined once
Source of data (to be) used	This parameter is provided in 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 1.4.
Value of data applied (for ex ante calculations/determinations)	77.4
Justification of the choice of data or description of measurement methods and procedures (to be) applied	-
QA/QC procedures (to be)	-

applied	
Any comment	-

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:

The analysis presented in Subsection B.1., clearly demonstrates that the proposed Project differs from the baseline scenario.

The analysis provided in subsection B.1. clearly demonstrates that the proposed project is not a baseline.

1. Definition and description of the selected approach

In order to justify that the project is additional, the principles and regulations published in the following documents are used:

- Tool for the demonstration and assessment of additionality (version 05.2);[9]
- Guidelines for implementation of article 6 of the Kyoto Protocol (paragraph 33);
- Guidance on criteria for baseline setting and monitoring. Version 03 (Annex 1. Additionality)

Tool for the demonstration and assessment of additionality is a sequential analysis and comprises of 4 stages. If the investment analysis shows that the project is not the most suitable alternative from the financial point of view, then you should go from stage 2 to stage 4.

Stage 1. Determination of the alternatives;
Stage 2. Investment analysis of the alternatives, and (or)
Stage 3. Barriers analysis;
Stage 4. Common practice analysis.

2. Application of the selected approach

Stage 1. Determination of the alternatives

For further analysis the alternatives specified in section B.1. are adopted:

1. Decommission of turbine No.3 with the installation of boiler No.9 and turbine No.7
2. The Project itself without being registered as a JI project activity that is commissioning of CCGT plant

Stage 2. Investment analysis

At this stage it is determined if the project:

(a) is a more attractive alternative from the economic or financial point of view or
(b) can be implemented economically or financially without income gained from ERU sales.

Both of the proposed alternatives have capital expenditures and will bring in an income. Thus, it is necessary to apply the *investment comparison analysis*.

To assess the financial attractiveness of the project it is planned to determine the following commercial efficiency indicators:

[9] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf

- Discounted pay-back period (DPB);
- Internal rate of return (IRR);
- Net present value (NPV).

Below the outcomes of investment analysis[4] are provided for both alternatives scenarios based on economic and financial data that were effective in 2001.

Comparison of financial indicators of the two alternatives

Indicator	Unit	Alternative 1	Alternative 2
DPB	year	6	4
IRR	%	41.55	59.79
NPV	Ths rub	622 762	716 902

The provided analysis clearly shows that the financial indicators of Alternative 1 look considerably attractive than those of Alternative 2.

Sensitivity analysis

Sensitivity analysis is performed for the Alternative 1 and 2. The influence on the DPB, IRR and NPV of the +/-10% deviation of such parameters as capital expenditures (CAPEX), heat and electricity tariffs as well as gas and fuel oil price is provided in the below tables.

CAPEX		+10%	-10%	+10%	-10%
		Alternative 1		Alternative 2	
DPB	year	7	5	5	4
NPV	%	478 139	767 386	669 113	764 691
IRR	ths euro	38,15%	45,64%	55,8%	64,6%

Electricity and heat tariffs		+10%	-10%	+10%	-10%
		Alternative 1		Alternative 2	
DPB	year	5	8	4	6
NPV	%	934 082	311 443	1 028 222	405 582
IRR	ths euro	47%	36%	72,8%	46,9%

Natural gas price		+10%	-10%	+10%	-10%
		Alternative 1		Alternative 2	
DPB	year	7	6	4	4

[4] Investment analysis is provided in the spread sheet model *TGK-6 Dzerzh CCGT model.xls*

NPV	%	520 508	725 017	703 952	729 852
IRR	ths euro	40%	43%	59,3%	60,3%

Fuel oil price		+10%	-10%
		Alternative 2	
DPB	year	5	4
NPV	%	538 198	895 606
IRR	ths euro	51,9%	67,9%

The sensitivity analysis shows that the deviation of the heat energy tariff and investment creates the most significant impact on financial indicators of both alternatives.

Stage 2 conclusion: Alternative 1 that is the decommission of turbine No.3 with the installation of boiler No.9 and turbine No.7 is more financially attractive than Alternative 2.

In accordance with the "Tool for the demonstration and assessment of additionality" [5] if it was proved at Stage 2 that the project is not a more attractive alternative from an economic and financial point of view then go to Stage 4 – Common practice analysis.

Stage 4. Common practice analysis

An analysis is given in this section is to show what degree the technology used in the project prevailed in 2001.

When taking a decision in 2001 on the installation of the CCGT at the Dzerzhinskaya HPS, combined heat and power technologies were not widely prevalent in Russia. At that moment only one CCGT at Nivinnomisskaya GRES with capacity 145 MW[6] was implemented in Russia.
This fact indicates that the project to install a CCP is not common in Russia.

Conclusion:
The common practice analysis shows that the Project is not common practice. Thus, the project activity is additional.

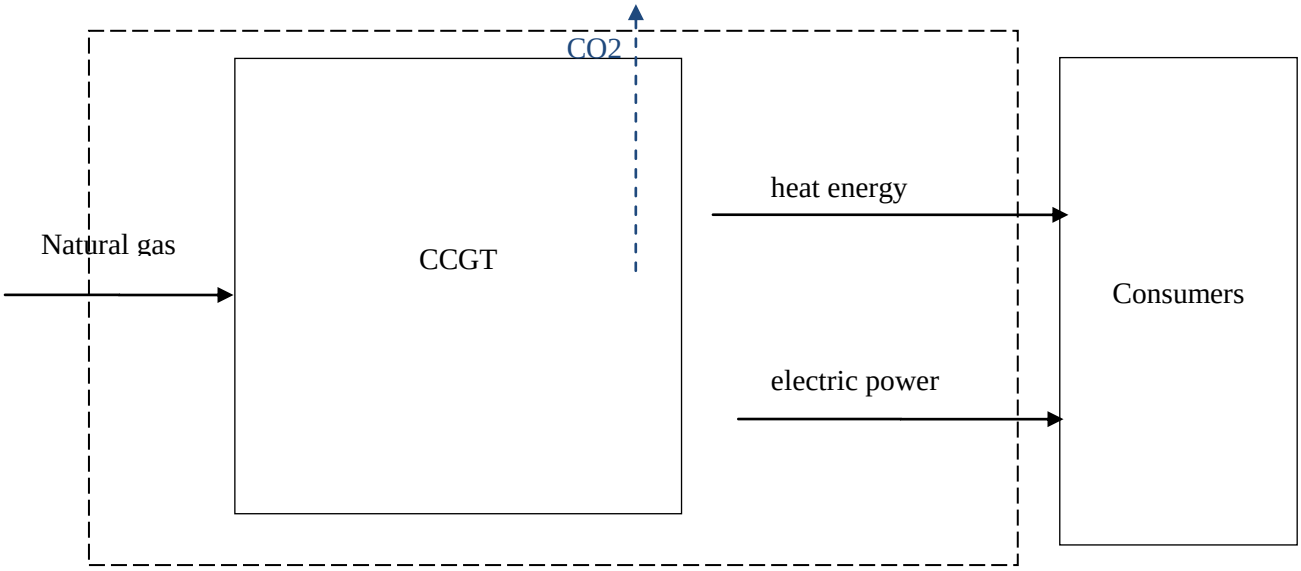
B.3. Description of how the definition of the project boundary is applied to the project:

Within the project boundary the following facilities are included: :

- GCS – gas compressor station
- GTU – gas turbine unit
- WHB – waste-heat boiler
- TG – turbo-generator unit

[5] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf

[6] http://www.yug.so-ups.ru/Page.aspx?IdP=84



- *Project boundary*

Figure B.1. Project boundary

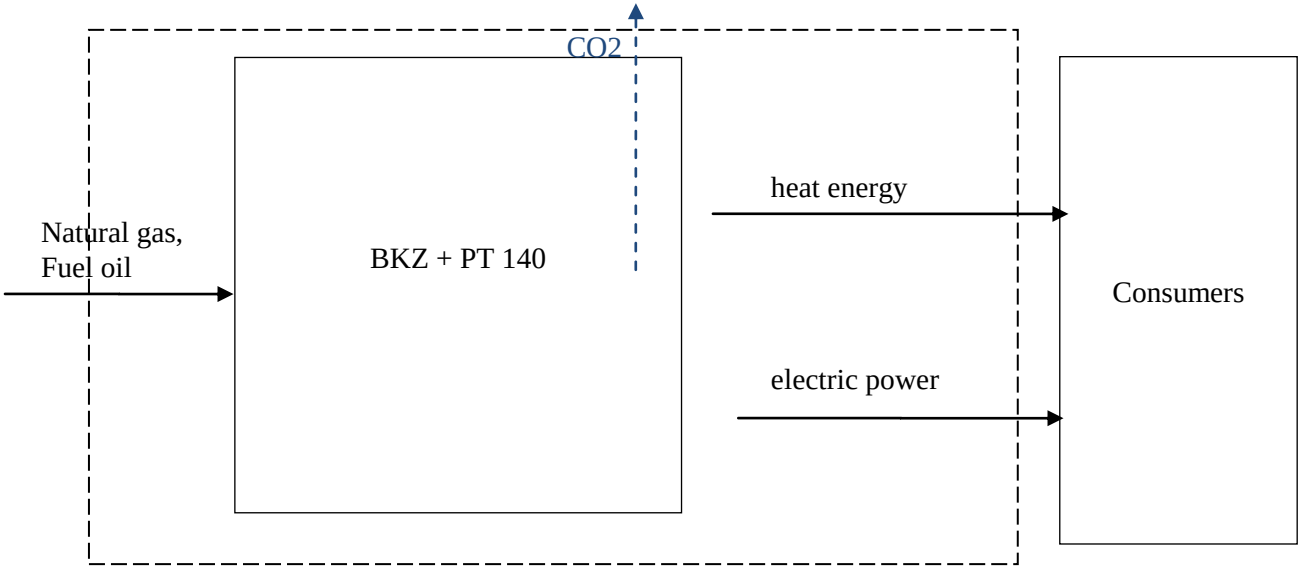


Figure B.1. Baseline scenario

The emission sources under baseline and project scenarios are given in Table B.4.

Table B.4. The emission sources under the baseline and project scenarios

	Source	GHG	Included/ Not included	Comments
Baseline	Fuel oil consumption	CO2	Included	Major emission source
		CH4	Not included	Emissions are negligibly small
		N20	Not included	Emissions are negligibly small
	Natural gas consumption	CO2	Included	Major emission source
		CH4	Not included	Emissions are negligibly small
		N20	Not included	Emissions are negligibly small
Project	Natural gas consumption	CO2	Included	Major emission source
		CH4	Not included	Emissions are negligibly small
		N20	Not included	Emissions are negligibly small
	Natural gas distribution at Gas-distribution station	CO2	Not included	Emissions are negligibly small
		CH4	Not included	Emissions are negligibly small. According to 2-tp form yearly emissions of CH4 from Gas-distribution station equal 0.325 t CH4/year or 6.825 t CO2/year - negligibly small
		N20	Not included	Emissions are negligibly small
Leakage	Fugitive methane emission due to Fossil fuel production and transportation	CH4	Included	Major emission source

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: 05/04/2011

The baseline was developed by:
Closed Joint-Stock Company “National Carbon Sequestration Foundation” (Moscow);
Contact: Evgeniya Baydakova, Senior Expert of the Project Development Department;
Phone: 8 499 788 78 35 ext. 104
Fax: 8 499 788 78 35 ext. 107
e-mail: BaydakovaEV@ncsf.ru

Closed Joint-Stock Company “National Carbon Sequestration Foundation” is not the project participant.

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

The project started with the date of decision making about project realization 25.02.2001

C.2. Expected operational lifetime of the project:

14 years or 168 months: 16.10.2006 – 16.10.2019

C.3. Length of the crediting period:

The crediting period is in accordance with the budget period of the Kyoto protocol:
5 years or 60 months 01.01.2008 - 31.12.2012.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

1. Indication and description of the monitoring approach applied

In accordance with "Guidelines for users of the JI PDD form" version 04 for monitoring of the project it is necessary to apply either approved CDM methodology or the JI Specific approach approach.
Monitoring plan of the given project based on the JI Specific approach approach in accordance with following regulations:

- Guidelines for the implementation of Article 6 of the Kyoto Protocol (Appendix B. Criteria for baseline setting and monitoring, II. Monitoring[7]
- Guidance on criteria for baseline setting and monitoring, Version 03 (D. Guidance on monitoring)[8].

In accordance with "Guidelines for users of the JI PDD form" version 04, in section D it is necessary explicitly and clearly distinguish:

a) Data and parameters that are not monitored throughout the crediting period, but are determined only once (and thus remain fixed throughout the crediting period), and that are available already at the stage of determination regarding the PDD;
b) Data and parameters that are not monitored throughout the crediting period, but are determined only once (and thus remain fixed throughout the crediting period), but that are not already available at the stage of determination regarding the PDD;
c) Data and parameters that are monitored throughout the crediting period.

2. Application of the approach chosen

The monitoring plan includes energy flows related to the CCGT unit performance such as fuel consumption, heat and electric power production, steam consumption by the waste-heat boiler and a turbo-generating unit.

In order to determine the GHG reductions data concerning the amount of natural gas used in the project scenario is needed, and the amount of heat and electric power used under the baseline.

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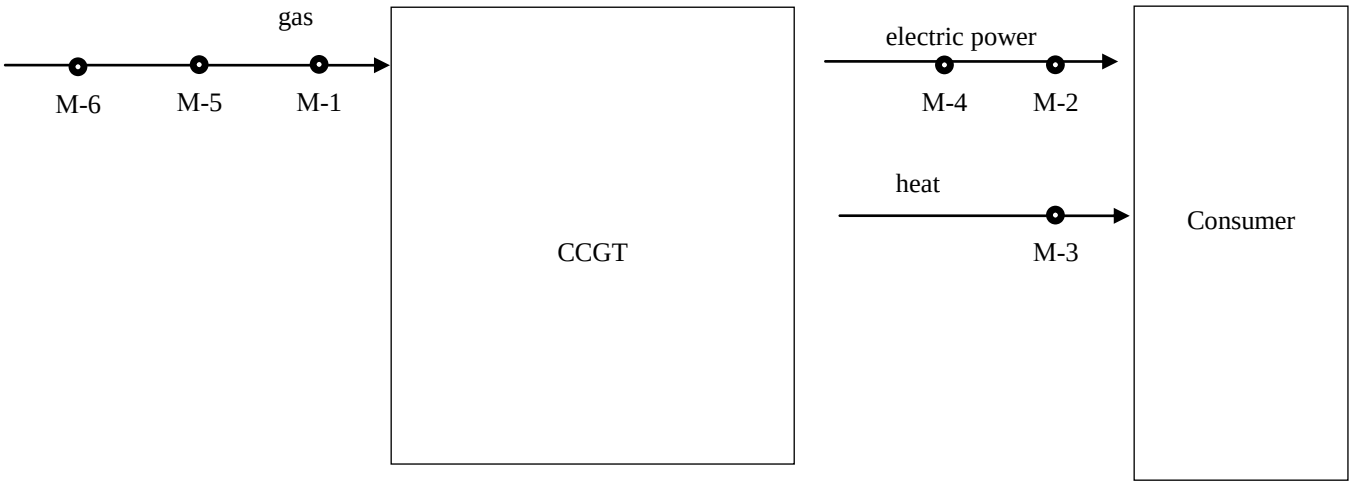
[7] http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=2 9/CMP.1 Guidelines for the implementation of Article 6 of the Kyoto Protocol. Report of the Conference of the Parties serving
[8] as the meeting of the Parties to the Kyoto Protocol on its first session, held at Montreal from 28 November to 10 December 2005.
http://ji.unfccc.int/Sup_Committee/Meetings/index.html Joint Implementation Supervisory Committee, Eighteenth meeting. 22-23.10.2009

In this section information is given concerning the algorithm of data collection and storage, necessary for the estimation of baseline and project emissions :

1. Data and parameters that are not monitored throughout the crediting period, but are determined only once (and thus remain fixed throughout the crediting period), and that are available already at the stage of determination regarding the PDD:
    - Specific fuel consumption for electricity output under the baseline
    - Specific fuel consumption for heat output under the baseline
    - Baseline natural gas capacity
    - Minimal natural gas consumption by Dzerzhinskaya HPS for the period 2002-2004
    - Net calorific value of the fuel oil
    - CO2 emission factor for natural gas
    - CO2 emission factor for fuel oil
2. Data and parameters that are monitored throughout the crediting period.
    - Natural gas consumption by the CCGT unit;
    - Net calorific value of the natural gas
    - Output of heat energy from CCGT
    - Electricity generation by CCGT
    - Consumption of electric power for the CCGT auxiliaries

More detailed information concerning data and factors is given in the Table D.1.1.1.



M-1 - Natural gas consumption at the CCGT
M-2 - Electricity generation by CCGT
M-3 - Heat output from the CCGT
M-4 - Consumption of electric power for the CCGT auxiliaries
M-5 -NCV of natural gas
M-6- Coefficient of losses from extraction and transportation of natural gas

Figure. D.1. Monitoring points

Calculation of heat output from CCGT

Parameter "Heat output from CCGT" ($HO_{CCGT,y}$) is used for the purpose of baseline CO_2 emission calculation.
HO_{CCGT} is calculated every day by the Lead engineer of Technical department on the base of following measured parameters:
- overheated steam consumption,
- steam pressure
- steam temperature,
- hot water consumption,
- hot water temperature
- hot water pressure

Formula D.1.1 $\mathbf{HO_{CCGT,y} = \Sigma\ HO_{CCGT,\ dd}}$

$HO_{CCGT,\ dd}$ is calculated as follows:
$HO_{CCGT,dd} = HO_{CCGT\ hot\ water} + HO_{CCGT\ steam,}$

where:

$HO_{CCGT,dd}$ – daily heat output from CCGT, Gkal

$HO_{CCGT\ service\ water}$ – heat output from CCGT by hot water, Gkal

$HO_{CCGT\ steam,}$ - heat output from CCGT by steam, Gkal

Formula D.1.2 $\mathbf{HO_{CCGT\ hot\ water} = WC * (h_{dir\ sw} - h_{ret\ sw})}$,

where :

WC – hot water consumption, t

$h_{dir\ sw}$ [9] – enthalpy of direct hot water, kkal/kg

[9] Determined by reference book " Tables of thermophysical properties of water and water steam", Vukalovich M.P, Rivkin S.L, Alexandrov A.A, M-1969.

$h_{ret\ sw}$[9] - enthalpy of return hot water, kkal/kg

Formula D.1.3 $\mathbf{h_{dir\ sw} = f\ (T_{dir\ sw};\ P_{dir\ sw})}$

where:

$T_{dir\ sw}$ – temperature of direct hot water, °C

$P_{dir\ sw}$- pressure of direct hot water, Pa

Formula D.1.4 $\mathbf{h_{ret\ sw} = f\ (T_{ret\ sw};\ P_{ret\ sw})}$

$T_{ret\ sw}$ – temperature of return hot water, °C

$P_{ret\ sw}$- pressure of return hot water, Pa

Formula D.1.5 $\mathbf{HO_{CCGT\ steam} = (SC_{exit}\text{-}SC_{entrance})*h_{out}}$

SC_{exit}– steam consumption on exit of waste heat boiler, t

$SC_{entrance}$ – steam consumption on entrance of turbine, t

h_{exit}[9] – steam enthalpy on exit of waste heat boiler, kkal/kg

Formula D.1.6 $\mathbf{h_{exit\ =} f\ (T_{s\ exit};\ P_{s\ exit})}$

where:

$T_{s\ exit}$ - steam temperature on exit of waste heat boiler, °C

$P_{ret\ sw}$- steam pressure temperature on exit of waste heat boiler, Pa

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
M-1	Natural gas consumption at CCGT unit, FC_{NGy}	Technical reports	m3	m	Constantly	100%	electronic	Measured by measurement complex including secondary gas corrector SPG 761, pressure sensors, termoresistor and orfis.
M-5	NCV of natural gas, NCV_{NG}	Technical reports	Kcal per m3	m	Every 5 days	100%	paper	Test report of natural gas from JSC "Inspection of natural gas and peat quality at Nizhniy Novgorod region "INSTOP".
Data and parameters that are not monitored throughout the crediting period, but are determined only once								
	Emission factor for NG, EF_{NG}		t CO2/TJ	e	Determined once	100%	Electronic/Paper	56.1 t CO2 per TJ

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

Formula D.1.1.2.1 $PE_y = PE_{fuel,y} = FC_{NG,y} * NCV_{NG} * EF_{CO2,NG}$

where:

PE_y - total GHG project emissions, t CO2-eq

$PE_{fuel,y}$ - GHG project emissions from natural gas consumption, t CO2-eq
$FC_{NG,y}$ - natural gas consumption, mln m3/year
$EF_{CO2,NG}$ - CO2 emission factor for natural gas, equal to 56.1 tons of CO2 per TJ
NCV_{NG} - net calorific value of the natural gas, kcal per m3. To be converted in TJ by multiplying by $4,1868*10^{9}$ [10]

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
Data and parameters that are monitored throughout the crediting period								
M-2	Electricity generation by CCGT, EG_{CCGT}	Technical reports	MWh	m	Constantly	100%	Electronic and paper	Report from the Automated measuring and information system for electric power fiscal accounting. Measured by electric power meters SET-4

[10] Information on net calorific value of the natural gas is supplied with delivery documents

M-3	Heat output from the CCGT, HO	Technical reports	Gcal	m	Constantly	100%	Electronic and paper	Calculated by the Lead engineer of Technical department on the base of measured parameters : Steam consumption - Metran 100-DD, RP-160; Hot water consumption - RP-160; Steam pressure - Metran 100-DN,IRT 5920; Hot water pressure – RP-160M1-08; Steam temperature - Metran 201-320, RP-160, IRT 5920 Hot water temperature - RP-160M
M-4	Consumption of electric power for the CCGT auxiliaries, $EG_{aux\ CCGT}$	Technical reports	MWh	m	Constantly	100%	electronic	Report from the Automated measuring and information system for electric power fiscal accounting. Measured by electric power meter PSCH-4TM.05 and PSCH-4.
Data and parameters that are not monitored throughout the crediting period, but are determined only once								

	Specific fuel consumption for electricity output under the baseline	6TP form for the period 2002-2004	t.e.f/MWh	e	Determined once	100%	Electronic/Paper	0.353 t.e.f/MWh
	Specific fuel consumption for heat output under the baseline	6TP form for the period 2002-2004	t.e.f/Gkal	e	Determined once	100%	Electronic/Paper	0.153 t.e.f/Gkal
	Baseline natural gas capacity	Natural gas capacity of Gas-distributing station №1	ths.m3/year	e	Determined once	100%	Paper	700 800 ths.m3
	Minimal natural gas consumption by Dzerzhinskaya HPS for the period 2002-2004	6TP form for the period 2002-2004	ths.m3	e	Determined once	100%	Paper	625 049 ths.m3
	Emission factor for FO, EF_{FO}	IPCC 2006	t CO2/TJ	e	Determined once	100%	Electronic/Paper	77.4 t CO2 per TJ
	Emission factor for NG, EF_{NG}	IPCC 2006	t CO2/TJ	e	Determined once	100%	Electronic/Paper	56.1 t CO2 per TJ

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

Formula D.1.1.4.1 $BE_y = BE_{NG} + BE_{FO}$

where:

BE_y - total GHG baseline emissions, t CO2-eq

$BE_{NG,y}$ - GHG baseline emissions from natural gas consumption, t CO2-eq

$BE_{FO,y}$ - GHG baseline emissions from fuel oil consumption, t CO2-eq

Formula D.1.1.4.2 $BE_{NG} = FC_{BE\,NG} * EF_{NG}$

where:

$FC_{BE\,NG}$ - baseline natural gas consumption, TJ

EF_{NG} - CO2 emission factor for natural gas, equal to 56.1 t CO2/TJ

Formula D.1.1.4.3 $FC_{BE\,NG} = (V_{lim}-V_{hist}) * NCV_{NG} * 4.1868*10\text{^-}6$

where:

V_{lim} - baseline natural gas capacity, ths.m^3

V_{hist} - average natural gas consumption by Dzerzhinskaya HPS for the period 2002-2004, ths.m^3

NCV_{NG} - net calorific value of natural gas at Dzerzhinskaya HPS

Formula D.1.1.4.4 $BE_{FO} = FC_{BE\,FO} * EF_{FO}$

where:

$FC_{BE\,FO}$ - baseline fuel oil consumption, TJ

EF_{FO} - CO2 emission factor for fuel oil, equal to 77.4 t CO2/TJ

Formula D.1.1.4.5 $FC_{BE\,FO} = FC_{BE} - FC_{BE\,NG}$

where:

FC_{BE} - total baseline fuel consumption, TJ

Formula D.1.1.4.6 $FC_{BE} = ((HO_{CCGT} * SFC_h) + (EO * SFC_e)) * 7000 * 4.1868*10\text{^-}9$

where:

HO_{CCGT} - heat energy output from the CCGT, Gcal.

SFC_h - specific fuel consumption for heat output, Kg.e.f./Gcal

EO_{CCGT} - electricity output from the CCGT, ths. kWh

SFC_e - specific fuel consumption for electricity output, g.e.f./kWh
7000 Kcal/kg f. e. – conversion factor from kg f.e. to Kcal
4.1868*10^-9 – conversion factor from Kcal to TJ

Formula D.1.1.4.7 $EO = EG_{CCGT} - EC_{aux\ CCGT}$
where:
EG_{CCGT} - electric power generation at CCGT, ths.kWh.
$EC_{aux\ CCGT}$ - consumption of electric power for the CCGT auxiliaries, ths.kWh.

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:

Project assumes increase of natural gas consumption and decrease of fuel oil consumption.

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
M-1	Natural gas consumption at CCGT unit, FC_{NGy}	Technical reports	m3	m	Constantly	100%	electronic	Measured by measurement complex including secondary gas corrector SPG 761, pressure sensors, termoresistor and orfis.
M-2	Electricity generation by CCGT, EG_{CCGT}	Technical reports	MWh	m	Constantly	100%	Electronic and paper	Report from the Automated measuring and information system for electric power fiscal accounting. Measured by electric power meters SET-4
M-3	Heat output from the CCGT, HO_{CCGT}	Technical reports	Gcal	m	Constantly	100%	Electronic and paper	Calculated by the Lead engineer of Technical department on the base of measured parameters : Steam consumption - Metran 100-DD, RP-

								160; Hot water consumption - RP-160; Steam pressure - Metran 100-DN,IRT 5920; Hot water pressure – RP-160M1-08; Steam temperature - Metran 201-320, RP-160, IRT 5920 Hot water temperature - RP-160M
M-6	Coefficient of losses from extraction and transportation of natural gas	Gazprom environmental reports	%	e	Every year	100%	Paper	$EF_{NG,\ fugitive\ 2008}$=0.00353 $EF_{NG,\ fugitive\ 2009}$=0.0043 $EF_{NG,\ fugitive\ 2010}$=0.0029
Data and parameters that are not monitored throughout the crediting period, but are determined only once								
	Specific fuel consumption for electricity output under the baseline	6TP form for the period 2002-2004	t.e.f/MWh	e	Determined once	100%	Electronic/Paper	0.353 t.e.f/MWh
	Specific fuel consumption for heat output under the baseline	6TP form for the period 2002-2004	t.e.f/Gkal	e	Determined once	100%	Electronic/Paper	0.153 t.e.f/Gkal
	Baseline	Natural gas	ths.m3/year	e	Determined once	100%	Paper	700 800 ths.m3

	natural gas capacity	capacity of Gas-distributing station №1						
	Minimal natural gas consumption by Dzerzhinskaya HPS for the period 2002-2004	6TP form for the period 2002-2004	ths.m3	e	Determined once	100%	Paper	625 049
	Coefficient of losses from extraction and transportation of fuel oil	IPCC 2006, Volume 2, Ch.4, Table 4.2.5	t CH4/mln.m3	e	Determined once	100%	Paper	$EF_{FO\ fugitive}$ = 0.079
	Average net calorific value of the fuel oil	6TP form for the period 2008-2010	Kcal/kg	e	Determined once	100%	Paper	NCV_{FO} = $NCV_{FO\ 2008\text{-}2010}$=9060 Ccal/kg
	Fuel oil density,	http://ru.wikipedia.org/wiki/%CC%E0%E7%F3%F2	g/sm^3	e	Determined once	100%	Paper	ρ_{FO}=1 g/sm^3

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

$LE = ((FC_{NG,y} - FC_{BE\ NG}) * NCV_{NG} * k_{loss,\ NG} * 21) - (FC_{BE\ FO} / 4.1868*10\text{^}6/NCV_{FO} * \rho_{FO} * k_{loss} * 21)$

Where:

$FC_{NG,\ y}$ - natural gas consumption, TJ;

NCV_{NG} - net calorific value of the natural gas, kcal per m3. To be converted in TJ by multiplying by $4{,}1868*10^9$

$FC_{BE\ NG}$ - baseline natural gas consumption, TJ (calculated with formula D.1.1.4.3)

EF_{NG} – emission factor of fugitive methane emissions from extraction and transportation of natural gas;

$FC_{BE\ FO}$ - baseline fuel oil consumption, TJ (calculated with formula D.1.1.4.5);
$k_{loss,\ NG}$ - Coefficient of losses from extraction and transportation of natural gas;
$k_{loss,\ FO}$[11] – emission factor of fugitive methane emissions from extraction and transportation of fuel oil;
NCV_{FO} - fuel oil caloric value, Kcal;
ρ_{FO} - fuel oil density, g/sm^3
4.1868*10^6 Kcal/TJ. – conversion factor from Kcal to TJ.

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):

Formula D.1.4. 1 $ER_y = BE_y - PE_y - LE_y$
Where:
ER_y *GHG reductions under the project per year, tons of CO2/year;*
BE_y *baseline GHG emissions, tons of CO2-eq/year;*
PE_y *project GHG emissions, tons of CO2-eq/year;*
LE_y – *leakage emissions, tons of CO2-eq/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:

In accordance with environmental protection laws, the company shall control the emission of contaminants and waste water, manage and control production and consumer wastes, provide statutory reports to authorized state bodies (the Federal Service for Ecological, Technological and Nuclear Inspection). In the Dzerzhinsky affiliate of the OJSC TGC-6 for the autonomous district environmental protection is organized by an environmental group under the supervision of the head of production of the Technology Department of the Dzerzhinsky affiliate of the OJSC TGC-6. Measures concerning environmental protection are elaborated and implemented every year. They include environmental monitoring of the production and commercial operations of the company. The environmental department duly prepares and presents official statistic reports and forms to the authorized state bodies, including:

[11] IPCC 2006, Volume 2, Chapter 4, Table 4.2.5:Oil Transportation/Tanker trucks and Rail Cars/ + Oil production/Heavy oil. k_{loss} =2.5*10^-5 + 7.9*10^-6

- 2-TS (air) – data concerning air protection, including data about the amount of trapped and neutralized contaminants; thorough information concerning specific contaminant emissions, the number of emission sources and measures taken to reduce the discharge of the separate groups of contamination sources into the atmosphere;
- 2-TS (water resources) – data concerning water usage, including data about water consumption from natural sources, water discharge and the amount of contaminants in the water, the volume of water and the treatment facilities.
- 4-OS - data concerning environmental costs and ecological payments;
- 2-TS (wastes) – data concerning the generation, usage, neutralization, transportation and placement of production and consumer wastes, including the annual balance of wastes according to their type and hazard class.

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.
M-1 (table D.1.1.1.)	Low	Measured by measurement complex including secondary gas corrector SPG 761, pressure sensors, termoresistor and orfis. Measurement devices are are calibrated every12 month.
M-2 (table D 1.1.3.)	Low	Report from the Automated measuring and information system for electric power fiscal accounting. Measured by electric power meters SET-4. The electric supply meters are calibrated every 10 and 12 years. The Automated measuring and information system for electric power fiscal accountingis certified and is checked every 5 years.
M-3 (table D 1.1.3)	Low	Calculated by the Lead engineer of Technical department on the base of measured parameters of overheated steam consumption, steam pressure and temperature. These parameters are measured by measurement devices Metran 100-DD, Metran 100-DN, THA Metran 201-320, RP-160, IRT 5920, RP-160M that are calibrated every 12,24 and 36 month.
M-4 (table D 1.1.3)	Low	Report from the Automated measuring and information system for electric power fiscal accounting. Measured by electric power meter PSCH- 4TM.05 and PSCH-4. The electric supply meters are calibrated every 6 and 12 years. The Automated measuring and information system for electric power fiscal accountingis certified and is checked every 5 years.
M-5 (table D 1.1.1)	Low	Test report of natural gas from JSC "Inspection of natural gas and peat quality at Nizhniy Novgorod region "INSTOP". This parameter is provided with by an independent certified laboratory.
M-6 (table D 1.3.1)	Low	Yearly Gazprom environmental reports.

Control and quality procedures of the abovementioned parameters are ensured by fulfilling the requirements of the following documents:

- Federal law 26.6.2008 N 102-FZ
- GOST 8.280-78GSOEI
- GOST 8.338-2002GSOEI
- GOST 7164-78
- MI- 1997-89
- GOST 7164-78
- GOST 8.243-77

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

The operational structure of the Project is connected to the existing arrangement of data collection, transmission and storage at the company. All data required for determination, shall be kept for two years from the moment of ERU transmission under the project. Compiling reports on fuel consumption and steam production is the responsibility of the production and technological department of the Dzerzhinsky affiliate of the OJSC TGC-6.

Reporting at the Dzerzhinskaya HPS

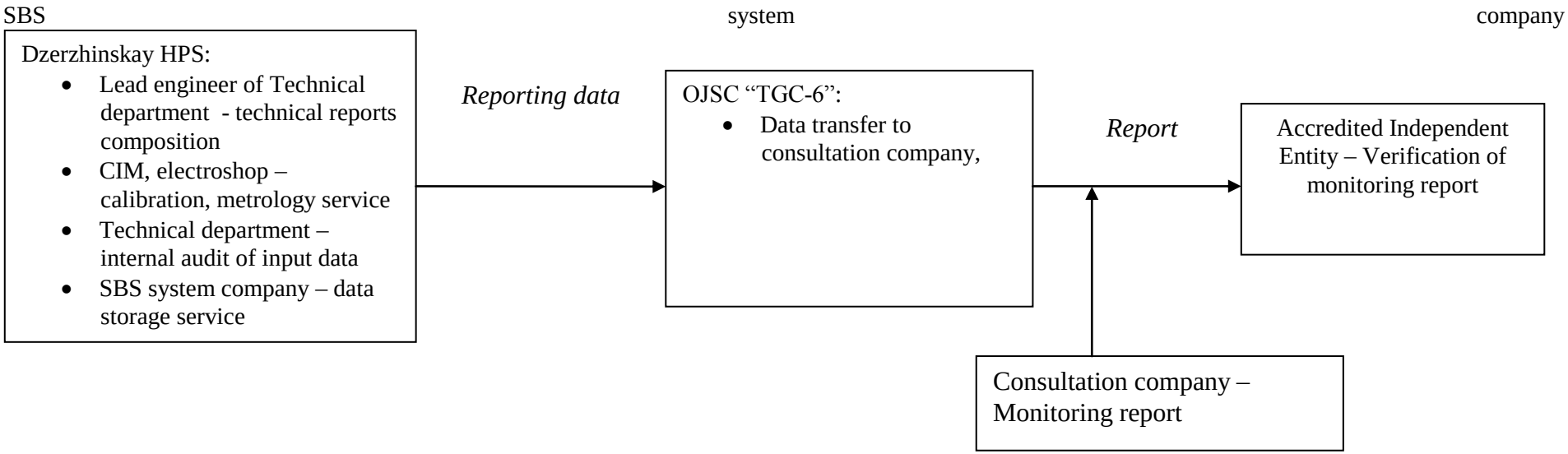
Form 10-14 "Energetic Report concerning the production and output of heat and electric power".
The model ensures the monthly transmission of data concerning primary technical and economic indicators, and the information required to form the territorial balances of electric power. For heat power stations some data is classified into facility groups. The preparation of the primary reporting data is made by the staff of power stations and heating net companies in the form of the model "10-14 – energetic" and is sent to a higher organization to be compiled and verified. The informational part of the Report concerning the production and output of heat and electric power consists of two models:
Model 51329 – Report concerning the production and output of heat and electric power
Model 51328 – Input and output of electric power with detailing of net companies (annex 1)

Form 7-FEC "Report concerning the operation of the heat power station".
This form includes data concerning the primary technical and economic indicators of the HPS for the month and the running total from the start of the year (data concerning electric power production, the output of heat and electric power, the specific consumption of standard fuel for the output of heat and electric power, the consumption of electric power for personal purposes, the specific consumption of electric power for personal purposes for the production of electric power and output of heat, the total consumption of the standard fuel for the reporting period and consumption of the standard fuel for the output of heat and electric power, the receipt, consumption and residue of fuel for the reporting period).

Form No.6-TS "Heat Power Station operation data".
Form No.6-TS is a state statistical observation form and it is annually presented to the territorial body of the Federal State Statistics Service. In terms of its contents Form No.6-TS corresponds to Form 7-FEC. The reporting period is one year.

4. Form No.4-TEC "Data concerning residue, receipt and consumption of fuel and power resources, accumulation and usage of the processed oil products".
An explanatory note, containing the primary technical and economic indicators of the operation of the Heat Power Station for the reporting period in comparison with the base year[12] and the reasons for the discrepancies are specified, is attached to the report.

The flow diagram given in Figure.D.3., shall be applied in the implementation of the monitoring plan for verification reporting.



[12] Do not confuse with the "base scenario"

Fig. D.3. Project operation and control flow diagram

Data for monitoring is provided from the following sources:

Data	**Source**
- Natural gas consumption at CCGT unit - Heat output from the CCGT	Lead engineer of Technical department gets data from experts of SBS system company (CCGT service company), makes calculations and put the monthly technical reports
- Electricity generation by CCGT - Consumption of electric power for the CCGT auxiliaries	Lead engineer of Technical department take data from Automated measuring and information system for electric power fiscal accounting and put it in to monthly technical reports.
- NCV of natural gas	Lead engineer of Technical department gets data from Test report of natural gas from JSC "Inspection of natural gas and peat quality at Nizhniy Novgorod region "INSTOP" and put the monthly technical reports Calculated by the 1-st category engineer of N-ITPP on a bases of approved norms with reduction to factual heat network operation parameters (temperature of ambient air and network water) and inclusion of above-standard heat losses (discharges and leaks).
- Coefficient of losses from extraction and transportation of natural gas	Open access source - Yearly Gazprom environmental reports. http://www.gazprom.ru/nature/environmental-reports/

Concerning staff training to operate the CCGT unit

As the CCGT was a new facility for the HPS, specialists and workers of the primary professions were sent for their first training courses in Aschenberg, Germany (2 weeks of theoretical courses and 2 weeks studying actions to take in emergency situations including on simulated training systems) in the Siemens training center. The theoretical part included training at an operative station V94.2 turbine in Munich, and then as follows:

1. A 15 day onsite study course in accordance with the position at the OJSC North-West HPS in St. Petersburg;
2. A 15 day course concerning the operational basics of the V94.2 GTU at the OJSC Dzerzhinskaya HPS with the participation of specialists from Siemens AG (Basic Operation Training), that included studying the:

- Electrics;
- Automatic Process Control System;
- Mechanics;
- Gas turbine.

3. Work based training on the gas turbine and gas compression station systems with the participation of specialists from Siemens AG.

These training sessions gave the personnel who previously worked with the turbines the opportunity to adapt, and eliminate the possibility of technological violations occurring due to personnel error after the introduction of the CCGT.

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

Date of baseline setting: 05/04/2011

The baseline has been designed by National Carbon Sequestration Foundation – (NCSF, Moscow)

Closed Joint-Stock Company “National Carbon Sequestration Foundation” (Moscow);
Contact: Evgeniya Baydakova, Senior Expert of the Project Development Department;
Phone: 8 499 788 78 35 ext. 104
Fax: 8 499 788 78 35 ext. 107
e-mail: BaydakovaEV@ncsf.ru

Closed Joint-Stock Company “National Carbon Sequestration Foundation” is not the project participant.

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions:

The emission of greenhouse gases under the Project occurs due to the consumption of natural gas.

Table E 1.

Indicator	Natural gas consumption at CCGT unit	Emission factor for natural gas	Estimated GHG project emissions, tCO2-eq
Unit	**TJ**	**tCO_2/TJ**	**tCO2**
2008	10 979	56,1	615 923
2009	11 360		637 306
2010	9 296		521 500
2011	10 541		591 351
2012	10 344		580 288

E.2. Estimated leakage:

Table E 2.

	2008	2009	2010	2011	2012
Increase of natural gas consumption under the project (t)	234 972	245 552	191798	224 266	219 124
Reduction of fuel oil consumption under the baseline (m^3)	303 324	306 683	280 219	328 419	304 548
Emission factor of fugitive methane emissions from extraction and transportation of natural gas	0.00368	0.00469	0.00328	0.00388	0.00388
Emission factor of fugitive methane emissions from extraction and transportation	0.17				

of fuel oil (tCO_2/m^3)					
Leakages,t CO2	- 32 332	- 26 830	- 33 429	- 36 366	- 32 812

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

Table E.5. Total project emissions and leakages

Year	Estimated GHG project emissions	Estimated leakage	The sum of project and leakages
2008	615 923	- 32 332	583 595
2009	637 306	- 26 830	610 480
2010	521 500	- 33 429	488 075
2011	591 351	- 36 366	554 990
2012	580 288	- 32 812	547 480
Total in 2009-2012	**2 946 369**	**- 161 770**	**2 784 599**

E.4. Estimated baseline emissions:

The emission of greenhouse gases under the Baseline occurs due to the consumption of natural gas and fuel oil.

Table E 6.Output of heat and electric power under the Baseline[13]

Indicator	Output of electric power	Output of heat energy	Specific fuel consumption for electricity output	Specific fuel consumption for heat output
Unit	**MWh**	**Gcal**	**t.f.e/MWh**	**t.f.e/Gkal**
2008	1 228 851	314 303	0.353	0.153
2009	1 230 683	343 252		
2010	1 018 448	624 922		
2011	1 138 320	719 370		
2012	1 058 223	702 110		

Table E 7. Estimation of the CO2 emissions from the consumption of natural gas under the Baseline

Year	Fuel consumption		Natural gas emission factor	Fuel oil emission factor	Total baseline emission
	Natural gas	Fuel oil			
	TJ	**TJ**	**tCO2/TJ**	**tCO2/ TJ**	**tCO2**
2008	2 534	11 506	56.1	77.4	1 032 705

[13] According to reference data on technical and economic indicators of CCGT unit provided by the production and technical department of Dzerzhinskaya HPS.

2009	2 540	11 633			1 042 888
2010	2 540	10 629			965 224
2011	2 540	12 458			1 106 738
2012	2 540	11 552			1 036 654
Total					**5 184 209**

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

Reductions under the Project are calculated in the following way:

Formula E.5.1. ***ER = BE – PE – LE***

where
ER – GHG reductions the Project per year, tons of CO2/year;
BE – baseline GHG emissions per year, tons of CO2/year;
PE –project GHG emissions per year, tons of CO2/year;
LE – leakage, tons of CO2/year.

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

Year	**Estimated project emissions (tonnes of CO2 equivalent)**	**Estimated leakage (tonnes of CO2 equivalent)**	**Estimated baseline emissions (tonnes of CO2 equivalent)**	**Estimated emission reductions (tonnes of CO2 equivalent)**
2008	615 923	- 32 332	1 041 922	449 109
2009	637 306	- 26 830	1 052 125	432 408
2010	521 500	- 33 429	974 464	477 149
2011	591 351	- 36 366	1 115 978	551 748
2012	580 288	- 32 812	1 045 895	489 174
Total	**2 946 369**	**- 161 770**	**5 184 209**	**2 399 610**

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:

Environmental impact assess data is an obligatory part of the project documentation and give the results of the impact assessment on the environment, social and anthropogenic medium and justify the admissibility of the planned activity.

The installation of the V-94.2 GTU, produced by Inturbo (Siemens), at the Dzerzhinskaya HPS is done in the existing main building at the place where the disassembled steam-generating unit No.3 stood. The discharge of gases after the turbine is produced in the waste-heat boiler, generating commercial pressure (1.5 MPa) steam. The waste-heat boiler is located in boiler bay No.1, in place of the steam-generating unit No.3, which will be disassembled. To withdraw gas into the atmosphere a separate 80-meter metal smoke pipe is constructed, and the mouth diameter of the pipe is 5.3 meters. The discharges of nitric oxide from the V-94.2 gas turbine unit, as a result of the measures undertaken by the company, is significantly lower than the disassembled steam-generating unit No.3 type TGM-88 (the concentration in smoke gases is up to 600 mg/m3 and the single discharge 58.55 g/s) and with the nominal capacity is equal to 21.25 g/s (NOx in transfer to NO_2). **Thus, due to the replacement of the steam-generating unit No.3, provided at the Technological and Experimental Department, with the V-94.2 GTU, the total single discharge of NO at the Dzerzhinskaya HPS will be reduced by 37.3 g/s (in transfer to NO_2).** The Automatic Process Control System, which the new facilities are equipped with (the system is elaborated and delivered by Siemens), provides uninterrupted control of the amount of contaminants – nitric oxides and carbon dioxide in the exhaust gases of the turbine and records the amount of contaminants discharged for the operating period (hour, day and so on)
The installation of the GTU with the waste-heat boiler instead of the steam-power facilities barely touches on the matters of underconsumption and water discharge, because all water consumption for personal needs (losses in the cycle, cooling of mechanisms, oil and gas cooler) are left without alterations, and the absence of a condenser eliminates the heat contamination of water.

The noise specifications of the gas turbines without sound-damping systems are given in the following table. The levels provided describe the noise 1 meter from the GTU without the reduction of sound-dampers. In order to reduce the noise level, the sound-dampers in the complex air-filtering system (CAFS), waste-heat boiler (WHB) and sound-proofing lugging are installed. The specified measures ensure the reduction to the levels, regulated by CH 3077-84 and GOST 12.1.003-89. **The noise level on the grounds of the HPS near the main building is no higher than the regulations stipulate – 80 dBA.**

An assessment of the negative impact caused by the introduction of contaminants into the atmosphere and the noise confirmed the accordance of the sanitary protection zone with the Sanitary regulations and standards 2.2.1./2.1.1.1200-03.

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:

The Project received a positive conclusion, which was issued by the Federal State Institution Glavgosexpertiza.

SECTION G. Stakeholders' comments

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

Information on the project was published in the "Dzerzhinsk" newspaper # 25 in 2001. No comments on this matter were received.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Organisation:	**Open Joint Stock Company Territorial Generating Company No.6 (OJSC TGC-6)**
Street/P.O.Box:	-
Building:	10/16
City:	Nizhniy Novgorod
State/Region:	Nizhegorodskaya oblast
Postal code:	603950
Country:	Russian Federation
Phone:	+7 831 527 71 11
Fax:	+7 831 527 71 11
E-mail:	tgc6-info@ies-holding.com
URL:	http://www.tgc6.ru/
Represented by:	
Title:	Executive vice-president of ZAO "KES" – Head of Division "Generation of Center"
Salutation:	Mr.
Last name:	Kolokoltsev
Middle name:	Aleksandrovitch
First name:	Aleksandr
Department:	Division "Generation of Center"
Phone (direct):	+7 831 527 71 11
Fax (direct):	+7 831 527 71 11
Mobile:	+7 831 527 71 11
Personal e-mail:	tgc6-info@ies-holding.com

National Carbon Sequestration Foundation is not a project participant.

Annex 2

BASELINE INFORMATION

Key information and data to establish baseline

Data/Parameter 1	$HO_{CCGT, y}$
Data unit	Gcal
Description	Output of heat energy from CCGT
Time of determination/monitoring	Every month
Source of data (to be) used	Technical report of Dzerzhinskay HPS
Value of data applied (for ex ante calculations/determinations)	2008 – 321 525 Gkal 2009 – 346 534 Gkal 2010 – 625 971 Gkal 2011 – 719 370 Gkal 2012 – 702 110 Gkal
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Calculated as sum of daily heat output from CCGT. Calculation is made by the Lead engineer of Technical department on the base of measured parameters of overheated steam consumption, steam pressure and temperature. These parameters are measured by measurement devices Metran 100-DD, Metran 100-DN, THA Metran 201-320, RP-160, IRT 5920, RP-160M. Data for 2008-2010 – fact, data for 2011-2012 – forecast.
QA/QC procedures (to be) applied	All calculations are based on the measured data presented in the annual reports. All measurements are made by the calibrated measuring devices in accordance with the standards in the energy industry.
Any comment	-

Data/Parameter 2	EG_{CCGT}
Data unit	MWh
Description	Electricity generation by CCGT
Time of determination/monitoring	Constantly
Source of data (to be) used	Technical report of Dzerzhinskay HPS
Value of data applied (for ex ante calculations/determinations)	2008 – 1 254 695 MWh 2009 – 1 261 631 MWh 2010 – 1 037 006 MWh 2011 – 1 169 826 MWh 2012 – 1 101 048 MWh
Justification of the choice of data or description of measurement methods and procedures (to be) applied	All data is measured with electricity meters SET-4, the measurement results are transferred to the central server of Automated measuring and information system for electric power fiscal accounting. Data for 2008-2010 – fact, data for 2011-2012 – forecast.

QA/QC procedures (to be) applied	The electric supply meters are calibrated every 10 and 12 years. The Automated measuring and information system for electric power fiscal accountingis certified and is checked every 5 years. All measurements are made by the calibrated measuring devices in accordance with the standards in the energy industry.
Any comment	

Data/Parameter 3	$EC_{aux\ CCGT}$
Data unit	MWh
Description	Consumption of electric power for the CCGT auxiliaries
Time of determination/monitoring	Constantly
Source of data (to be) used	Technical report of Dzerzhinskay HPS
Value of data applied (for ex ante calculations/determinations)	2008 – 36 331 MWh 2009 – 41 103 MWh 2010 – 34 975 MWh 2011 – 31 506 MWh 2012 – 42 825 MWh
Justification of the choice of data or description of measurement methods and procedures (to be) applied	All data is measured with electricity meters PSCH- 4TM.05 and PSCH-4-1 the measurement results are transferred to the central server of Automated measuring and information system for electric power fiscal accounting Data for 2008-2010 – fact, data for 2011-2012 – forecast
QA/QC procedures (to be) applied	The electric supply meters are calibrated every 6 and 12 years. The Automated measuring and information system for electric power fiscal accountingis certified and is checked every 5 years. All measurements are made by the calibrated measuring devices in accordance with the standards in the energy industry.
Any comment	

Data/Parameter 4	SFC_e
Data unit	t.e.f/MWh
Description	Specific fuel consumption for electricity output under the baseline
Time of determination/monitoring	Determined once
Source of data (to be) used	6TP form for the period 2002-2004
Value of data applied (for ex ante calculations/determinations)	0.353
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Calculated as average specific fuel consumption for electricity output for the period 2002-2004.
QA/QC procedures (to be) applied	6 TP form is official statistic form.
Any comment	-

Data/Parameter 5	SFC_h
Data unit	t.e.f/Gkal
Description	Specific fuel consumption for heat output under the baseline
Time of determination/monitoring	Determined once
Source of data (to be) used	6TP form for the period 2002-2004
Value of data applied (for ex ante calculations/determinations)	0.153
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Calculated as average specific fuel consumption for heat output for the period 2002-2004.
QA/QC procedures (to be) applied	6 TP form is official statistic form.
Any comment	-

Data/Parameter 6	V_{lim}
Data unit	ths.m^3/year
Description	Baseline natural gas capacity
Time of determination/monitoring	Determined once
Source of data (to be) used	Calculated on the base of natural gas capacity of Gas-distributing station №1 (Passport of Gas-distributing station)
Value of data applied (for ex ante calculations/determinations)	700800 ths.m^3
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Calculation was made by multiplying of natural gas capacity of Gas-distributing station №1 per hour on number of hour in a year – (80000 m^3 * 8760 hours = 700800 ths.m^3).
QA/QC procedures (to be) applied	-
Any comment	-

Data/Parameter 7	V_{his}
Data unit	ths.m^3/year
Description	Minimal natural gas consumption by Dzerzhinskaya HPS for the period 2002-2004,
Time of determination/monitoring	Determined once
Source of data (to be) used	6TP form for the period 2002-2004
Value of data applied (for ex ante calculations/determinations)	625 049 ths.m^3

Justification of the choice of data or description of measurement methods and procedures (to be) applied	Minimal value of natural gas consumption at Dzerzhinskaya HPS for the period 2002-2004.
QA/QC procedures (to be) applied	6 TP form is official statistic form.
Any comment	-

Data/Parameter 8	NCV_{NG}
Data unit	$Kcal/m^3$
Description	Natural gas caloric value.
Time of determination/monitoring	Every 5 days
Source of data (to be) used	Test report of natural gas from JSC "Inspection of natural gas and peat quality at Nizhniy Novgorod region "INSTOP".
Value of data applied (for ex ante calculations/determinations)	2008 – 7989 $Kcal/m^3$ 2009 – 8007 $Kcal/m^3$ 2010 – 8009 $Kcal/m^3$ 2011 – 8009 $Kcal/m^3$ 2012 - 8009 $Kcal/m^3$
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Provided by the JSC "Inspection of natural gas and peat quality at Nizhniy Novgorod region "INSTOP". Data for 2008-2010 – fact, data for 2011-2012 – forecast
QA/QC procedures (to be) applied	This parameter is provided with by an independent certified laboratory.
Any comment	-

Data/Parameter 8	EF_{NG}
Data unit	t CO2/TJ
Description	CO2 emission factor for natural gas
Time of determination/monitoring	Determined once
Source of data (to be) used	This parameter is provided in 2006 IPCC Guidelness for National Greenhouse Gas Inventories, Table 1.4.
Value of data applied (for ex ante calculations/determinations)	56.1
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 9	EF_{FO}
Data unit	t CO2/TJ
Description	CO2 emission factor for fuel oil
Time of determination/monitoring	Determined once
Source of data (to be) used	This parameter is provided in 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 1.4.
Value of data applied (for ex ante calculations/determinations)	77.4
Justification of the choice of data or description of measurement methods and procedures (to be) applied	-
QA/QC procedures (to be) applied	-
Any comment	-

Annex 3

MONITORING PLAN

Detailed description of the monitoring plan is presented in section D of the PDD.

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