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:

Title of the project: "Construction of gas piston power plants for utilization of associated petroleum gas at oilfields developed by OJSC "Surgutneftegas" in Khanty-Mansiysk Autonomous Okrug"

The sectoral scope(s): (1) Energy industries (renewable/non-renewable sources);
(10) Fugitive emissions from fuels (solid, oil and gas).

PDD Version: 1.2

Date: 11/04/2012

A.2. Description of the project:

Brief description of the project

The project involves the construction of 6 gas piston power plants (hereinafter GPPP) near oilfields developed by OJSC "Surgutneftegas" in the Khanty-Mansiysk Autonomous Okrug, Russian Federation. Associated petroleum gas is used as a fuel at the GPPPs. The project allows OJSC "Surgutneftegas" to avoid flaring of associated petroleum gas (hereinafter APG) by utilizing it for the purposes of electricity generation.

Purpose of the project

The main purposes of the project are:

- Increasing of the APG utilization level;
- Covering on-site power demand of oilfields developed by OJSC "Surgutneftegas" with own-generated electricity;
- Improving the environmental situation near the oilfields;
- Reducing greenhouse gas (GHG) emissions.

Situation existing prior to the starting date of the project

APG

Prior to the project implementation associated petroleum gas was burned mainly in flares. Only small quantities of APG were used for internal needs. APG was flared under suboptimal conditions, i.e. part of APG was not oxidized and was released into the atmosphere (also known as soot flaring). At the time of decision making to implement the project[1], APG flaring was common practice at oilfields in Russia.

Electricity

Prior to the project implementation the on-site power demand of OJSC "Surgutneftegas" oilfields was covered only by electricity from the external power grid of Integrated Power System "Urals" (hereinafter IPS "Urals").

Baseline scenario

The baseline scenario can be described as follows; in the absence of the project, APG consumed by all GPPPs would be flared. On-site power demand of the OJSC "Surgutneftegas" oilfields would be supplied by electricity from the IPS "Urals" grid.

The baseline scenario also includes fugitive methane emissions due to incomplete combustion of APG in flares. This is due to the flare combustion efficiency, which is lower than combustion in piston engines. This means that not all methane in the APG will be converted into CO2, and thus is released to the atmosphere uncombusted.

Expected results of the project:

- Coverage of Surgutneftegas power needs by own generated electricity;

[1] 2004

- Reduction of electricity consumption from the power grid by 217[2] ths. MWh/year;
- Increase of APG utilization level;
- Environmental conditions near flares will be improved
- Mitigation of negative environmental impacts, including reduction of GHG emissions by average 135,831 tonnes of CO_2/year.

Project scenario

Under the project scenario, six GPPPs with the total installed capacity of 35.9 MW are installed. The GPPPs are fuelled with APG from oilfields developed by OJSC "Surgutneftegas. The GPPPs are designed to cover on-site power demand of these oilfields. Implementation of the project will lead to significant increase of APG utilization and reduction of power supply from Integrated Power System (IPS) "Urals" grid. IPS "Urals" is one of six IPS in the Unified Power System of the Russian Federation.

Brief history of the Project (including its JI component)

In late 2001 OJSC "Surgutneftegas" started implementation of GTPP construction project which was implemented with involvement of Kyoto Mechanisms. Considering opportunities to enhance financial attractiveness of GPPPs construction OJSC "Surgutneftegas" appealed to the Marrakesh accords which underlined mechanisms of Joint Implementation. By the time of the decision making Yukos Oil Company already started implementation of APG utilization project which intended to sell a part of emission reductions to Japan. As a result OJSC "Surgutneftegas" took into account possibility of JI revenues prior to the project implementation. As no legislative acts or regulation regarding JI mechanisms existed at the time in Russia no special JI consideration protocols or acts were created.

In 2005 the completed project design developed by "SurgutNIPIneft" was received for the first GPPP located at Vostochno-Elovoe oilfield, project designs for the remaining GPPPs were completed in 2006 and 2007 respectively. All GPPPs received all necessary state approvals (Glavgosexpertiza). Construction and commissioning of the first GPPP were completed in March 2006 and the last in September 2009 as evidenced by the Construction Completion Act[3].

In early 2010 when regulatory regime became more transparent and Sberbank announced the first contest for host-country JI project approval, OJSC "Surgutneftegas" and Gazprom Marketing & Trading Ltd. (GM&T) started cooperation on commercializing of carbon credits generated by the company's APG utilization JI projects. 26th July 2011 OJSC "Surgutneftegas" and Gazprom Marketing & Trading Ltd. (GM&T) concluded an Emission Reduction Purchase Agreement and commenced development of Project Design Documentation on this project titled "Construction of gas piston power plants for utilization of associated petroleum gas at oilfields developed by Surgutneftegas in Khanty-Mansiysk Autonomous Okrug".

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)	Legal entity A1: Open Joint Stock Company "Surgutneftegas"	No
Party B: United Kingdom	Legal entity B1: Gazprom Marketing&Trading Ltd.	No

[2] 2010 data. Annual power output may vary from year to year.

[3] Construction Completion Act has been provided to verifiers.

Open Joint Stock Company "Surgutneftegas"

Oil and gas producer Surgutneftegas is one of the largest companies in the Russian oil sector. It accounts for almost 13% of the country's crude output and 25% of gas produced by domestic oil companies.

Key lines of the company's business are:

- Hydrocarbon exploration and production;

- Gas processing and power generation;

- Output and marketing of oil products, sales gas, and gas products;

- Petrochemical production.

Gazprom Marketing & Trading

Based in London, Gazprom Marketing and Trading is a global business that provides customers with integrated energy solutions. Gazprom Marketing and Trading is wholly owned by the investment and holding company Gazprom Germania GmbH. This in turn is a 100% subsidiary of Gazprom Export – the export arm of OAO Gazprom, the world's largest gas producer.

A.4. Technical description of the project:

A.4.1. Location of the project:

The Russian Federation, Tyumen Region, Khanty-Mansiysk Autonomous Okrug

A.4.1.1. Host Party(ies):

The Russian Federation

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

Khanty-Mansiysk Autonomous Okrug, Tyumen Region (oblast)

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

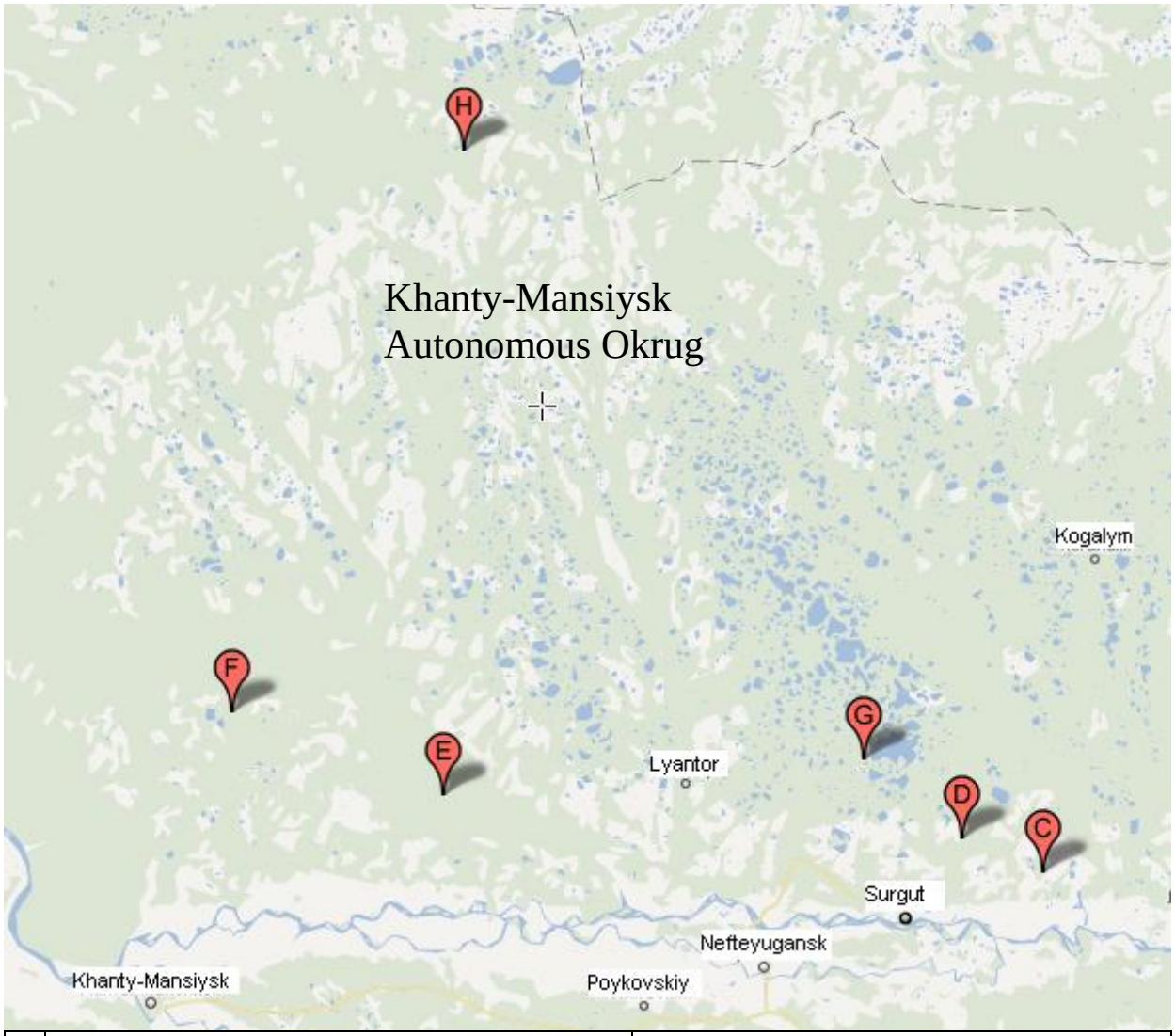
Surgut city

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

The project activity involves the construction of 6 GPPPs located in the area of Surgut, the largest city (population is estimated as 303,040 in 2010) on the Ob river in Khanty-Mansiysk Autonomous Okrug.

Location of oil fields and GPPPs is presented at the map below.

Figure A.4.1.4-1. GPPP location map



#	GPPP	Marker
1	Vostochno-Elovaya GPPP	C
2	Vostochno-Surgutskaya GPPP	D
3	Zapadno-Sakhalinskay GPPP	E
4	Severo-Seliyarovskaya GPPP	F
5	Vatlorskaya GPPP	G
6	Yaun-Lorskaya GPPP	H

Table A.4.1.4-1. Description of the physical locations of the GPPPs.

#	GPPP	Oilfield	District	Geographical

				coordinates[4]
1	Vostochno-Elovaya GPPP	Vostochno-Elovoe oilfield	Surgut disctrict	latitude - 61° 22′ 40″ N, longitude - 74° 12′ 34″ E
2	Vostochno-Surgutskaya GPPP	Vostochno-Surgutskoe oilfield	Surgut disctrict	latitude - 61° 28′ 18″ N, longitude - 73° 44′ 10″ E
3	Zapadno-Sakhalinskay GPPP	Zapadno-Sakhalinskoe oilfield	Surgut disctrict	latitude - 61° 35′ 33″ N, longitude - 70° 43′ 16″ E
4	Severo-Seliyarovskaya GPPP	Severo-Seliyarovskoe oilfield	Surgut disctrict	latitude - 61° 49′ 09″ N, longitude - 69° 29′ 21″ E
5	Vatlorskaya GPPP	Vatlorskoe oilfield	Surgut disctrict	latitude - 61° 41′ 28″ N, longitude - 73° 09′ 50″ E
6	Yaun-Lorskaya GPPP	Yaun-Lorskoe oilfield	Surgut disctrict	latitude - 63° 19′ 43″ N, longitude - 70° 50′ 09″ E

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

Brief description of the project

The project involves construction of 6 GPPPs near oilfields developed by OJSC "Surgutneftegas" in Khanty-Mansiysk Autonomous Okrug, Russian Federation.

GPPPs are designed to cover on-site power demand of the oilfields and their total installed capacity amounts to 35.9 MW.

The electricity net output from the 6 GPPPs will amount to approximately 217 ths. MWh per year.

The list of GPPPs and their main technical specifications are presented in the Table A.4.2-1 below.

Table A.4.2-1. Technical characteristics of GPPPs included in the project[5].

#	GPPP	Amount of energy units	Single unit capacity (MW)	Total installed capacity of GPPP
1	Vostochno-Elovaya GPPP	6	1.027	6.16
2	Vostochno-Surgutskaya GPPP	6	1.37 and 1.54	8.56
3	Zapadno-Sakhalinskay GPPP	4	1.54	6.16
4	Severo-Seliyarovskaya GPPP	2	1.37	2.74
5	Vatlorskaya GPPP	4	1.54	6.16
6	Yaun-Lorskaya GPPP	4	1.54	6.16

Each of the GPPPs includes the following major facilities:

- Process block (with piston engines) and administrative block;
- Power transforming section;
- APG treatment unit.

The general information regarding piston engines is presented in the Table A.4.2-2 below.

- **Table A.4.2-2. Technical characteristics of six GPPPs included in the project[6].**

[4] Geographical coordinates have been provided by OJSC "Surgutneftegas". There are no open sources to check the coordinates.

[5] Data provided by OJSC "Surgutneftegas"

#	GPPP	Piston engine type	Producer of equipment	Single unit capacity (MW)
1	Vostochno-Elovaya GPPP	Jenbacher J320 GS[7]	General Electric Company	1.027
2	Vostochno-Surgutskaya GPPP	Cummins QSV 81 G/ Cummins QSV 91 G/	Cummins Power Generation Inc.	1.37/1.54
3	Zapadno-Sakhalinskaya GPPP	Cummins QSV 91 G/	Cummins Power Generation Inc.	1.54
4	Severo-Seliyarovskaya GPPP	Cummins QSV 81 G/	Cummins Power Generation Inc.	1.37
5	Vatlorskaya GPPP	Cummins QSV 91 G/	Cummins Power Generation Inc.	1.54
6	Yaun-Lorskaya GPPP	Cummins QSV 91 G/	Cummins Power Generation Inc.	1.54

Below tables provide actual and forecasted data on power generation, power supply and APG consumption for power generating purposes at GPPPs operated by OJSC "Surgutneftegas".

Table A.4.2-3. Actual and forecasted power generation, 2008-2012[8]

Power generating facility	Units	Commissioned	2008	2009	2010	2011*	2012*
Vostochno-Elovaya GPPP	MWh	2006/2008	20,665	35,863	39,459	39,203	45,176
Vostochno-Surgutskaya GPPP	MWh	2007/2010	28,543	34,256	40,577	60,928	63,571
Zapadno-Sakhalinskaya GPPP	MWh	2008	0	34,237	43,298	44,820	44,658
Severo-Seliyarovskaya GPPP	MWh	2009	0	3,206	10,178	8,445	8,862
Vatlorskaya GPPP	MWh	2009	0	7,504	40,344	40,195	46,746
Yaun-Lorskaya GPPP	MWh	2009	0	6,531	43,930	44,810	47,439
* – forecast							

Table A.4.2-4. Actual and forecasted APG consumption for power generation, 2008-2012

Power generating facility	Units	APG consumption[9], m^3/kWh	2008	2009	2010	2011*	2012*
Vostochno-Elovaya GPPP	mln. m^3	0.253	6.84	9.69	10.22	7.94	8.52
Vostochno-Surgutskaya GPPP	mln. m^3	0.268	9.55	10.22	11.85	19.79	18.85
Zapadno-Sakhalinskaya	mln.	0.28	0.00	9.27	12.63	12.87	13.41

[6] Data provided by OJSC "Surgutneftegas"

[7] For more details on technical parameters please refer to the following website: http://www.ge-energy.com/products_and_services/products/gas_engines_power_generation/ge_jenbacher_type_3_gas_engines.jsp

[8] Data of OJSC "Surgutneftegas"

[9] "Gas consumption rate for power supply from Intra-field Petroleum Gas Gathering and Utilization Division of OJSC "Surgutneftegas.

GPPP	m^3						
Severo-Seliyarovskaya GPPP	mln. m^3	0.31	0.00	1.17	3.01	2.53	2.71
Vatlorskaya GPPP	mln. m^3	0.275	0.00	2.35	12.44	13.80	14.42
Yaun-Lorskaya GPPP	mln. m^3	0.242	0.00	2.25	11.36	11.22	11.50
* – forecast							

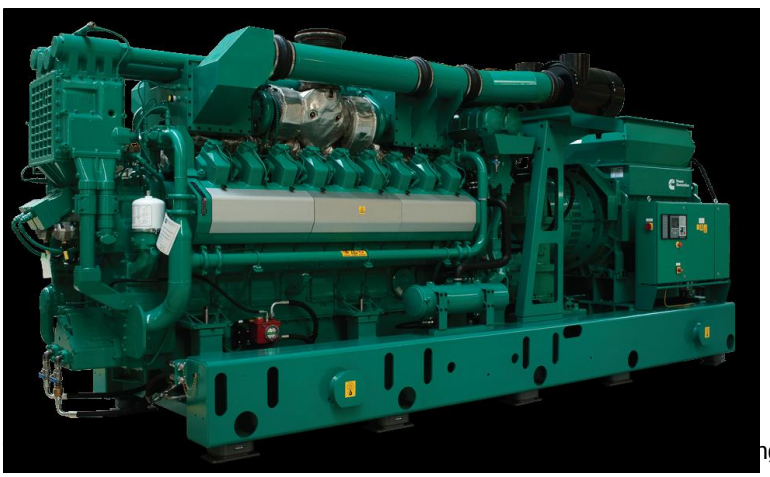
Jenbacher J320 GS piston engine

General Electric's Jenbacher gas engine division is one of the world's leading manufacturers of gas-fueled reciprocating engines, packaged generator sets and cogeneration units for power generation. GE's Jenbacher gas engines range in power from 0.25MW to 4.4MW and run on either natural gas or a variety of other gases (e.g., biogas, landfill gas, coal mine gas, sewage gas, combustible industrial waste gases). Piston engines of this kind can be defined as reliable, maintenance-friendly, high efficient engines with optimal fuel consumption level. Compact construction allows installation in 40-foot modular container configuration.

Table A.4.2-5. Technical characteristics of Jenbacher J320 GS piston engine

Parameter	Unit	Value
Electrical output	kW	1027
Electrical efficiency	%	40.8
Combustion		Lean burn principle
Configuration		V 70°
No. of cylinders		20
Piston displacement	lit.	48.67
Nominal speed	RPM	1500
Compression ratio	Epsilon	12.5
Maintenance overhauls	hours	60000

Cummins QSV 81/91 G piston engine



Cummins manufactures generation sets for working on natural and associated gases with a single capacity of 315-1715 kW. An open type combustion chamber is used in Cummins engines. In contrast to the engine with a precombustion chamber, the engine temperature mode is less intense, which explains the increased life of the engine. In combination with the

relatively low average effective pressure in the cylinder of 12...16 bar, the standard running time before the first overhaul is 60 000 machine hours. Cummins gas piston engines can work at very low gas pressure - starting from 0.2 bar. Thus, when using them in a power unit, the necessity is eliminated to install additional compressor plants, in turn making the system less bulky and reducing investment. The engines allow working without any decrease in capacity on the fuel gas with the methane number from 52. When operating engines with the set degree of compression, when the methane index is changed, the settings are automatically adjusted ensuring the maximum unit capacity. QSV81/91 models can work on fuel gas with the lowered methane number (to 38) with no more than 30% decrease of the nominal capacity.

Table A.4.2-6. Technical characteristics of Cummins QSV 81/91 G piston engine

Parameter	Unit	Value
Electrical output	kW	1370 / 1540
Electrical efficiency	%	35.7 / 36.0
Combustion		Lean burn principle
Nominal speed	RPM	1500
Configuration		V-block
No. of cylinders		18
Compression ratio	Epsilon	12
Maintenance overhauls	hours	60000

Table A.4.2-7. Technical characteristics of power transformers used in the project

GPPP	Substation	Power transformer type	Nominal full capacity (MVA)	Nominal voltage (kV)	Ampere rating (A)
Vostochno-Elovaya GPPP	PS 35/6 kV #198	TDNS - 10000/35	10	36.75/6.3	157.1/916.5
Vostochno-Elovaya GPPP (2 stage)	PS 35/6 kV #198	TDNS - 10000/35	10	36.75/6.3	157.1/916.5
Vostochno-Surgutskaya GPPP	PS 35/6 kV #247	TDNS - 10000/35	10	36.75/6.3	157.1/916.5
Vostochno-Surgutskaya GPPP (2 stage)	PS 35/6 kV #247	TDNS - 10000/35	10	36.75/6.3	157.1/916.5
Zapadno-Sakhalinskaya GPPP	PS 35/6 kV #267	TMN - 6300/35	6.3	35/6.3	103.98/606.22
Severo-Seliyarovskaya GPPP	PS 110/35/6 kV “Seliyarovskaya”	TDTN - 25000/110	25	115/38.5/6.3	131.22/412.39/2 405.63
Vatlorskaya GPPP	PS 110/35/6 kV “Vatlorskaya”	TDTN 25000/110	25	115/38.5/6.3	131.22/412.39/2 405.63
Yaun-Lorskaya GPPP	PS 35/6 kV #105	TDNS - 10000/35	10	36.75/6.3	157.1/916.5

Table A.4.2-8. Technical characteristics of power transformers used in the project

GPPP	Substation	Amount of energy units	Single unit capacity (MW)	Total power capacity (MW)	Electric efficiency (%)
Vostochno-Elovaya GPPP	PS 35/6 kV #198	4	1.027	4.11	38.9
Vostochno-Elovaya GPPP (2 stage)	PS 35/6 kV #198	2	1.027	2.05	38.9
Vostochno-Surgutskaya GPPP	PS 35/6 kV #247	4	1.37	5.48	38.2
Vostochno-Surgutskaya	PS 35/6 kV #247	2	1.54	3.08	38.2

GPPP (2 stage)					
Zapadno-Sakhalinskay GPPP	PS 35/6 kV #267	4	1.54	6.16	38.2
Severo-Seliyarovskaya GPPP	PS 110/35/6 kV "Seliyarovskaya"	2	1.37	2.74	37.8
Vatlorskaya GPPP	PS 110/35/6 kV "Vatlorskaya"	4	1.54	6.16	38.2
Yaun-Lorskaya GPPP	PS 35/6 kV #105	1	1.54	1.54	38.9

Surgutneftegas' GPPPs are connected, and operate in parallel mode with, the IPS "Urals" grid. All facilities are equipped with the necessary control and automation equipment that allows emergency shut-downs, switching between parallel and standalone modes of operation, power output control and load balancing between the units. The power plants have the necessary switch gear enabling them to supply low-voltage power to on-site users. Generally auxiliary consumption accounts for less than 5% of total production volume.

Training program

A comprehensive training program is conducted for a selected number of the Employer's shift engineers, operations and maintenance personnel. The training includes the following main courses:

- Safe methods of gas equipment maintenance;
- Service of pressure vessels;
- Implementation of gas dangerous work;
- Hooker;
- Labour protection;
- Operation and maintenance of boiler;
- Exploitation of hazardous production facilities and gas consuming equipment;
- Exploitation and maintenance of GPPPs.

Human Resources Division of OJSC "Surgutneftegas" is responsible for proper training and qualification of employees involved in the project. In general about 37 persons were trained[10].

Table A.4.2-9. Implementation schedule of the project

Milestones	Starting date of construction	Commissioning date[11]
Vostochno-Elovaya GPPP	September 2005	March 2006
Vostochno-Elovaya GPPP(2 stage)	August 2008	October 2008
Vostochno-Surgutskaya GPPP	March 2007	September 2007
Vostochno-Surgutskaya GPPP(2 stage)	June 2010	October 2010
Zapadno-Sakhalinskaya GPPP	January 2008	December 2008
Severo-Seliyarovskaya GPPP	March 2009	August 2009
Vatlorskaya GPPP	April 2009	September 2009
Yaun-Lorskaya GPPP	January 2009	September 2009

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:

[10] Confirming document has been provided to verifiers.

[11] According to acts of commissioning

Overall, the project realization will lead to the reduction of the GHG emissions, out of which the primary ones are CO_2 and CH_4.

Reduction of GHG emissions as a result of the project realization will occur due to:

- Substitution of electricity produced with fossil fuels combustion by the existing thermal power plants in power grid of Integrated Power System "Urals" by electricity produced by GPPPs running on associated petroleum gas with simultaneous reduction of APG flaring;
- Reduction of fugitive CH_4 emissions from under burning of methane in flares.

Without participation in the Kyoto protocol mechanisms and registration of the project under the JI, the construction of GPPPs is unlikely, since:

- Implementation of the proposed project is not financially attractive;
- OJSC "Surgutneftegas" could continue to flare APG in flare units as there are no restrictions for the flaring or major incentives to invest in APG utilization projects;
- No additional investments are necessary to continue the flaring of APG in flare units;
- In the absence of the proposed project it would be possible to avoid risks associated with the lack of experience in GPPP construction and exploitation;
- No significant changes in the Russian environmental legislation are foreseen, which could force OJSC "Surgutneftegas" to discontinue APG flaring;
- There are no limitations on the GHG emissions for the companies in Russia and none are expected in the foreseen future.

For more information please refer to Section B.2 below.

The project will also lead to decreasing atmospheric pollution such as emissions of nitrogen dioxide, nitrogen monoxide, sulphur dioxide, carbon monoxide, hydrocarbons and soot[12]. Therefore, the ecological situation near the flare units will improve considerably.

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

	Years
Length of the crediting period	5
Year	Estimated annual emission reductions in tonnes of CO_2 equivalent
2008	36,705
2009	88,639
2010	159,988
2011	187,414
2012	206,406
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	679,153
Estimated average annual emission reductions over the crediting period (tonnes of CO_2 equivalent)	135,831

A.5. Project approval by the Parties involved:

[12] This statement is based on results of environmental impact assessment (a part of a project design). For more details please refer to the Section F below.

According to the Russian legislation, the letter of approval for the project will be issued by the Ministry of Economical Development of the Russian Federation based on an expert statement issued by the AIE. Once the Approval is received, both the PDD and the determination report will be updated and the determination will become final.

Project approval from Party B: United Kingdom will be received after approval of the project by the Host party.

SECTION B. Baseline

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

According to paragraph 9 of the "Guidance on criteria for the baseline setting and monitoring", version 03 (hereinafter referred to as "Guidance"), the project participants may select either:

(a) An approach for baseline setting and monitoring developed in accordance with appendix B of the JI guidelines (JI-specific approach); or

(b) A methodology for baseline setting and monitoring approved by the Executive Board of the clean development mechanism (CDM), including methodologies for small-scale project activities, as appropriate, in accordance with paragraph 4 (a) of decision 10/CMP.1, as well as methodologies for afforestation/reforestation project activities; or

(c) An approach for baseline setting and monitoring already taken in comparable JI cases.

Project participants have chosen Option (a) - JI specific approach to establish a baseline scenario for the current project. Baseline is set up in accordance with the Decision 9/CMP.1, Guidelines for the implementation of Article 6 of the Kyoto Protocol. FCCC/KP/CMP/2005/8/Add.2. 30 March 2006 and on the basis of "Guidance on criteria for baseline setting and monitoring", Version 03.

In order to justify the most plausible and realistic baseline scenario, detailed analysis of plausible alternatives are carried out below.

Application of the approach chosen - Identification of a baseline based on the selection of the most plausible alternative scenario

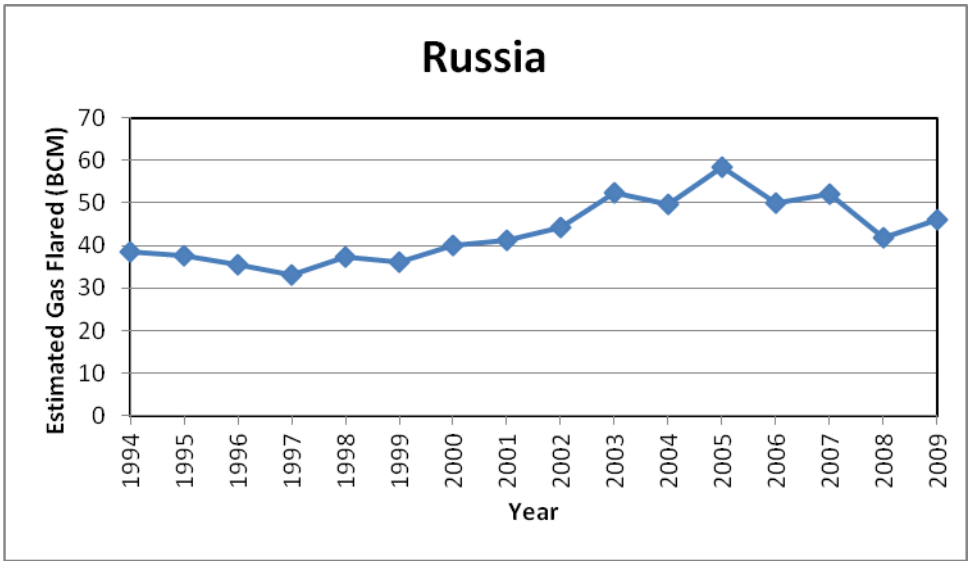
Identification and listing of plausible baseline scenarios

The proposed project involves the construction of six GPPPs with the total installed capacity 35.9 MW. GPPPs are fuelled with APG from nearby oilfields developed by OJSC "Surgutneftegas. Electricity produced by the GPPPs will cover power needs of the oilfields. Prior to the project implementation on-site power demand of OJSC "Surgutneftegas" oilfields was covered only by electricity from the external power grid of Integrated Power System "Urals". PDD developer considers here only plausible alternatives for the project owner - OJSC "Surgutneftegas" which are connected with the main activity i.e. oil and natural gas extraction. Hypothetical alternatives for the project scenario like generation of power with transmission to the power grid or APG release into the atmosphere are excluded from further consideration.

Venting of APG is prohibited in Russia. The cheapest and the most wide-spread method of APG utilization in Russia is its flaring. In 2004 APG flaring was the common practice in Russia, especially in remote locations, such as Khanty-Mansiysk Autonomous Okrug. According to the data of National Geophysical Data Center, more than 49 bln. m^3 of APG were flared in Russia in 2004. Moreover, as it seen from the Diagram B.2-1 below the amount of flared APG was growing not only before the start of the project implementation, but also afterwards.

Diagram B.2-1 –APG flaring level in Russia[13].

[13] http://www.ngdc.noaa.gov/dmsp/interest/flare_docs/Global_BCM_20100917.xls



Utilization of associated petroleum gas does not yield high profit for oil companies because of the low price of APG. APG prices are regulated by the Ministry of Economic Development and Trade of the Russian Federation and remain downright low. The average price for APG in 2004 was in range 73-442[14] RUB/ths. m^3 whereas price for natural gas was about 619-1160[15] RUB/ths. m^3. Besides, oilfields are usually located far away from end consumers in rural undeveloped areas and it is unreasonable for oil companies to invest in the required logistics for gas delivery. Taking into account that oil price was constantly growing[16] oil companies in Russia prefer to invest in their core business – oil extraction and processing rather than in development of APG utilization.

APG utilization is not financially attractive for oil companies in Russia and there are no distinct legislative restrictions which can push the oil companies to develop APG utilization. Fees and penalties for pollutant emissions into the atmosphere are very small. Until 01 July 2005 the fee for emission of methane was 0.05 RUB per tonne of methane. According to the decree #410 dated 01 July 2005[17]. The fee was increased to 50 RUB per tonne of methane in the limits of MPE. Only from 2012 onwards the fee for flaring the amount of APG which is lower than 95% APG utilization level is set to 250 RUR/t. of methane. Even this increased fee which equals to 6.4 EUR/t. of methane is not significant to bring Russian oil companies to invest in APG utilization.

Alternatives scenarios available for the project owner are listed below:

Alternative Scenario 1: Continuation of gas flaring in flare units and purchasing electricity from the power grid;

Alternative Scenario 2: Construction of APG fuelled Gas Turbine Power Plants;

Alternative Scenario 3: Transportation and sale of APG to end users and purchasing electricity from the power grid;

Alternative Scenario 4: Processing of APG at APG processing plant and purchasing electricity from the power grid;

Alternative Scenario 5: Construction of a new APG processing plant and purchasing electricity from the power grid;

[14] http://www.rg.ru/oficial/doc/min_and_vedom/min_ec_torg/117_p.shtm

[15] http://www.businesspravo.ru/Docum/DocumShow_DocumID_95796.html

[16] http://fx-commodities.ru/category/oil/

[17] Efficient as of 20 July 2005.

Alternative Scenario 6: Injection of APG into oil wells and purchasing electricity from the power grid;

Alternative Scenario 7: Implementation of the project without involving of JI mechanism.

Identification of the most plausible alternative scenario

Alternative scenario 1: Continuation of gas flaring in flare units and purchasing electricity from the power grid. When the decision to implement the project was made, APG flaring was the common practice in Russia and the historical practice at oilfields developed by OJSC "Surgutneftegas". The continuation of APG flaring was not prohibited by Russian law or national policies and there were no legislation which encouraged Russian oil companies to invest in APG utilization. It is planned that only from 2012 the level of level of environmental fees and fines may increase. This scenario can be considered as business-as-usual scenario as prior to the project realization APG was historically flared, flaring does not need any investments as compared with the other listed alternatives and there were no technical or legislative barriers for continuation of that business-as-usual scenario.

Prior to the project implementation on-site power demand of OJSC "Surgutneftegas" oilfields was covered by electricity from the external power grid of Integrated Power System "Urals" (hereinafter IPS "Urals"). Power demand of the oilfields was covered by electricity from the grid for decades and no barriers existed or exists which could restrict consumption of electricity from the Unified Power System of the Russian Federation by OJSC "Surgutneftegas".

It should be also mentioned that power generation is not a core business for OJSC "Surgutneftegas". It was more reasonable for "Surgutneftegas" to invest in oil production or treatment rather than in power generation.

Conclusion

Based on the analysis above, analysis of other alternatives below and investment analysis presented in Section B.2 it is considered that Alternative Scenario A1 is the most plausible and credible baseline scenario.

Alternative Scenario 2: Construction of Gas Turbine Power Plants. This alternative is similar to the project scenario except that power would be produced by Gas Turbine Power Plants (hereinafter GTPP) instead of Gas Piston Power Plants. GPPPs would cover on-site power demand of the oilfields. Same as in the project scenario, construction of GTPPs would lead to significant increase in APG utilization and reduction of power supply from the external power grid of Integrated Power System "Urals".

OJSC "Surgutneftegas" operates more than 15 GTPPs in the same region which were built in course of one JI project. Financial analysis for this project showed that construction of GTPPs was not financially attractive[18]. Financial analysis was checked and approved in course of a determination of this JI project and this determination was deemed final. The scale of the GTPP construction project was much bigger as the scale of this project (444 MW compared to 35.9 MW). Following the general rule that bigger projects have lower cost per unit of production than smaller projects, it can be conservatively assumed that this alternative is even more financially unattractive and cannot be considered as a plausible alternative.

Conclusion

Based on the analysis above it is considered that Alternative Scenario 2 cannot be considered as the most plausible and credible baseline scenario for the project.

Alternative Scenario 3: Transportation and sale of APG to end users and purchasing electricity for on-side power needs of the oilfields from the power grid. There are only two major APG consumers in Khanty-Mansiysk Autonomous Okrug - Surgut SDPP-1 and SDPP-2. Surgut SDPP-1 and SDPP-2 were supplied with APG from Fedorovskoe Oilfield and from Lyantorskoe and Russkinskoe oilfields (not

[18] This statement has been confirmed in course of determination of the project. Determination of for the project "Construction of gas turbine power plants for utilization of associated petroleum gas at thirteen oilfields developed by OJSC "Surgutneftegas" in Khanty-Mansiysk Autonomous Okrug, Russian Federation" was deemed final and the project received LOAs from Russia and the UK.

included in the project). Surgut SDPPs are operating on mixture of APG and natural gas which was received from the natural gas transmission pipeline owned by OJSC "Gazprom".

OJSC "Surgutneftegas" could not increase supply of APG to Surgut SDPPs from other oilfields because of the following reasons:

1. Surgut SDPPs are operating on mixture of APG and natural gas and cannot operate only on APG;
2. Strong competition for supply of fuel to Surgut SDPPs. Apart from Gazprom, OJSC "NOVATEK" is also supplying fuel to Surgut GPPPs;
3. Surgut SDPP-1 is owned by OJSC "Second Generation Company" (OKG-2) which is owned by OJSC "Gazprom". OJSC "Gazprom" is not interested in increasing of APG supply to Surgut SDPP-1 as it will decrease the share of natural gas supplied by Gazprom itself.

In 2004 the amount of flared APG only at Fedorovskoe and Lyantorskoe oilfields amounted 550 mln. m^3 (about 550% of 2012 APG consumption by 6 GPPPs included in the project).

Obviously if OJSC "Surgutneftegas" could increase the supply of APG to Surgut SDPPs it would do so.

In this scenario power demand of the oilfields developed by OJSC "Surgutneftegas" would be covered by electricity from the external power grid of Integrated Power System "Urals". Transparent analysis of electricity supply is presented in the analysis of the Alternative Scenario 1 above.

Conclusion

Based on the analysis above it is considered that Alternative Scenario 3 cannot be considered as the most plausible and credible baseline scenario for the project.

Alternative Scenario 4: Processing of APG at APG processing plant and purchasing electricity for on-side power needs of the oilfields from the power grid. OJSC "Surgutneftegas" historically supplied a part of APG to Surgut Gas Processing Plant (hereinafter SGPP). After processing at SGPP light fractions from APG are supplied to Surgut SDPPs.

In 2001 OJSC "Surgutneftegas" bought SGPP. In 2003 and in 2006 the plant was reconstructed and its capacity increased up to 4.2 bln. m^3 in 2003 and up to 7.2 bln. m^3 in 2006.

According to the policy of OJSC "Surgutneftegas" the first-priority option for APG handling is processing of APG at SGPP. Following this priority SGPP was 100% loaded starting from 2001 up to 2011. As SGPP is fully loaded there were no possibilities to direct the APG consumed by the project GPPPs to SGPP.

In this scenario power demand of the oilfields developed by OJSC "Surgutneftegas" would be covered by electricity from the external power grid of Integrated Power System "Urals". Transparent analysis of electricity supply is presented in the analysis of the Alternative Scenario 1 above.

Conclusion

Based on the analysis above it is considered that Alternative Scenario 4 cannot be considered as the most plausible and credible baseline scenario for the project.

Alternative Scenario 5: Construction of a new APG processing plant and purchasing electricity from the power grid.

Theoretically there was a possibility to build a new APG processing plant for the purposes of APG utilization. This option was not considered as the alternative for the project scenario because of the following reasons:

1. In 2001 OJSC Surgutneftegas had not any experience even in operation of an APG processing plants. Construction of a new APG processing plant was too risky and contained too many uncertainties. Investment in construction of the non-core asset was not reasonable;
2. In the same time with the project implementation OJSC "Surgutneftegas" bought the Surgut APG processing plant. Construction of a new plant in the same time did not make sense;
3. Construction of a new APG processing plant automatically involves construction of a pipeline system to collect APG from oil fields lockated 100, 200 and 300 km away from each other. As the project scenario envisages on site APG use an alternative scenario which includes

construction of a huge pipeline system cannot be considered as the plausible alternative to the project.

In this scenario power demand of the oilfields developed by OJSC "Surgutneftegas" would be covered by electricity from the external power grid of Integrated Power System "Urals". Transparent analysis of electricity supply is presented in the analysis of the Alternative Scenario 1 above.

Conclusion

Based on the analysis above it is considered that Alternative Scenario 5 cannot be considered as the most plausible and credible baseline scenario for the project.

Alternative Scenario 6: Injection of APG into oil wells and purchasing electricity for on-side power needs of the oilfields from the power grid. Theoretically APG may be re-injected into oil wells to increase oil recovery factor. Historically and because of geological characteristics of the oilfields developed by OJSC "Surgutneftegas" pressure in oil and gas-bearing formations was maintained by injection of water.

In this scenario power demand of the oilfields developed by OJSC "Surgutneftegas" would be covered by electricity from the external power grid of Integrated Power System "Urals". Transparent analysis of electricity supply is presented in the analysis of the Alternative Scenario 1 above.

Conclusion

Because of the geological characteristics of the oilfields developed by OJSC "Surgutneftegas" it is considered that Alternative Scenario 6 cannot be considered as the most plausible and credible baseline scenario for the project.

Alternative Scenario 7: Implementation of the project without involving of JI mechanism. Realization of the project without involving of JI mechanisms is not a plausible and credible baseline scenario because this alternative is not financially attractive. Please refer to the Section B.2 below for the details of financial analysis.

Description of the chosen baseline scenario

Based on the results of the analysis above it can be concluded that the most plausible baseline scenario for current project is the Alternative scenario 1. The baseline can be formulated as follows. In the absence of the project, APG consumed by all GPPPs included in the project would be flared. On-site power demand for the OJSC "Surgutneftegas" oilfields would be supplied by electricity from the IPS "Urals" grid.

Baseline scenario represents continuation of the common practice prior to the project realization, i.e. APG would be flared and on-site power demand of OJSC "Surgutneftegas" oilfields would be covered only by electricity from the IPS "Urals" grid.

The baseline scenario also includes fugitive methane emissions due to underburning of APG in flares. In the baseline methane would be flared under suboptimal conditions, i.e. part of APG would not be oxidized and would be released into the atmosphere (so-called soot flaring).

Baseline Emissions are based on the following parameters required to be monitored:

- Annual power output of GPPP *i* in a year *y* (MWh);

The baseline emissions (BE_y) comprise CH_4 emissions from underburning of methane in flares and CO_2 emissions from combustion of fossil fuels by power plants in IPS "Urals". The baseline emissions are calculated as follows:

$$BE_y = BE_{EL,y} + BE_{CH4,y} \quad \text{(Formula B.1)}$$

Where:

BE_y – Baseline emissions in year *y* ($t.CO_2$);

$BE_{EL,y}$ – Emissions due to electricity consumption from the IPS "Urals" grid (t. CO_2);

$BE_{CH4,y}$ – Emissions due to underburning of methane in flares (t. CO_2).

$$BE_{EL,y} = \sum_i EG_{PJ,\ GPPP\ i,\ y} * EF_{ELEC,grid,y} \quad \text{(Formula B.2)}$$

Where:

$EG_{PJ, GPPP\ i, y}$ – Annual power output by GPPP *i* in a year *y* (MWh);

$EF_{ELEC,grid,y}$ – Carbon emission factor for grid-based electricity generation in the Integrated Power System "Urals" (IPS "Urals") in year *y*. For more details please refer to the table below.

$$BE_{CH4,y} = \sum_i (FC_{APG, GPPP\ i, y} * W_{h, GPPP\ i, y} * p_h * \eta_{flare} * GWP_{CH4} * 10^{\wedge 3}) \quad \text{(Formula B.3)}$$

Where:

$FC_{APG, GPPP\ i, y}$ – Volume of associated petroleum gas consumed by GPPP *i* in a year *y* (mln. m^3);

$W_{h, GPPP\ i, m}$ – Volumetric fraction of methane in associated petroleum gas consumed by GPPP *i* in a year *y* (%);

η_{flare} – Underburning factor for combustion of APG (3.5%). This parameter is taken constant for the whole crediting period. For more details please refer to the table below;

SMF_h – Mass ratio of CO_2 produced from full combustion of unit mass of a hydrocarbon (t. CO_2 eq. / t. of a hydrocarbon). For more details please refer to the table below;

GWP_{CH4} –Global warming potential of methane (21 tCO_2e/tCH_4).

The full theoretical description together with formulae used for calculations is provided in the Section D below.

Key information and data used to establish the baseline

Monitored parameters

Data/Parameter	$FC_{APG, GPPP\ i, y}$	
Data unit	mln. m^3	
Description	Volume of associated petroleum gas consumed by GPPP *i* in a year *y*	
Time of determination/monitoring	Continuously	
Source of data (to be) used	Volume of APG is monitored continuously by certified meters	
Value of data applied (for ex ante calculations/determinations)	**Year**	**Volume of consumed APG by all 6 GPPPs[19] (mln. m^3)**
	2008	16.39
	2009	34.95
	2010	61.51
	2011	68.16
	2012	69.40
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The volume of consumed APG is measured by certified and duly calibrated meters.	
QA/QC procedures (to be) applied	All measurements are implemented only with certified and duly calibrated equipment.	
Any comment		

[19] 2008-2010 – factual data, 2011-2012 – forecasted data. The data is provided by OJSC "Surgutneftegas"

Data/Parameter	$EG_{PJ, GPPP\ i, y}$	
Data unit	MWh	
Description	Annual power output by GPPP *i* in a year *y*	
Time of determination/monitoring	Continuously	
Source of data (to be) used	Power output is monitored continuously by certified meters	
Value of data applied (for ex ante calculations/determinations)	**Year**	**Power output from all 6 GPPPs[20] (MWh)**
	2008	49,208
	2009	121,600
	2010	217,788
	2011	238,404
	2012	256,454
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The power output is measured by certified and duly calibrated meters.	
QA/QC procedures (to be) applied	All measurements are implemented only with certified and duly calibrated equipment.	
Any comment		

Data/Parameter	$W_{h, GPPP\ i, y}$	
Data unit	%	
Description	Volumetric fraction of hydrocarbon of type *h* in associated petroleum gas consumed by GPPP *i* in a year *y*	
Time of determination/monitoring	Monitored annually	
Source of data (to be) used	Volumetric fractions of hydrocarbons in APG are monitored annually for each GPPP included in the project. The fractions are determined by OJSC "Surgutneftegas" laboratories.	
Value of data applied (for ex ante calculations/determinations)	**Type of APG components (types *h* of hydrocarbons)**	**Volumetric fraction of hydrocarbons of type *h* (%)[21]**
	Methane (CH_4)	85.43
	Ethane (C_2H_6)	3.87
	Propane (C_3H_8)	4.40
	i-butane (methylpropane; C_4H_{10})	0.83
	n-butane (C_4H_{10})	1.48
	i-pentane (methylbutane; C_5H_{12})	0.28

[20] 2008-2010 – factual data, 2011-2012 – forecasted data. The data is provided by OJSC "Surgutneftegas"

[21] Preliminary ER calculations are made on the basis of average APG composition for 2008-2010 for each GPPP. Average 2008-2010 composition of APG for 6 GPPP is given in the table. The exact APG composition for each particular GPPP can be found in the Annex 4 below.

	n-pentane (C_5H_{12})	0.31
	C_6+ (Hexane and higher)	0.31
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The volume of consumed APG is measured by certified and duly calibrated meters. Volumetric fractions of hydrocarbons are measured by the laboratories with certified and duly calibrated equipment.	
QA/QC procedures (to be) applied	All measurements are implemented only with certified and duly calibrated equipment.	
Any comment	Preliminary ER calculations are made on the basis of average APG composition in 2008-2010 for each GPPP. The exact APG composition for each particular GPPP can be found in the Annex 4 below. If few measurements of APG composition are available during a year, the average value should be used for calculations.	

Parameters not monitored

Data/Parameter	$EF_{ELEC,grid,y}$	
Data unit	t. CO_2 / MWh	
Description	Carbon emission factor for grid-based electricity generation in the Integrated Power System "Urals" (IPS "Urals") in year *y*. All GPPPs included in the project are located in Khanty-Mansiysk Autonomous Okrug which pertains to IPS "Urals"[22].	
Time of determination/monitoring	Determined at the stage of the PDD preparation and fixed ex-ante.	
Source of data (to be) used	EBRD (European Bank of Reconstruction and Development) report "Development of the electricity carbon emission factors for Russia"[23]	
Value of data applied (for ex ante calculations/determinations)	**Year**	**Grid emission factor (t. CO_2 / MWh)**
	2008	0.631[24]
	2009	0.631
	2010	0.638
	2011	0.688
	2012	0.712
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The applied emission factors were positively determined by TÜV Süd.	
QA/QC procedures (to be) applied	The applied emission factors were positively determined by TÜV Süd.	

[22] http://so-ups.ru/index.php?id=odu_ural

[23] The study (report) is available at the following website, the referenced information is located on page 5-3: http://www.ebrd.com/downloads/sector/eecc/Baseline_Study_Russia.pdf

[24] The EBRD report does not include grid emission factor for 2008. To provide conservatism the lowest emission factor of the period 2009-2012 was applied.

Any comment	-

Data/Parameter	η_{flare}
Data unit	%
Description	Underburning factor for combustion of APG
Time of determination/monitoring	Determined at the stage of the PDD preparation and fixed ex-ante.[25].
Source of data (to be) used	Methodology for calculation of emissions into the atmosphere by burning of associated petroleum gas in flares", approved in 08.04.1998, order № 199 by Russian Federation State Committee for Environmental Protection
Value of data applied (for ex ante calculations/determinations)	3.5 %
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The value is recommended as default by the methodology
QA/QC procedures (to be) applied	Not applicable
Any comment	According to the NII Atmosphere methodology underburning of methane with soot flaring conditions comprises higher CO emissions as compared to the flaring in GPPPs (project scenario). CO formation with emission factor 0.25 kg CO/ kg APG (as per NII Atmosphere methodology) is not taken into account as CO eventually oxidises to CO_2. This baseline CO_2 is assumed equal to CO_2 in the project scenario. This approach is in line with IPCC provisions. IPCC clearly indicates that CO will oxidise to CO_2 and these CO_2 inputs can be accounted[26].

Data/Parameter	p_h
Data unit	10^{-6} Gg /m^3 (kg/m^3)
Description	This is the density of a hydrocarbon of type *h*. This parameter converts volume of a hydrocarbon to mass of a hydrocarbon
Time of determination/monitoring	Determined at the stage of the PDD preparation and fixed ex-ante.
Source of data (to be) used	The density for each type of hydrocarbon is calculated based GOST 31369-2008, Intergovernmental Standard "Natural gas. Calculation of calorific values, density, relative density and Wobbe index from composition"[27]

[26] 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 1, Chapter 7, box 7.2 page 7.6. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1_Volume1/V1_7_Ch7_Precursors_Indirect.pdf

[27] http://www.gazanaliz.ru/standards/gost_gasGC_2008/GOST_31369-2008/gost_31369-2008.html

Value of data applied (for ex ante calculations/determinations)	**Type of APG components (types *h* of hydrocarbons)**	**Density of real gas (kg/m3)**
	Methane (CH_4)	0,67
	Ethane (C_2H_6)	1,26
	Propane (C_3H_8)	1,86
	i-butane (methylpropane; C_4H_{10})	2,49
	n-butane (C_4H_{10})	2,50
	i-pentane (methylbutane; C_5H_{12})	3,15
	n-pentane (C_5H_{12})	3,17
	C_6+ (Hexanes and higher)	3,90
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The values are calculated on the basis of adopted official standard GOST 31369-2008. The excel spread sheet with calculations was provided to verifiers for review.	
QA/QC procedures (to be) applied	Calculation of the densities for each type of hydrocarbon is provided to verifiers in form of an excel spreadsheet. The exact references on formulae or data from the GOST are given in the excel spreadsheet.	
Any comment	The density is taken at 20°C and 1atmosphere pressure (standard conditions).	

Data/Parameter	SMF_h	
Data unit	t. CO_2 eq. / t. of hydrocarbon of type *h*	
Description	Stoichiometric Mass Factor - mass ratio of CO_2 produced from full combustion of unit mass of hydrocarbon of type *h.* The factor is calculated as follows: SMF_h = molar mass of CO_2 (44 g./mol) * the amount of atoms of carbon in hydrocarbon of type *h* (2 for ethane, 3 for propane, etc.) / molar mass of hydrocarbon of type *h* (molar masses were taken from GOST 31369-2008)	
Time of determination/monitoring	Determined at the stage of the PDD preparation and fixed ex-ante.	
Source of data (to be) used	The Stoichiometric Mass Factor for each type of hydrocarbon is calculated based GOST 31369-2008. The excel spread sheet with calculations was provided to verifiers for review.	
Value of data applied (for ex ante calculations/determinations)	**Type of APG components (types *h* of hydrocarbons)**	**Stoichiometric Mass Factor (t./t.)**
	Methane (CH_4)	2.75
	Ethane (C_2H_6)	2.93
	Propane (C_3H_8)	2.99
	i-butane (methylpropane; C_4H_{10})	3.03
	n-butane (C_4H_{10})	3.03
	i-pentane (methylbutane; C_5H_{12})	3.05
	n-pentane (C_5H_{12})	3.05
	C_6+ (Hexanes and higher)	3.06

Justification of the choice of data or description of measurement methods and procedures (to be) applied	Stoichiometric Mass Factors are calculated on the basis of well-known molar masses of carbon (C), hydrogen (H), Oxigen(O) and data from GOST 31369-2008. The excel spread sheet with calculations of molar mass of each hydrocarbonwas provided to verifiers for review.
QA/QC procedures (to be) applied	Stoichiometric Mass Factors are calculated on the basis of well-known molar masses of carbon (C), hydrogen (H), Oxigen(O) and data from GOST 31369-2008. QA/QC procedures are not required. The excel spread sheet with calculations of molar mass of each hydrocarbonwas provided to verifiers for review.
Any comment	

Data/Parameter	GWP_{CH4}
Data unit	-
Description	Global Warming Potential of methane
Time of determination/monitoring	default
Source of data (to be) used	According to UNFCCC Global Warming Potentials, http://unfccc.int/ghg_data/items/3825.php
Value of data applied (for ex ante calculations/determinations)	21
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Decisions under UNFCCC and the Kyoto Protocol (a value of 21 is to be applied for the first commitment period of the Kyoto Protocol
QA/QC procedures (to be) applied	Not applicable.
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:

According to the paragraph 2 of the Annex I to the "Guidance on criteria for baseline setting and monitoring" version 03, additionality can be demonstrated, inter alia, by using one of the following approaches:

(a) Provision of 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 or enhancements of net anthropogenic removals by sinks of GHGs;

(b) Provision of traceable and transparent information showing that the same approach for additionality demonstration has already been taken in cases for which determination is deemed final and which can be regarded as comparable, using the criteria outlined for baseline determination in paragraph 12 of the Guidance;

(c) Application of the most recent version of the "Tool for the demonstration and assessment of additionality" approved by the CDM Executive Board (allowing for a grace period of eight

months when the PDD is submitted for publication on the UNFCCC JI website), or any other method for proving additionality approved by the CDM Executive Board.

Approach (c) is used here to demonstrate additionality of the project. The version, 05.2.1, of the "Tool for the demonstration and assessment of additionality" (further referred as "the Tool") is applied. Clause 44 (c) of Guidance on criteria for baseline setting and monitoring version 3 allows for a grace period of eight months when the PDD is submitted for publication on the UNFCCC JI website. Although Track 1 JI projects are not subjects for publication on UNFCCC site, PDD developers assumed that the date of determination start can be used as criteria for Track 1 projects as dates of determination start and publication are very close to each other.

The following steps are stipulated by the tool:

- Step 1: Identification of alternatives to the project activity consistent with current laws and regulations;
- Step 2: Investment analysis (including the sensitivity analysis);
- Step 3: Barrier analysis (optional);
- Step 4: Common practice analysis.

Steps 1,2 and 4 are applied here to assess additionality of the project according to the Tool.

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations.

Sub-step 1a: Define alternatives to the project activity:

Described below are the alternatives for the JI project "Construction of gas piston power plants for utilization of associated petroleum gas at oilfields developed by Surgutneftegas in Khanty-Mansiysk Autonomous Okrug".

Plausible alternative scenarios are identified and analyzed in the Section B.1 Above. Among the possible alternatives are the following:

Alternative Scenario 1: Continuation of gas flaring in flare units and purchasing electricity from the power grid;

Alternative Scenario 2: Construction of APG fuelled Gas Turbine Power Plants;

Alternative Scenario 3: Transportation and sale of APG to end users and purchasing electricity from the power grid;

Alternative Scenario 4: Processing of APG at APG processing plant processing plant and purchasing electricity from the power grid;

Alternative Scenario 5: Construction of a new APG processing plant and purchasing electricity from the power grid;

Alternative Scenario 6: Injection of APG into oil wells and purchasing electricity from the power grid;

Alternative Scenario 7: Implementation of the project without involving of JI mechanism.

Sub-step 1b: Consistency with mandatory laws and regulations:

There are no special national and/or sectoral policies and circumstances which seriously influence the alternatives listed above. Implementation of all alternatives including the project scenario itself involves acquisition of various legislation approvals, licenses or permits but none of that permission documentation can be considered as obstructive or prohibitive. All the documents can be obtained in a common business-as-usual way.

There are also no special national and/or sectoral policies and circumstances which restricts flaring of APG to OJSC "Surgutneftegas". The main documents which regulate flaring of APG are:

- Subsoil Law of the Russian Federation from 21.02.1992 N 2395-1;
- Licenses for oilfields exploitation (Licenses are issued by Ministry of Natural Resources of the Russian Federation);
- Federal law #7 "Environmental protection" from January 10, 2002

None of these documents contain direct restrictions for APG flaring. At the time of the decision making to implement the project, licenses for the exploitation of the oilfields developed by OJSC "Surgutneftegas" contained an obligation to utilize APG by the method of its injection. However, this obligation was not fulfilled because of geological characteristics of the oilfields. Prior to the project implementation the APG was only flared[28]. The only incentives to utilize APG in other ways than its flaring are fees and penalties for pollutant emissions into the atmosphere which were negligibly small and could not motivate OJSC "Surgutneftegas" to discontinue practice of APG flaring (for more information about fees and penalties please refer to the Section B.1 above). As this obligation was not implemented for many years it cannot be considered as restrictive for the project.

Step 2. Investment analysis

According to the Tool, it should be determined whether the proposed project activity is not:

a) The most economically or financially attractive; or

b) Economically or financially feasible, without the revenue from the sale of Emission Reduction Units (ERUs).

Option (b) is selected. Investment analysis is implemented here to prove that without ERU revenues the project is not financially attractive.

Sub-step 2a: Determine appropriate analysis method

According to the Tool, during this step of proving the project additionality, the project participant can use one of the following types of analysis: simple cost analysis, investment comparison analysis or benchmark analysis. The simple cost analysis for this project is not applicable, since the project activity and the alternatives identified in Step 1 generate financial benefits other than JI related income.

Project participants decided to use Benchmark analysis which is in compliance with the Tool.

Sub-step 2b: Option III. Apply benchmark analysis

The Net Present Value (NPV) as a financial indicator during the benchmark analysis is used. Positive NPV is considered as a benchmark of financially attractive project. Negative NPV indicates that the project is not financially feasible.

Sub-step 2c: Calculation and comparison of financial indicators

Parameters used in the financial analysis

The parameters, used in the financial analysis, are based on the figures provided by OJSC "Surgutneftegas" based on the actualized figures of 2011. These figures are presented in detail in table B.2.1 below:

Table B. 2-1. Parameters used in the financial analysis

Item	Unit	Value	Data source
Total investments	kRUB	1,230,308	Actual investment amount in nominal terms
Lifetime of the project	Year	15	Lifetime of the project was taken equal to the lifetime of the main equipment[29] starting from 2006 - commissioning of the first GPPP.

[28] Confirming evidences have been provided to verifiers.

[29] Documental evidences confirming the lifetime of the equipment have been provided to verifiers.

Inflation	%	5	An average forecasted inflation rate for 2012-2014 period inclusive was taken[30].
IRR benchmark (real)	%	15	The real discount rate was taken equal to the discount rate used for JI project ("Construction of gas turbine power plants for utilization of associated petroleum gas at thirteen oilfields developed by OJSC "Surgutneftegas" in Khanty-Mansiysk Autonomous Okrug, Russian Federation") for which the determination was deemed final.
IRR benchmark (nominal)	%	20	IRR benchmark (real) + forecasted inflation rate
Property tax	%	2	Property tax rates are established by Constituents (subjects) of Russian Federation and cannot exceed 2.2 per cent (Article 380 of the Tax Code of the RF)
Profit tax	%	20.00	Article 284 of the Tax Code of the RF
Grid electricity cost	RUB/kWh	1,99	Calculated on the basis of factual prices of electricity purchased by OJSC "Surgutneftegas" from the grid, post-2011 values adjusted for inflation.
Operation expenses	%	10	Actual costs up to 2011. Post-2011 values are adjusted for inflation.[31]

Table B.2-2 Economic indicators of the project.

Data name	Unit	Project activity
Investments	kRUB	1,230,308
NPV	kRUB	-356,347

Sub-step 2d: Sensitivity analysis

Sensitivity analysis was carried out by several factors:

- Capital expenditure;
- Operational expenses;
- Grid electricity price.

The project sensitivity to changes in the main parameters is analyzed below (see Table B.2-3)

For carrying out and estimating the sensitivity analysis, the key factors affecting the project were selected. They include: alteration of investment amount, discount rate, operational expenses and electricity prices. The variation interval is taken from -10% to +10% with the 5% step.

[30] Russian Central Bank inflation forecast for 2012-2014 (http://www.rg.ru/2011/11/01/inflacia-anons.html)

[31] Evidences confirming operational expenses have been provided to verifiers.

Table B.2-3. Economic indexes of sensitivity analysis during variation of the investment expenditures level and discount rate

Investments (% of base)		90%	95%	100%	105%	110%
Discount rate	18.00%	-255,028	-292,630	-330,233	-367,835	-405,438
	19.00%	-270,722	-307,552	-344,382	-381,211	-418,041
	20.00%	-284,199	-320,273	-356,347	-392,421	-428,495
	21.00%	-295,719	-331,055	-366,391	-401,727	-437,063
	22.00%	-305,513	-340,129	-374,745	-409,361	-443,977

Table B.2-4. Economic indexes of sensitivity analysis during variation of the operational expenses and discount rate

Operation expenses (% of base)		90%	95%	100%	105%	110%
Discount rate	18.00%	-252,893	-291,563	-330,233	-368,903	-407,572
	19.00%	-272,278	-308,330	-344,382	-380,434	-416,485
	20.00%	-289,030	-322,689	-356,347	-390,005	-423,664
	21.00%	-303,458	-334,925	-366,391	-397,858	-429,325
	22.00%	-315,831	-345,288	-374,745	-404,202	-433,659

Table B.2-5. Economic indexes of sensitivity analysis during variation of the electricity prices and discount rate

Electricity price (% of base)		90%	95%	100%	105%	110%
Discount rate	18.00%	-409,686	-369,960	-330,233	-290,506	-250,779
	19.00%	-417,277	-380,829	-344,382	-307,934	-271,487
	20.00%	-423,302	-389,825	-356,347	-322,869	-289,391
	21.00%	-427,961	-397,176	-366,391	-335,606	-304,821
	22.00%	-431,425	-403,085	-374,745	-346,405	-318,065

Conclusion on Step 2

As shown on the tables above, within the variation of the selected parameters, the project activity is unprofitable for the company and the NPV remains negative. Thus, the project activity is not a financially attractive alternative.

Step 3. Barrier analysis

Not applicable to the project activity.

Step 4. Common practice analysis

Sub-step 4a: Analyze other activities similar to the proposed project activity:

No similar project activities (except APG utilization projects implemented as JI projects) can be observed in Khanty-Mansiysk Autonomous Okrug.

The main part of the projects intended to APG utilization in Russia are being implemented considering JI mechanisms[32]. Other APG utilization projects implemented in Khanty-Mansiysk Autonomous Okrug and located nearby Yamal Nenets Autonomous Okrug are also implemented as JI projects[33].

[32] http://ji.unfccc.int/JI_Projects/DeterAndVerif/Verification/PDD/index.html JI projects 41, 52, 90, 108, 114, 142, 160, 171 and 184.

Thus, it can be concluded that the project activity is not the common practice in the Khanty-Mansiysk Autonomous Okrug.

Sub-step 4b: Discuss any similar Options that are occurring:

As it is said in Sub-step 4a, the project activity is not the common practice and similar activities in the region are been implemented as JI projects.

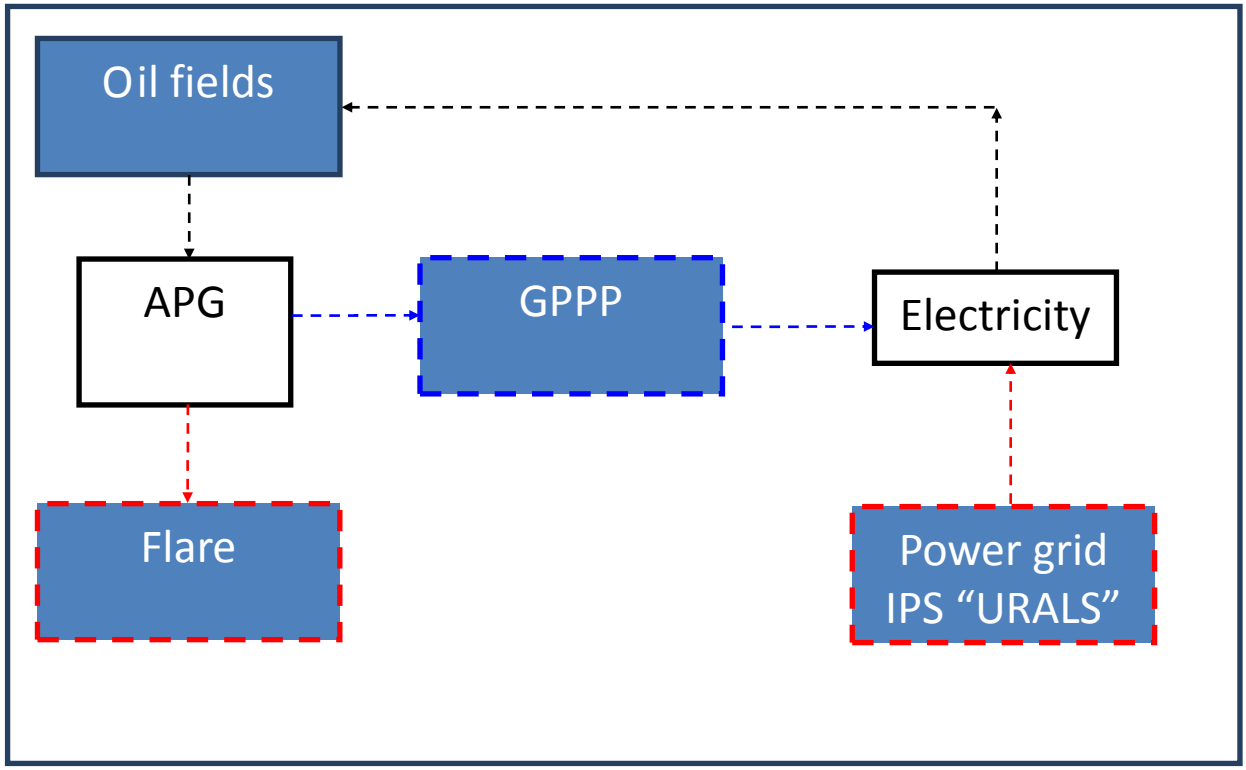
Conclusion

Based on the analysis above it can be concluded that the project activity is additional.

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

Sources of emissions included or excluded from the project boundary are presented in the Table B.3-1 below.

Figure B.3-1 Project boundary.



According to the NII Atmosphere methodology which is used as a source of data for estimation of the methane underburning factor, underburning of methane with soot flaring conditions in the baseline scenario comprises higher CO emissions as compared to the flaring in GPPPs in the project scenario.

CO emissions in the baseline scenario with emission factor 0.25 kg CO/ kg APG (as per NII Atmosphere methodology) are not taken into account as it is assumed that CO will eventually oxidise to CO_2. This

[33] http://www.bureau-veritas.ru/wps/wcm/connect/bv_ru/local/home/news/news-ghg-yugragasprocessing?presentationtemplate=bv_master/news_full_story_presentation

http://www.bureau-veritas.ru/wps/wcm/connect/bv_ru/local/home/news/news-ghg-gazpromneft?presentationtemplate=bv_master/news_full_story_presentation

baseline CO_2 is assumed equal to CO_2 in the project scenario. This approach is in line with IPCC provisions. IPCC clearly indicates that CO will oxidise to CO_2 and these CO_2 inputs can be accounted[34].

No leakage are taken into account for the current project. Usually, the main sources of leakage are leaks during fuel transportation outside project boundaries. Under the project scenario APG used as a fuel is extracted inside project boundaries. Thus there is no leakage connected with fuel transportation in the project scenario and leakage connected with grid electricity generation in the baseline scenario is excluded according to the principle of conservatism. Possible leakages connected with expendable materials consumed by the GPPPs are negligibly small and are excluded from consideration.

Sources of emissions included or excluded from the project boundary are presented in the Table B.3-1 below.

Table B.3-1 Emission sources included or excluded from the project boundary

	Source	Gas	Included?	Justification/Explanation
Baseline	Power generation by grid connected power plants in Integrated Power System "Urals"	**CO_2**	**Included**	**Main source of emissions**
		CH_4	Excluded	Excluded for simplification as the emission are negligible small. This approach is line with existing CDM methodologies[35].
		N_2O	Excluded	
	Associated Petroleum gas flaring	CO_2	Excluded	CO_2 emissions from APG combustion both in the baseline and in the project scenario are almost equal and are excluded for simplification. The additional CO_2 emissions in the project scenario due to full oxidation of methane which would be underburned in the baseline scenario are included in project emissions.
		CH_4	**Included**	**Main source of emissions.**
		N_2O	Excluded	Considered to be negligibly small.
Project activity	Associated Petroleum Gas combustion in GPPPs for purposes of electricity generation	**CO_2**	**Included**	**Main source of emissions.** CO_2 emissions from APG combustion both in the baseline and in the project scenario are almost equal. Only additional CO_2 emissions due to full oxidation of hydrocarbons which would be underburned in the baseline

[34] 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 1, Chapter 7, box 7.2 page 7.6. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1_Volume1/V1_7_Ch7_Precursors_Indirect.pdf

[35] Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas, AM0029/version 03, Approved Methodology, CDM Executive board

	Source	Gas	Included?	Justification/Explanation
				scenario are included here.
		CH_4	Excluded	Considered to be negligibly small.
		N_2O	Excluded	

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: 29/02/2012

The baseline was developed by Gazprom Marketing&Trading Ltd.

Tel.: +44 (0) 207 756 0000

E-mail: global_carbon@gazprom-mt.com

Gazprom Marketing&Trading Ltd. is a project participant listed in Annex 1.

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

15/03/2005 (date of contract signing for supplying of equipment for the first GPPP at Vostochno-Elovoe oilfield)

C.2. Expected operational lifetime of the project:

15 years / 180 months (The operational period of the main equipment – gas piston engines)

C.3. Length of the crediting period:

5 years / 60 months. 01/01/2008 – 31/12/2012.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

The JI specific approach is chosen to establish the monitoring plan for the project, taking into account the requirements of "Guidance on criteria for baseline setting and monitoring", version 03 and given the requirements of Decision 9/CMP.1, Appendix B "Criteria for baseline setting and monitoring".

The monitoring plan is designed to calculate and record the GHG emission reductions at six GPPPs operated by OJSC "Surgutneftegas" in a full and transparent manner. Monitoring plan is based on and created in accordance with the company's existing fuel and energy metering systems and environmental impact assessment. Four major divisions are responsible for implementation of the monitoring plan:

1. Environmental Safety and Environmental Management Division;
2. Intra-field Petroleum Gas Gathering and Utilization Division (hereinafter IPGGUD);
3. Power Division.
4. Technical Division

The monitoring process will not require introduction of any changes in the existing system of data collection and storage. All necessary data is processed and registered in course of business-as-usual operation of the GPPPs. The monitoring plan data should be stored for at least 2 years after the last transfer of ERUs for the project.

Short description regarding of the project and baseline scenario and components to be monitored are presented below:

I. Project scenario description

According to the project concept, six GPPPs with the total installed capacity of 35.9 MW are installed. GPPPs are fuelled with APG from nearby oilfields developed by OJSC "Surgutneftegas. GPPPs are designed to cover on-site power demand of the oilfields. Implementation of the project will lead to significant increase of APG utilization and reduction of power supply from the external power grid of Integrated Power System "Urals". IPS "Urals" is one of six IPS in the Unified Power System of the Russian Federation.

The electricity net output from 6 GPPPs will amount to about 217 ths. MWh per year. Besides, the project realization will enhance the environmental conditions near the flares at the oilfields.

According to the chosen approach emissions due to full oxidation of hydrocarbons which would be underburned in the baseline scenario are included in project emissions.

Project Emissions are based on the following parameters required to be monitored:

- Volume of associated petroleum gas consumed by GPPP *i* in a year *y* for the purposes of power generation (mln. m^3);
- Volumetric fraction of hydrocarbons of different types in associated petroleum gas consumed by GPPP *i* in a year *y* (%);
- Annual power output of GPPP *i* in a year *y* (MWh).

II. Baseline description

Baseline scenario represents continuation of the common practice prior to the project realization, i.e. APG would be flared and on-site power demand of OJSC "Surgutneftegas" oilfields would be covered only by electricity from the IPS "Urals" grid.

The baseline scenario also includes fugitive methane emissions due to underburning of APG in flares. In the baseline methane would be flared under suboptimal conditions, i.e. part of APG would not be oxidized and would be released into the atmosphere (so-called soot flaring).

Baseline Emissions are based on the following parameters required to be monitored:

- Annual power output of GPPP *i* in a year *y* (MWh).

Key factors, determining the GHG emissions

The key factors, determining the GHG emissions in both baseline and project scenarios are:

- Combustion of APG in flares or in GPPPs for generation of electricity;
- Emissions due to underburning of methane while flaring in flares in the baseline scenario and emissions due to complete oxidation of hydrocarbons in the project scenario.

There are no special national monitoring standards applicable to the project except federal law #102-FZ dated 11.06.2008 "about standardisation of measurements" and various federal standards (GOSTs) and methodologies for meters calibration. All legislation requirements prescribed are fulfilled.

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
1. $FC_{APG, GPPP\ i, y}$	Volume of associated petroleum gas consumed by GPPP i in a year *y*	IPGGUD	m^3	m	continuously	100 %	Electronic and paper	Gas meters readings
2. $W_{h, GPPP\ i, y}$	Volumetric fraction of hydrocarbon of	IPGGUD	%	m	annually	100 %	Electronic and paper	Determined by laboratory tests once or twice per

	type *h* in associated petroleum gas consumed by GPPP *i* in a year *y*							year. If few measurements of APG composition are available during a year, the average value should be used for calculations.

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

The project CO_2 emissions (PE_y) include CO_2 emissions from complete oxidation of hydrocarbons (methane, ethane, butane, propane, hexane and higher) and are calculated as follows:

$$PE_y = \sum_i \sum_h (FC_{APG, GPPP\ i, y} * W_{h, GPPP\ i, y} * p_h * \eta_{flare} * SMF_h * 10^{\wedge 3}) \quad \text{(D.1.1.2-1)}$$

Where:

PE_y – Project emissions in year *y* (t. CO_2);

$FC_{APG, GPPP\ i, y}$ – Volume of associated petroleum gas consumed by GPPP *i* in a year *y* (mln. m^3);

$W_{h, GPPP\ i, y}$ – Volumetric fraction of hydrocarbon of type *h* in associated petroleum gas consumed by GPPP *i* in a year *y* (%);

p_h – The density of hydrocarbon of type *h* used to convert volume of a hydrocarbon to mass of a hydrocarbon (kg/m^3). This parameter is taken constant for the whole crediting period. For more details please refer to the Section B.1 above;

η_{flare} – Underburning factor for combustion of APG (3.5%). This parameter is taken constant for the whole crediting period. For more details please refer to the Section B.1 above;

SMF_h – Mass ratio of CO_2 produced from full combustion of unit mass of a hydrocarbon (t. CO_2 eq. / t. of a hydrocarbon). For more details please refer to the Section B.1 above.

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-*	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/	Comment

referencing to D.2.)							paper)	
1. $EG_{PJ, GPPP\ i, y}$	Annual power output by GPPP *i* in a year *y*	Power Division	MWh	m	continuously	100%	Electronic and paper	Annual power output is measured directly.
3. $FC_{APG, GPPP\ i, y}$	Volume of associated petroleum gas consumed by GPPP i in a year *y*	IPGGUD	m^3	m	continuously	100 %	Electronic and paper	Gas meters readings
4. $W_{h, GPPP\ i, y}$	Volumetric fraction of hydrocarbon (methane) of type *h* in associated petroleum gas consumed by GPPP *i* in a year *y*	IPGGUD	%	m	annually	100 %	Electronic and paper	Determined by laboratory tests once or twice per year

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

The baseline emissions (BE_y) comprise CH_4 emissions from underburning of methane in flares and CO_2 emissions from combustion of fossil fuels by power plants in IPS "Urals". The baseline emissions are calculated as follows:

$$BE_y = BE_{EL,y} + BE_{CH4,y} \quad \text{(D.1.1.4-1)}$$

Where:

BE_y – Baseline emissions in year *y* ($t.CO_2$);

$BE_{EL,y}$ – Emissions due to electricity consumption from the IPS "Urals" grid (t. CO_2);

$BE_{CH4,y}$ – Emissions due to underburning of methane in flares (t. CO_2).

$$BE_{EL,y} = \sum_i EG_{PJ, GPPP\ i, y} * EF_{ELEC,grid,y} \quad \text{(D.1.1.4-2)}$$

Where:

$EG_{PJ, GPPP\ i, y}$ – Annual power output by GPPP *i* in a year *y* (MWh);

$EF_{ELEC,grid,y}$ – Carbon emission factor for grid-based electricity generation in the Integrated Power System "Urals" (IPS "Urals") in year *y*. For more details please refer to the Section B.1 above.

$$BE_{CH4,y} = \sum_i (FC_{APG, GPPP\ i, y} * W_{h, GPPP\ i, y} * p_h * \eta_{flare} * GWP_{CH4} * 10^{\wedge 3}) \quad \text{(D.1.1.4-3)}$$

Where:

$FC_{APG, GPPP\ i, y}$ – Volume of associated petroleum gas consumed by GPPP *i* in a year *y* (mln. m^3);

$W_{h, GPPP\ i, m}$ – Volumetric fraction of methane in associated petroleum gas consumed by GPPP *i* in a year *y* (%);

η_{flare} – Underburning factor for combustion of APG (3.5%). This parameter is taken constant for the whole crediting period. For more details please refer to the Section B.1 above;

SMF_h – Mass ratio of CO_2 produced from full combustion of unit mass of a hydrocarbon (t. CO_2 eq. / t. of a hydrocarbon). For more details please refer to the Section B.1 above;

GWP_{CH4} –Global warming potential of methane (21 tCO_2e/tCH_4).

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

This option is not applicable to the monitoring of the project.

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

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):

This option is not applicable to the monitoring of the project.

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

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

The leakage equal zero in this project.

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):

The following formula is applied to estimate emission reductions generated by the project:

$$ER_y = BE_y - PE_y \quad \text{(D.1.4-1)}$$

Where:

BE_y – Baseline emissions in year y ($t.CO_2$);

PE_y – Project emissions in year y ($t.CO_2$);

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 Department of Environmental Safety and Management at OJSC "Surgutneftegas" is responsible for the company's operations in terms of environmental protection and monitoring. The department has well-trained staff, all required technical equipment and is capable to handle information on the environmental impacts of the project. The Company's Central Base Laboratory for Ecoanalytical and Process Studies responsible for general environmental monitoring is accredited by the Standardization, Metrology and Certification Committee (GosStandart) of Russia to perform analysis of 707 parameters, including 365 ecological and 47 radiological parameters. Surgutneftegas ecological management system involves all the Company's divisions. Within environmental policy of the Company staff liabilities and responsibilities are specified throughout the entire management structure. There are detailed procedures to define primary ecological aspects which constitute the basis for environmental activity planning.

The Company has eleven laboratories to perform in-house monitoring of water and soil quality, and ambient air, as well as environmental impact of emission and discharge sources, and disposal sites. The unique laboratory facilities carry out a wide range of research and analysis activities, including determination of heavy

metals, carcinogenic and polluting substances, and natural radionuclides in all media. Research is conducted by trained engineering and laboratory personnel using up-to-date instrumentation such as chromato-mass-spectrometers, gas and liquid chromatographs, and spectrophotometers.

The list of major official statistical forms which Surgutneftegas submits according to Russian Legislation:

- 2-TP (air). *Annual data on the atmospheric air protection*, including the information on the amount of the collected and neutralized atmospheric pollutants, detailed emissions of specific contaminants, number of emission sources, measures for reduction of emissions into the atmosphere and emissions from separate groups of contamination sources, (prepared according to the resolution of the Russian State Statistical Committee date September 17th of 2010 # 319 "On the establishment of the statistical tools for the arrangement of statistical monitoring over the environment and agriculture"(version from 23.03.2011)[36];
- 2-TP (water management) *Data on the water usage*, including the information on the water consumption from natural sources, discharge of waste water and content of contaminants in the water, capacity of water treatment facilities etc. (prepared according to the resolution of the Russian State Statistical Committee dd. October 19th of 2009 # 230 "On the establishment of statistical tools for the arrangement by the Federal Water Resources Agency of the statistical monitoring of water usage"[37];
- 2-TP (wastes) Data on the generation, use, neutralization, transportation and emplacement of production and consumption wastes, including the annual balance of the wastes management separately for their types and hazard classes, (prepared according to the resolution of the Russian State Statistical Committee dd. January 28th of 2011 #17 "On the establishment of statistical tools for the arrangement by the Federal Service for Supervision of Natural Resource Usage of the statistical monitoring of production and consumption wastes [38]).

The Company's environmental activity is in line with nature protection plans developed under the comprehensive Ecology Program with a view of systematic planned mitigation of industrial impact on the environment. Principal areas of the Ecology Program are as follows:
- construction of nature protection facilities;
- land conservation, management and rehabilitation;
- air protection;
- water resources protection;
- natural environment and production facilities monitoring;
- pipeline accident prevention and clean-up;
- industrial waste neutralization and utilization;
- environmental training;
- R&D activity.

[36] The document is available here http://base.consultant.ru/cons/cgi/online.cgi?req=doc;base=LAW;n=112162. Free access to the document may be limited.

[37] The document is available here http://base.consultant.ru/cons/cgi/online.cgi?req=doc;base=LAW;n=93393. Free access to the document may be limited.

[38] The document is available here http://base.consultant.ru/cons/cgi/online.cgi?req=doc;base=LAW;n=109918. Free access to the document may be limited.

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.
$FC_{APG, GPPP\ i, y}$	Low	Amount of APG consumed by GPPPs is measured continuously by APG measuring complexes installed at the plants. Only certified meters and equipment are used. All certified meters have factory calibration. Calibration and checking has been done in terms prescribed by meters passports by specialized accredited metrology organizations. A calibration schedule has been established.
$W_{h, GPPP\ i, y}$	Low	Specialized licensed laboratory is responsible for analysis of APG and measuring of hydrocarbons fractions in the APG. The laboratory is equipped with gas-analyzing equipment and chromatograph. Only certified meters and equipment are used. All equipment used is calibrated and checked in full compliance with Russian legislation.
$EG_{PJ, GPPP\ i, y}$	Low	The data on the electricity supply by GPPPs is determined by standardized electricity meters. Amount of electricity supplied is measured continuously. Only certified meters and equipment are used. All certified meters have factory calibration. Calibration and checking has been done on terms prescribed by meters passports by specialized accredited metrology organizations. A calibration schedule has been established. The data from power meters are automatically and regularly transferred to the computer system and archived.

Data archiving

Data on APG consumption and power output is archived in special electronic database. The database undergoes appropriate maintenance to minimize a chance of data loss. Data on APG composition is archived in form of paper certificates. Excel spreadsheets with calculations are kept in computers of responsible persons in both "Surgutneftegas" and " Gazprom Marketing and Trading". All data will be stored for at least 2 years after the end of the crediting period or the last issue of ERUs.

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

The monitoring plan and control structure fully correspond to the already existing production monitoring and control system at the OJSC «Surgutneftegas». Monitoring of such parameters as associated petroleum gas consumption and power output is carried out by on-duty engineers and power engineers. Detection of volumetric fraction of methane and other hydrocarbons in associated petroleum gas is carried out by certified laboratories.

Only certified and duly calibrated and checked equipment is used for measuring of parameters included in the monitoring plan. All equipment is subject for timely calibration and checking according to the Russian standards and regulation and internal calibration schedules. Normally, meters and equipment are checked and calibrated in the periods of scheduled shutdowns. But in the case when a meter should be taken off for checking and calibration during the operation

time this meter can be replaced with a reserve one. Not calibrated meters and equipment will not be used for monitoring of parameters included in the monitoring plan.
In case of a monitored parameter cannot be measured by an appropriately calibrated device an alternative method of monitoring can be developed for calculation of emission reductions. The alternative method should guarantee the same level of accuracy. If the same level of accuracy as in the initial monitoring plan cannot be achieved a conservative adjustment should be made.
The main monitored parameters are:

- Volume of associated petroleum gas consumed by GPPPs for the purposes of power generation;
- Volumetric fraction of methane and other hydrocarbons in associated petroleum gas consumed by GPPPs;
- Annual power output of GPPPs.

The description of how the primary recordings of electric energy, APG volume and APG composition are taken, processed, verified and converted in monthly electronic data

- Power output of GPPPs is measured by automated power meters which transfer information to servers of automated system of measurement and control named "Alfa-Centre". Transfer of power output data is implemented electronically and is controlled and checked by on-duty power engineers of the Power division of OJSC "Surgutneftegas". In the end of a calculation period the numbers are double checked and confirmed by IPGGUD in paper form. Power output measurement is a common "business as usual" duty. Data for preparation of monitoring reports is taken from the automated system on request of the Head of Technical Division of OJSC "Surgutneftegas";
- Volume of associated petroleum gas consumed by GPPPs for the purposes of power generation is measured by APG measurement stations. Once per day volumes of consumed by a GPPP APG are transferred to dispatchers of central Engineering and Technical Service who form accumulative report on usage of APG at GPPPs. Measurement and transfer of information is carried out with teleautomatic tools. APG consumption measurement is a common "business as usual" duty. Data for preparation of monitoring reports is taken from the automated system on request of the Head of Technical Division of OJSC "Surgutneftegas";
- Samples of APG composition are taken by specialists of the central base laboratory of OJSC "Surgutneftegas". After analysis the results are transferred in paper form to GPPPs where samples were taken. The results are also sent in electronic form to the electronic enterprise system. Measurement of APG composition is a common "business as usual" duty. Data for preparation of monitoring reports is taken on request of the Head of Technical Division of "Surgutneftegas".

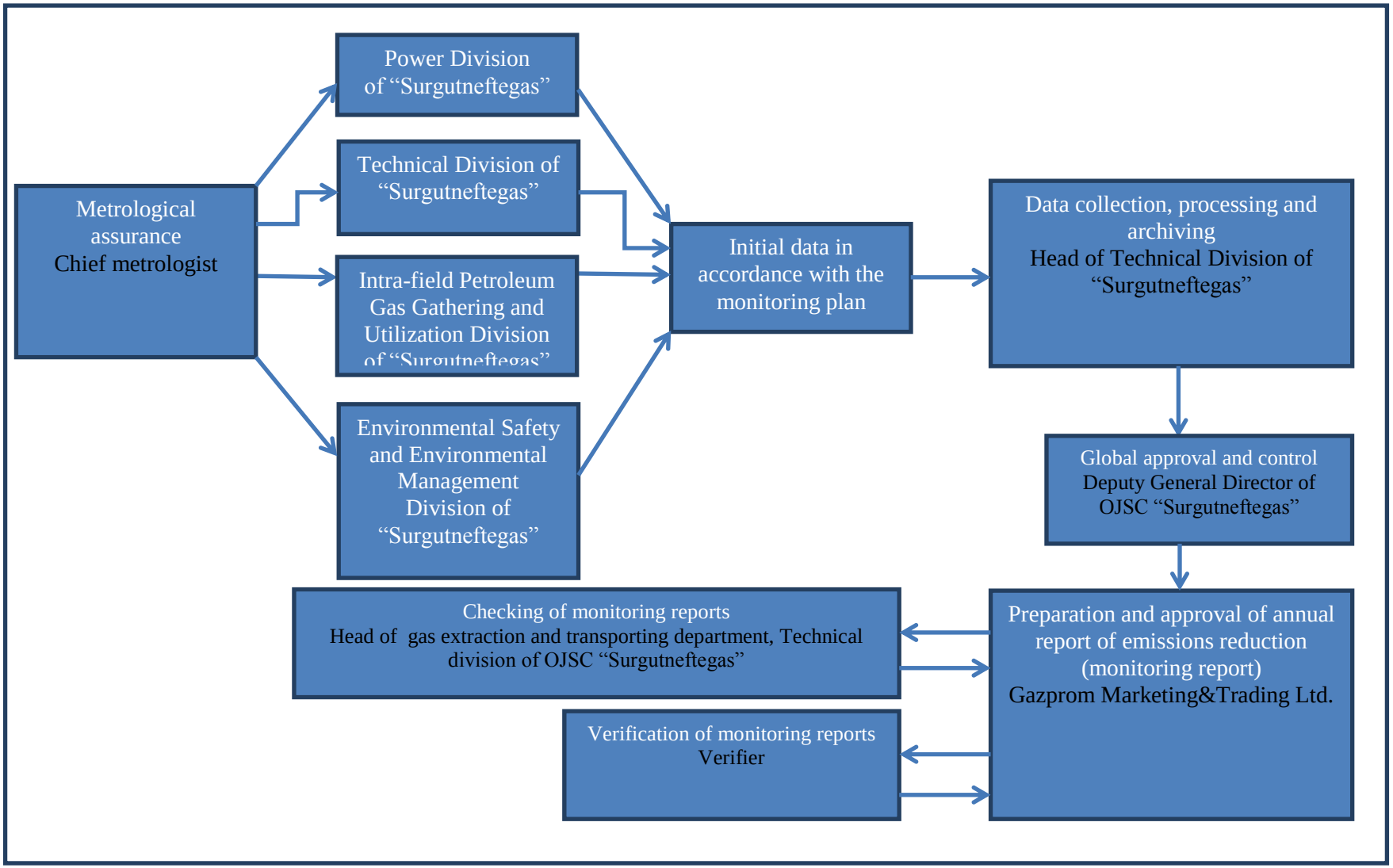
The following procedure should be applied in a case when a monitored parameter cannot be measured by an appropriately calibrated device. This procedure should be applied only for long-term interruptions in measurements. Short term interruptions up to 1 can be replaced by calculations on the basis of other data. For example, one hour interruption in measurement of power supply can be replaced by a calculation based on amount of consumed APG and weighted average m^3/MWh consumption normative for a given GPPP. The inaccuracy in such cases is too small to influence annual figures and can be neglected. Taking into account that during the three year period of the current monitoring report no such interruptions occurred such admission is quite permissible.

Long term interruptions (more than 1 day) in measurements should be treated individually on case by case basis. In any case the principle of conservativeness should be applied on the first place. Few main options can be applied for calculation of data which is impossible to measure with calibrated devices:

1) Calculate parameters on the basis of other manufacturing parameters. This option should be applied when it is possible to calculate a measured parameter on the basis of other directly measured parameters. E.g. as generation and internal power consumption are also measured by calibrated meters it is possible to calculate power output on the basis of the given data.
2) Take the most conservative data from a past period. This option can be applied to establish APG composition;
3) Exclude emission reductions for such period from monitoring reports.

OJSC “Surgutneftegas” provides all data according to the monitoring plan to Gazprom Marketing&Trading Ltd. which is responsible for monitoring report preparation and verification tasks. The monitoring data should be stored for at least 2 years after the last transfer of ERUs for the project.
Routine tasks and responsibilities are regulated by internal job descriptions which were crated in the framework of the existing production monitoring and control system at OJSC «Surgutneftegas».
The basic management structure is shown below in the fig. B.4-1.

Figure B.4-1 The operational and management structure


Power Division of "Surgutneftegas"
Technical Division of "Surgutneftegas"
Metrological assurance Chief metrologist
Intra-field Petroleum Gas Gathering and Utilization Division of "Surgutneftegas"
Environmental Safety and Environmental Management Division of "Surgutneftegas"
Initial data in accordance with the monitoring plan
Data collection, processing and archiving Head of Technical Division of "Surgutneftegas"
Global approval and control Deputy General Director of OJSC "Surgutneftegas"
Preparation and approval of annual report of emissions reduction (monitoring report) Gazprom Marketing&Trading Ltd.
Checking of monitoring reports Head of gas extraction and transporting department, Technical division of OJSC "Surgutneftegas"
Verification of monitoring reports Verifier

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

Date of the monitoring plan setting: 29/02/2012

Monitoring plan was developed by Gazprom Marketing & Trading Ltd.

Tel.: +44 (0) 207 756 0000

E-mail: global_carbon@gazprom-mt.com

Gazprom Marketing & Trading Ltd. is a project participant listed in Annex 1.

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions:

The project GHG emissions due to complete oxidation of hydrocarbons in GPPPs are presented in the Table E.1-1 below.

Ex-ante calculations of the project GHG emissions from complete oxidation of hydrocarbons in GPPPs are made on the ground of 2008-2010 data. Annual average specific APG compositions for each oilfield were used for the calculations.

Table E.1-1. Project GHG emissions from complete oxidation of hydrocarbons in GPPPs over the crediting period, t CO_2e

Year	GHG emissions under the project
2008	1,274
2009	2,724
2010	4,805
2011	5,310
2012	5,408
2008-2012	19,520

E.2. Estimated leakage:

There are no associated leakage in the project scenario.

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

The sum of E.1 + E.2 = E.1 is presented in the Table E.3-1 below.

Table E.3-1. The sum of E.1 + E.2 over the crediting period, t CO_2e

Year	The sum of E.1 + E.2
2008	1,274
2009	2,724
2010	4,805
2011	5,310
2012	5,408
2008-2012	19,520

E.4. Estimated baseline emissions:

The baseline GHG emissions due to underburning of methane in flares and CO_2 emissions from combustion of fossil fuels by power plants in IPS "Urals" are presented in the Tables E.4-1 – E.4-3 below.

Table E.4-1. Baseline GHG emissions from underburning of methane in flares over the crediting period, t CO_2e

Year	GHG emissions from underburning of methane under the baseline
2008	6,929
2009	14,633
2010	25,843
2011	28,703
2012	29,219
2008-2012	105,327

Table E.4-2. Baseline GHG emissions from combustion of fossil fuels by power plants in IPS "Urals" over the crediting period, t CO_2e

Year	GHG emissions from combustion of fossil fuels by power plants in IPS "Urals"
2008	31,050
2009	76,730
2010	138,949
2011	164,022
2012	182,595
2008-2012	593,346

Table E.4-3. Total baseline GHG emissions over the crediting period, t CO_2e

Year	GHG emissions under the baseline
2008	37,980
2009	91,363
2010	164,792
2011	192,724
2012	211,814
2008-2012	698,673

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

Emission reductions generated by the project are presented in the Table E.5-1 below.

Table E.5-1. Estimated GHG emission reductions over the crediting period, t CO_2e

Year	Estimate of annual emission reductions in tons of CO_2e
2008	36,705
2009	88,639
2010	159,988
2011	187,414
2012	206,406
Total estimated emission reductions over the crediting period (tonnes of CO_2e)	679,153

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

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)
2008	1,274	0	37,980	36,705
2009	2,724	0	91,363	88,639
2010	4,805	0	164,792	159,988
2011	5,310	0	192,724	187,414

2012	5,408	0	211,814	206,406
Total (tonnes of CO_2 equivalent)	19,520	0	698,673	679,153

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 assessment of the GPPPs included in the project was carried out according to the following major Russian legislative documents:

- Federal Law #7 "On Environmental Protection" dated 10.01.2001;
- Construction Code of the Russian Federation;
- Federal Law #174 "On the Environmental Expertise" dated 23.11.1995 (Applicable for GPPPs constructed before 2008).

Before February 2007 all capital construction objects i.e. GPPPs were subjects for two major state expertise assessment: environmental expertise and state expertise. All GPPPs constructed before 2008 have received two expert conclusions: environmental expertise positive conclusion and state expertise positive conclusion.

In 2006 changes to the Federal Law #174 "On the Environmental Expertise" were adopted and environmental expertise became mandatory only for a row of projects described in the Article 49 of the Construction Code of the Russian Federation. Starting from 2007 GPPPs stopped to be subjects for environmental expertise. Environmental Impact Assessment of Vostochno-Elovaya GPPP (1 and 2 stage) and Vostochno-Surgutskaya GPPP (1 stage) were carried out in course of the old procedure, i.e. EIA was subject of a separate expertise. EIA for all remaining GPPPs was carried out in course of the state expertise. The part of the project designs called "Environmental impact assessment" was studied by Glavgosexpertiza. As a result all GPPPs included in the project obtained positive conclusions for their EIA either in a course of independent EIA or in a course of state expertise.

Vatlorskaya GPPP is located in a specially protected natural zone "Numto". A special environmental expertise was implemented to assess whether this GPPP would not do any harm to the natural zone. As a result positive expert opinion # 29 was obtained 28.12.2008.

The authorities (expert organizations) responsible for EIA approval of the GPPPs included in the project are described in the Table F.1-1 below.

Table F.1-1 Expert organizations responsible for EIA and its approval

GPPP	Expert organization responsible for EIA approval	Date	Document number
Vostochno-Elovaya GPPP	Directorate for Technological and Ecological Supervision of Rostekhnadzor in Khanty-Mansiysk Autonomous Okrug	10/10/2005	#550
Vostochno-Elovaya GPPP (2 stage)	Directorate for Technological and Ecological Supervision of Rostekhnadzor in Khanty-Mansiysk Autonomous Okrug	25/07/2007	#547
Vostochno-Surgutskaya GPPP	Directorate for Technological and Ecological Supervision of Rostekhnadzor in Khanty-Mansiysk Autonomous Okrug	19/01/2007	#104-e
Vostochno-Surgutskaya GPPP (2 stage)	Federal State Institution "Head Department of State Examination (Glavgosexpertiza of Russia)", Ekaterinburg branch	01/06/2010	#158-10/EGE-1167/01
Zapadno-Sakhalinskaya GPPP	Federal State Institution "Head Department of State Examination (Glavgosexpertiza of Russia)", Omsk branch	18/12/2007	#460-07/OGE-0921/03
Severo-Seliyarovskaya	Federal State Institution "Head Department of State Examination (Glavgosexpertiza of	25/02/2009	#038-09/OGE-

GPPP	Russia)", Omsk branch		1343/03
Vatlorskaya GPPP	Federal State Institution "Head Department of State Examination (Glavgosexpertiza of Russia)", Omsk branch	14/04/2009	#103-09/OGE-1296/03
Yaun-Lorskaya GPPP	Federal State Institution "Head Department of State Examination (Glavgosexpertiza of Russia)", Omsk branch	07/05/2009	#103-09/OGE-1295/02

OJSC "Surgutneftegas" obtained all necessary permissions on emissions and during the project implementation the analytical control over various kinds of environmental impacts, will be carried out in compliance with the existing regulations. The plant shall submit the following statistical forms: 2-TP (air), 2-TP (water management), 2-TP (wastes). Rostekhnadzor regularly checks these documents for compliance with rules and regulations.

Apart of EIAs and their approvals OJSC "Surgutneftegas" successfully underwent the Expert Examination of Industrial Safety and received positive state expert opinion.

Permissions for emission of pollutants into the atmosphere were obtained for all 6 GPPPs. GPPPs are united in three oil-and-gas production departments (OGPD, in Russian - NGDU). The list of oil-and-gas production departments with corresponding GPPPs, numbers of in-force permissions and names of authorities issued those permissions are presented in the Table F.1-2 below.

Table F.1-2 Permissions for pollutant emissions into the atmosphere

GPPP	Oil-and-gas production departments	Numbers of in-force permissions for pollutant emission into the atmosphere	Date of issuing/ responsible authority
Vostochno-Elovaya GPPP	Surgutneft	009/10	14.12.2010 Federal Service for Supervision in the Sphere of Natural Resource Use (Rosprirodnadzor) in Khanty-Mansiysk Autonomous Okrug-Yugra
Vostochno-Surgutskaya GPPP	Surgutneft	009/10	14.12.2010 Federal Service for Supervision in the Sphere of Natural Resource Use (Rosprirodnadzor) in Khanty-Mansiysk Autonomous Okrug-Yugra
Zapadno-Sakhalinskaya GPPP	Lyantorneft	324/11	03.11.2011 Federal Service for Supervision in the Sphere of Natural Resource Use (Rosprirodnadzor) in Khanty-Mansiysk Autonomous Okrug-Yugra
Severo-Seliyarovskaya GPPP	Lyantorneft	324/11	03.11.2011 Federal Service for Supervision in the Sphere of Natural Resource Use (Rosprirodnadzor) in Khanty-Mansiysk Autonomous Okrug-Yugra
Vatlorskaya GPPP	Nizhnesortymskneft	89-10 P	29.07.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Yaun-Lorskaya GPPP	Surgutneft	009/10	14.12.2010 Federal Service for Supervision in the Sphere of Natural Resource Use

GPPP	Oil-and-gas production departments	Numbers of in-force permissions for pollutant emission into the atmosphere	Date of issuing/ responsible authority
			(Rosprirodnadzor) in Khanty-Mansiysk Autonomous Okrug-Yugra

The negative impact on the environmental due to power generation and flaring implementation will be significantly reduced as a result of the project. The project allows decreasing emissions into the atmosphere of the following contaminants:

- nitrogen dioxide (NO_2);
- nitrogen oxide (NO);
- hydrocarbons C1 - C5;
- carbon monoxide (CO);
- benz a pyrene;
- soot.

Documents concerning impacts on environment are listed below[39]:

1. Project designs (explanatory notes);
2. Environmental impact assessments (parts of the project designs, OVOS);
3. Positive state environmental expertise conclusions;
4. Positive state expertise conclusions;
5. Expert examinations of industrial safety;
6. Permissions on emissions into the atmosphere;
7. Sanitary-and-epidemiologic resolutions.

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:

As it is shown in Section F.1 above, the project leads to a significant decrease of pollutants emissions into the atmosphere. For references to relevant supporting documentation please refer to Section F.1 above.

[39] Documents have been provided to verifiers for review.

SECTION G. Stakeholders' comments

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

Proposed JI projects does not require to go through a local stakeholder consultation process. However the project measures got an extensive coverage in mass media, information was also given on the web-sites of the equipment manufacturers[40].

[40] http://www.ngenergo.ru/news/46.html

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

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Annex 2

BASELINE INFORMATION

Summary of key elements of the baseline is presented in table below[41]:

Parameter	Monitored/not monitored parameter	Value	Data unit	Description
$FC_{APG, GPPP\ i, y}$	Monitored	-	m^3	Volume of associated petroleum gas consumed by GPPP *i* in a year *y*
$W_{h, GPPP\ i, m}$	Monitored	-	%	Volumetric fraction of hydrocarbons of different types in associated petroleum gas consumed by GPPP *i* in a month *m*
$EG_{PJ, GPPP\ i, y}$	Monitored	-	MWh	Annual power output by GPPP *i* in a year *y*
$EF_{ELEC,grid,y}$	Not monitored	-	t. CO_2 / MWh	Carbon emission factor for grid-based electricity generation in the Integrated Power System "Urals" (IPS "Urals") in year *y*. For values applied please refer to the Section B.1 above.
η_{flare}	Not monitored	3.5	%	Underburning factor for combustion of APG
p_h	Not monitored	-	-	This is the density of a hydrocarbon of type *h*. This parameter converts volume of a hydrocarbon to mass of a hydrocarbon. For exact values of the factor for different types of hydrocarbons please refer to the Section B.1 above.
SMF_h	Not monitored	-	-	Stoichiometric Mass Factor - mass ratio of CO_2 produced from full combustion of unit mass of hydrocarbon of type *h.* For exact values of the factor for different types of hydrocarbons please refer to the Section B.1 above.
GWP_{CH4}	Not monitored	21	-	Global Warming Potential of methane

[41] Sources and additional details are provided in Section B and Section D above.

Annex 3

MONITORING PLAN

Please refer to the Section D.

Annex 4

APG composition data

For preliminary ER estimation average 2008-2010 APG compositions for 6 GPPPs were used. APG composition for each of 6 GPPPs can be found in the table below.

Oilfield	VOSTOCHNO-ELOVAYA GPPP	VOSTOCHNO-SURGUTSKAYA GPPP	ZAPADNO-SAHALINSKAYA GPPP	SEVERO-SELIYAROVSKAYA GPPP	VATLORSKAYA GPPP	YAUN-LORSKAYA GPPP
Methane (CH_4)	84.96	86.53	82.73	86.43	88.52	83.42
Ethane (C_2H_6)	3.81	3.48	6.05	3.60	2.31	3.97
Propane (C_3H_8)	4.19	4.04	5.02	3.62	3.69	5.85
i-butane (methylpropane; C4H10)	1.01	0.74	0.68	0.91	0.66	0.99
n-butane (C_4H_{10})	1.62	1.33	1.12	1.35	1.49	1.96
i-pentane (methylbutane; C5H12)	0.37	0.28	0.19	0.28	0.21	0.36
n-pentane (C_5H_{12})	0.36	0.31	0.19	0.32	0.28	0.39
C_6+ (Hexanes and higher)	0.35	0.35	0.17	0.43	0.22	0.35
Carbon Dioxide (CO_2)	1.08	1.11	2.17	1.62	0.48	0.63
Nitrogen (N_2)	2.01	1.49	1.68	1.43	2.03	1.82