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

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SECTION A. General description of the project

A.1. Title of the project:

Title of 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"

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: 25/04/2011

A.2. Description of the project:

Brief description of the project

The project involves the construction of 16 gas turbine power plants (hereinafter GTPP) near oilfields developed by OJSC "Surgutneftegas" in the Khanty-Mansiysk Autonomous Okrug, Russian Federation. Associated petroleum gas will be used as fuel at the GTPPs. 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 "Surgutneftegas" oilfields 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.

Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP are fueled by APG which was supplied to Surgut District Power Plant - 1 and Surgut District Power Plant - 2 (hereinafter Surgut SDPP-1 and Surgut SDPP-2 or Surgut SDPPs) prior to the project realization. Efficiency of power generation at Surgut SDPP-1 and Surgut SDPP-2 is higher that the efficiency at Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP. Using the same amount of APG Surgut SDPP-1 Surgut SDPP-2 will generate more electricity than Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP. Undergeneration of power is considered as the difference of the power supply in the baseline and in the project scenarios.

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 GTPPs excluding Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP would be flared and APG consumed by Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP would be supplied to Surgut

[1] 2002

SDPPs. On-site power demand for the OJSC "Surgutneftegas" oilfields would be supplied by electricity by 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 on a gas turbine. This means that not all methane in the APG will be converted into CO_2, and thus is released to the atmosphere uncombusted.

Expected results of the project:

- Coverage of Surgutneftegas power needs by own generated electricity;
- Reduction of electricity consumption from the power grid by 3.3 mln. 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 8,334,300 tonnes of CO_2/year.

Project scenario

Under the project scenario, sixteen GTPPs with the total installed capacity of 444 MW are installed. The GTPPs are fuelled with APG from oilfields developed by OJSC "Surgutneftegas. The GTPPs 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.

The net electricity output from the 16 GTPPs will amount approximately 3.3 mln MWh per year.

Brief history of the Project (including its JI component)

In 1998 OJSC "Surgutneftegas" decided to implement a pilot GTPP construction project. As a result two GTPPs were built, Konitlorskaya GTPP and Tyanskaya GTPP. Having considered construction costs and exploitation expenses, OJSC "Surgutneftegas" decided that the option to purchase electricity from the IPS "Urals" grid is more financially attractive and less labour-consuming. This was confirmed by a study commissioned to OJSC "Uralenergosyetproekt"[2] which indicated that purchasing electricity from the IPS "Urals" grid is more financially attractive and less labour-consuming for OJSC "Surgutneftegas".

Taking into account results of two pilot GTPPs construction OJSC "Surgutneftegas" made the decision to suspend any further plans of GTPP construction, continue purchasing electricity from the external power grid and focus on oil extraction and processing.

In late 2001 the company assessed the possibility of GTPPs construction once again. The analysis showed that construction of GTPPs is still less financially attractive than purchasing of electricity from the grid. Considering opportunities to enhance financial attractiveness of GTPPs construction OJSC "Surgutneftegas" appealed to the Marrakesh accords which underlined mechanisms of Joint Implementation. Based on the assignment given by the Chief Engineer of OJSC "Surgutneftegas" the head of environmental and corrosion control department prepared a report with analysis of JI perspectives in Russia[3]. 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.

[2] Extractions from the study made by "Uralenergosyetproekt" which confirm that electricity supply from the external power grid is more financially attractive than electricity generation at own GTPPs have been provided to verifiers.

[3] The staff report confirming that JI perspectives were considered by OJSC "Surgutneftegas"JI has been provided to verifiers.

In the beginning of 2005 together with the adoption of the Kyoto Protocol OJSC "Surgutneftegas" participated in a contest under the framework of JI for APG utilization projects organized by the Government of Khanty-Mansiysk Autonomous Okrug and the World Bank.

In early 2010 when regulatory regime became more transparent and Sberbank announced the first contest for host-country JI project approval, OJSC "Surgutneftegas" concluded a ERU purchasing agreement with Gazprom Marketing & Trading Ltd. (GM&T). In 2010, a previous version of the Project Design Document was written and later withdrawn. This current Project Design Document has been prepared by Gazprom Marketing & Trading Limited independently of the previous version, and it replaces and supersedes the previous version in its entirety.

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

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 16 GTPPs 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 GTPPs is presented at the map below.

Geographical coordinates: latitude - 61° 15′ 0″ N, longitude - 73° 26′ 0″ E[4].

[4] http://toolserver.org/~geohack/geohack.php?pagename=Surgut&params=61_15_N_73_26_E_region:RU_type:city(298,500)

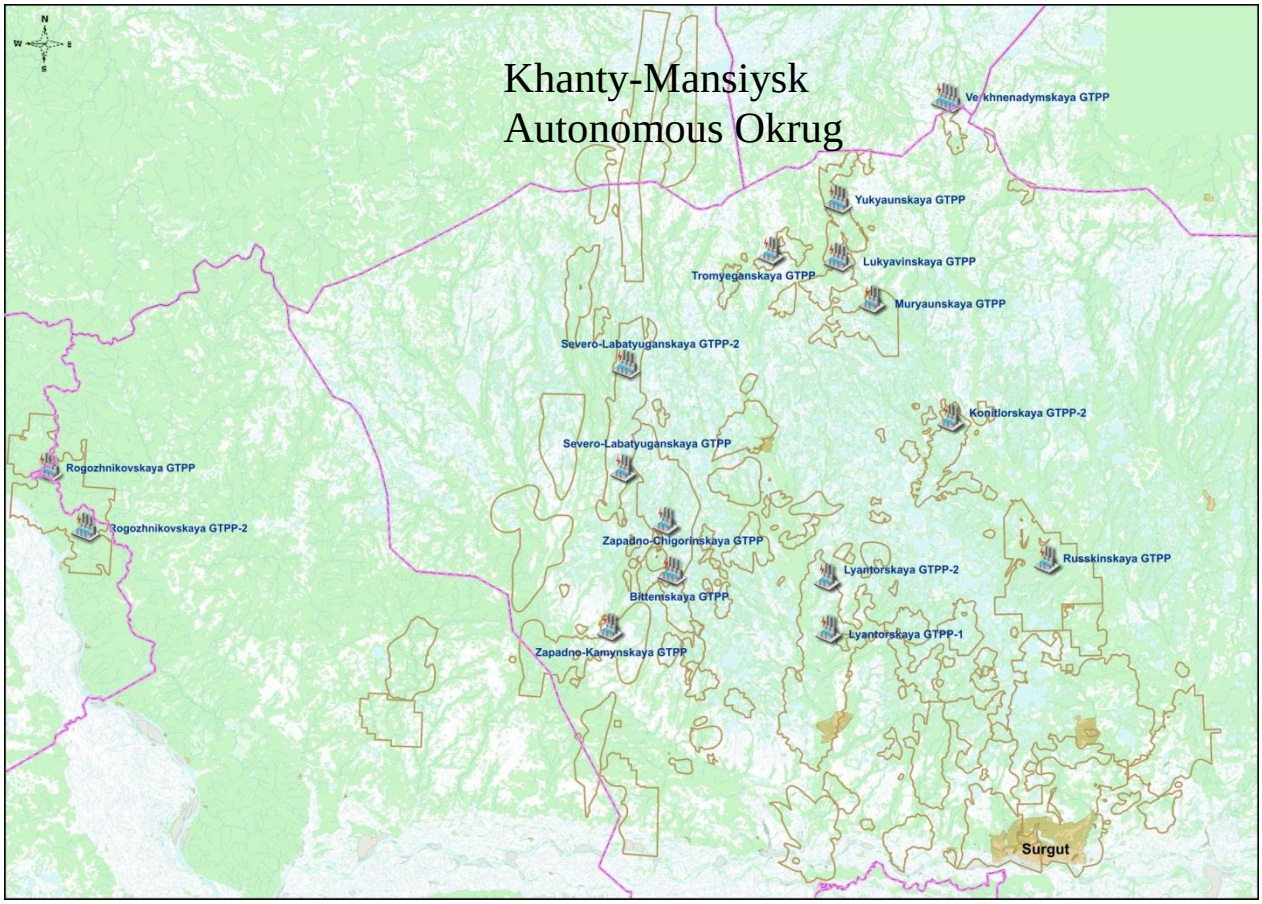


Table A.4.1.4-1. Description of the physical locations of the GTPPs.

#	GTPP	Oilfield	District
1	Lukyavinskaya GTPP	Lukyavinskoe oilfield	Surgut disctrict
2	Lyantorskaya GTPP-1	Lyantorskoe oilfield	Surgut disctrict
3	Lyantorskaya GTPP-2	Lyantorskoe oilfield	Surgut disctrict
4	Russkinskaya GTPP	Russkinskoe oilfield	Surgut disctrict
5	Bittemskaya GTPP	Bittemskoe oilfield	Surgut disctrict
6	Konitlorskaya GTPP-2	Konitlorskoe oilfield	Surgut disctrict
7	Muryaunskaya GTPP	Muryaunskoe oilfield	Surgut disctrict
8	Yukyaunskaya GTPP	Yukyaunskoe oilfield	Surgut disctrict
9	Tromyeganskaya GTPP	Tromyeganskoe oilfield	Surgut disctrict
10	Zapadno-Kamynskaya GTPP	Zapadno-Kamynskoe oilfield	Surgut disctrict
11	Severo-Labatyuganskaya GTPP	Severo-Labatyuganskoe oilfield	Surgut disctrict
12	Zapadno-Chigorinskaya GTPP	Zapadno-Chigorinskoe oilfield	Surgut disctrict
13	Verkhnenadymskaya GTPP	Verkhnenadymskoe oilfield	Surgut disctrict
14	Rogozhnikovskaya GTPP	Rogozhnikovskoe oilfield	Oktyabrskiy district
15	Rogozhnikovskaya GTPP -2	Rogozhnikovskoe oilfield	Oktyabrskiy district
16	Severo-Labatyuganskaya GTPP-2	Severo-Labatyuganskoe oilfield	Surgut disctrict

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 16 GTPPs near oilfields developed by OJSC "Surgutneftegas" in Khanty-Mansiysk Autonomous Okrug, Russian Federation.
GTPPs are designed to cover on-site power demand of the oilfields and their total installed capacity amounts to 444 MW.

The electricity net output from the 16 GTPPs will amount to approximately 3.3 mln MWh per year.

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

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

#	GTPP	Amount of energy units	Single unit capacity (MW)	Total installed capacity of GTPP	Efficiency, %
1	Lukyavinskaya GTPP	3	12	36	31,5
2	Lyantorskaya GTPP-1	2	12	24	31,5
3	Lyantorskaya GTPP-2	3	12	36	31,5
4	Russkinskaya GTPP	2	12	24	31,5
5	Bittemskaya GTPP	3	12	36	31,5
6	Konitlorskaya GTPP-2	2	12	24	29
7	Muryaunskaya GTPP	2	12	24	29
8	Yukyaunskaya GTPP	3	12	36	29
9	Tromyeganskaya GTPP	2	6	12	24,5
10	Zapadno-Kamynskaya GTPP	2	12	24	29
11	Severo-Labatyuganskaya GTPP	2	12	24	29
12	Zapadno-Chigorinskaya GTPP	2	6	12	24,5
13	Verkhnenadymskaya GTPP	4	6	24	24,5
14	Rogozhnikovskaya GTPP	3	12	36	29
15	Rogozhnikovskaya GTPP -2	3	12	36	29
16	Severo-Labatyuganskaya GTPP-2	3	12	36	29

Each of the GTPPs includes the following major facilities:

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

[5] Data provided by OJSC "Surgutneftegas"

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

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

#	GTPP	Turbine type	Producer of equipment	Single unit capacity (MW)
1	Lukyavinskaya GTPP	GTU-12PG-2PS[7]	OJSC "Aviadvigatel"	12
2	Lyantorskaya GTPP-1	GTU-12PG-2PS	OJSC "Aviadvigatel"	12
3	Lyantorskaya GTPP-2	GTU-12PG-2PS	OJSC "Aviadvigatel"	12
4	Russkinskaya GTPP	GTU-12PG-2PS	OJSC "Aviadvigatel"	12
5	Bittemskaya GTPP	GTU-12PG-2PS	OJSC "Aviadvigatel"	12
6	Konitlorskaya GTPP-2	NK-16 ST[8]	OJSC "Sumy Frunze Machine-building Science-and-Production Association"	12
7	Muryaunskaya GTPP	NK-16 ST	OJSC "Sumy Frunze Machine-building Science-and-Production Association"	12
8	Yukyaunskaya GTPP	NK-16 ST	OJSC "Sumy Frunze Machine-building Science-and-Production Association"	12
9	Tromyeganskaya GTPP	GTD-6 RM[9]	OJSC "SATURN"	6
10	Zapadno-Kamynskaya GTPP	NK-16 ST	OJSC "Sumy Frunze Machine-building Science-and-Production Association"	12
11	Severo-Labatyuganskaya GTPP	NK-16 ST	OJSC "Sumy Frunze Machine-building Science-and-Production Association"	12
12	Zapadno-Chigorinskaya GTPP	GTD-6RM	OJSC "SATURN"	6
13	Verkhnenadymskaya GTPP	GTD-6RM	OJSC "SATURN"	6
14	Rogozhnikovskaya GTPP	NK-16 ST	OJSC "Sumy Frunze	12

[6] Data provided by OJSC "Surgutneftegas"

[7] For more details on technical parameters please refer to the producers website: http://www.avid.ru/products/gtu_energy/gtu_12pg-2/

[8] For more details on technical parameters please refer to the producers website: http://www.frunze.com.ua/index.php?option=com_content&view=article&id=185%3Agpa-harakteristiki&catid=25%3Aneft-gaz&lang=ru

[9] For more details on technical parameters please refer to the producers website: http://www.npo-saturn.ru/?pid=128

#	GTPP	Turbine type	Producer of equipment	Single unit capacity (MW)
			Machine-building Science-and-Production Association"	
15	Rogozhnikovskaya GTPP -2	NK-16 ST	OJSC "Sumy Frunze Machine-building Science-and-Production Association"	12
16	Severo-Labatyuganskaya GTPP-2	NK-16 ST	OJSC "Sumy Frunze Machine-building Science-and-Production Association"	12

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

Table A.4.2-3. Actual power generation, 2004-2007[10]

Power generating facility	Units	Commissioned	2004	2005	2006	2007
Lukyavinskaya GTPP	MWh	2004	105 539	270 103	265 222	243 356
Lyantorskaya GTPP-1	MWh	2004	36 851	183 206	179 917	177 484
Lyantorskaya GTPP-2	MWh	2004	34 834	266 765	267 595	273 444
Russkinskaya GTPP	MWh	2004	71 427	182 919	164 560	175 953
Bittemskaya GTPP	MWh	2004	95 896	252 530	269 108	258 160
Konitlorskaya GTPP-2	MWh	2006			162 105	193 788
Muryaunskaya GTPP	MWh	2006			96 977	182 611
Yukyaunskaya GTPP	MWh	2006			102 035	284 074
Tromyeganskaya GTPP	MWh	2006				80 119
Zapadno-Kamynskaya GTPP	MWh	2006			125 054	189 062
Severo-Labatyuganskaya GTPP	MWh	2006				128 370
Zapadno-Chigorinskaya GTPP	MWh	2007				8 427
Verkhnenadymskaya GTPP	MWh	2007				
Rogozhnikovskaya GTPP	MWh	2008				
Rogozhnikovskaya GTPP -2	MWh	2010				
Severo-Labatyuganskaya GTPP-2	MWh	2010				

Table A.4.2-4. Actual and forecasted power generation, 2008-2012[11]

Power generating facility	Units	Commissioned	2008	2009	2010*	2011*	2012*
Lukyavinskaya GTPP	MWh	2004	239 371	250 446	288 994	283 824	283 824
Lyantorskaya GTPP-1	MWh	2004	181 257	196 231	191 451	189 216	189 216
Lyantorskaya GTPP-2	MWh	2004	269 883	287 624	241 275	283 824	283 824
Russkinskaya GTPP	MWh	2004	190 119	197 309	189 335	189 216	189 216
Bittemskaya GTPP	MWh	2004	274 103	285 853	277 918	283 824	283 824
Konitlorskaya GTPP-2	MWh	2006	188 434	196 900	157 895	189 216	189 216
Muryaunskaya GTPP	MWh	2006	193 887	160 500	197 346	189 216	189 216
Yukyaunskaya GTPP	MWh	2006	284 768	269 776	294 077	283 824	283 824
Tromyeganskaya GTPP	MWh	2006	85 558	66 792	78 813	94 608	94 608

[10] Data of OJSC "Surgutneftegas"

[11] Data of OJSC "Surgutneftegas"

Zapadno-Kamynskaya GTPP	MWh	2006	187 163	194 864	200 927	189 216	189 216
Severo-Labatyuganskaya GTPP	MWh	2006	194 436	193 041	199 093	189 216	189 216
Zapadno-Chigorinskaya GTPP	MWh	2007	76 613	97 832	97 987	94 608	94 608
Verkhnenadymskaya GTPP	MWh	2007	59 288	161 514	177 253	189 216	189 216
Rogozhnikovskaya GTPP	MWh	2008	54 990	236 783	251 406	283 824	283 824
Rogozhnikovskaya GTPP -2	MWh	2010			36 851	283 824	283 824
Severo-Labatyuganskaya GTPP-2	MWh	2010			23 616	283 824	283 824
* – forecast							

Table A.4.2-5. Actual power supply, 2004-2007[12]

Power generating facility	Units	Commissioned	2004	2005	2006	2007
Lukyavinskaya GTPP	MWh	2004	99 588	258 556	252 408	231 094
Lyantorskaya GTPP-1	MWh	2004	36 374	181 220	177 946	175 605
Lyantorskaya GTPP-2	MWh	2004	32 574	254 120	254 105	259 980
Russkinskaya GTPP	MWh	2004	68 266	175 399	156 581	168 212
Bittemskaya GTPP	MWh	2004	91 046	241 437	257 502	247 076
Konitlorskaya GTPP-2	MWh	2006			155 096	185 493
Muryaunskaya GTPP	MWh	2006			92 232	173 657
Yukyaunskaya GTPP	MWh	2006			97 196	270 876
Tromyeganskaya GTPP	MWh	2006				76 273
Zapadno-Kamynskaya GTPP	MWh	2006			119 841	181 001
Severo-Labatyuganskaya GTPP	MWh	2006				121 742
Zapadno-Chigorinskaya GTPP	MWh	2007				7 619
Verkhnenadymskaya GTPP	MWh	2007				
Rogozhnikovskaya GTPP	MWh	2008				
Rogozhnikovskaya GTPP -2	MWh	2010				
Severo-Labatyuganskaya GTPP-2	MWh	2010				

Table A.4.2-6. Actual and forecasted power supply, 2008-2012[13]

Power generating facility	Units	Commissioned	2008	2009	2010*	2011*	2012*
Lukyavinskaya GTPP	MWh	2004	226 887	237 917	276 154	269 808	269 808
Lyantorskaya GTPP-1	MWh	2004	179 403	194 261	189 649	187 464	187 464
Lyantorskaya GTPP-2	MWh	2004	256 542	273 705	227 824	269 808	269 808
Russkinskaya GTPP	MWh	2004	182 519	189 119	178 229	180 456	180 456
Bittemskaya GTPP	MWh	2004	261 867	273 696	265 490	269 808	269 808
Konitlorskaya GTPP-2	MWh	2006	180 339	188 294	149 774	174 324	174 324
Muryaunskaya GTPP	MWh	2006	184 300	151 560	187 700	178 704	178 704
Yukyaunskaya GTPP	MWh	2006	271 665	257 720	281 044	269 808	269 808
Tromyeganskaya GTPP	MWh	2006	80 949	62 618	74 691	89 352	89 352
Zapadno-Kamynskaya GTPP	MWh	2006	179 221	186 536	192 122	180 456	180 456
Severo-Labatyuganskaya GTPP	MWh	2006	186 289	185 181	187 076	180 456	180 456
Zapadno-Chigorinskaya GTPP	MWh	2007	72 289	93 030	93 154	89 352	89 352
Verkhnenadymskaya GTPP	MWh	2007	54 515	153 873	169 554	181 332	181 332
Rogozhnikovskaya GTPP	MWh	2008	52 023	224 885	238 260	269 808	269 808

[12] Data of OJSC "Surgutneftegas"

[13] Data of OJSC "Surgutneftegas"

Rogozhnikovskaya GTPP - 2	MWh	2010			33 849	269 808	269 808
Severo-Labatyuganskaya GTPP-2	MWh	2010			20 899	253 164	253 164
* – forecast							

Table A.4.2-7. Actual APG consumption for power generation, 2004-2007

Power generating facility	Units	APG consumption[14], m^3/kWh	APG[15] methane content by vol.	2004	2005	2006	2007
Lukyavinskaya GTPP	mln m^3	0.328	82.22%	40.978	86.729	86.002	80.331
Lyantorskaya GTPP-1	mln m^3	0.311	92.30%	11.629	58.283	58.820	58.172
Lyantorskaya GTPP-2	mln m^3	0.355	92.30%	12.601	79.345	85.338	88.749
Russkinskaya GTPP	mln m^3	0.299	83.35%	33.040	54.209	52.270	48.704
Bittemskaya GTPP	mln m^3	0.268	71.65%	32.486	76.815	81.820	71.917
Konitlorskaya GTPP-2	mln m^3	0.358	81.45%			64.564	71.599
Muryaunskaya GTPP	mln m^3	0.432	84.67%			36.348	72.358
Yukyaunskaya GTPP	mln m^3	0.401	90.14%			40.644	107.049
Tromyeganskaya GTPP	mln m^3	0.395	89.48%				30.997
Zapadno-Kamynskaya GTPP	mln m^3	0.357	72.20%			41.482	64.762
Severo-Labatyuganskaya GTPP	mln m^3	0.354	76.20%				47.990
Zapadno-Chigorinskaya GTPP	mln m^3	0.44	81.50%				5.436
Verkhnenadymskaya GTPP	mln m^3	0.423	83.74%				
Rogozhnikovskaya GTPP	mln m^3	0.389	68.97%				
Rogozhnikovskaya GTPP -2	mln m^3	0.389	68.97%				
Severo-Labatyuganskaya GTPP-2	mln m^3	0.354	76.20%				

Table A.4.2-8. Actual and forecasted APG consumption for power generation, 2008-2012

Power generating facility	Units	APG consumption[16], m^3/kWh	APG[17] methane content by vol.	2008	2009	2010*	2011*	2012*
Lukyavinskaya GTPP	mln m^3	0.328	90.55%	74.984	75.711	90.579	88.497	88.497
Lyantorskaya GTPP-1	mln m^3	0.311	97.14%	58.642	61.322	58.981	58.301	58.301
Lyantorskaya GTPP-2	mln m^3	0.355	97.14%	85.300	89.440	80.878	95.782	95.782
Russkinskaya GTPP	mln m^3	0.299	86.19%	53.261	53.640	53.290	53.956	53.956
Bittemskaya GTPP	mln m^3	0.268	77.64%	71.319	71.150	71.151	72.309	72.309
Konitlorskaya GTPP-2	mln m^3	0.358	85.49%	69.967	64.403	53.619	62.408	62.408
Muryaunskaya GTPP	mln m^3	0.432	91.72%	78.284	69.359	81.086	77.200	77.200
Yukyaunskaya GTPP	mln m^3	0.401	92.32%	110.782	105.909	112.699	108.193	108.193
Tromyeganskaya GTPP	mln m^3	0.395	89.12%	31.838	28.304	29.503	35.294	35.294
Zapadno-Kamynskaya	mln m^3	0.357	72.39%	64.129	65.890	68.588	64.423	64.423

[14] "Gas consumption rate for power supply from Intra-field Petroleum Gas Gathering and Utilization Division of "Surgutneftegas" of OJSC "Surgutneftegas" of 05.08.2009.

[15] The average 2010 data of OJSC "Surgutneftegas" (this values are used for preliminary ER calculation)

[16] "Gas consumption rate for power supply from Intra-field Petroleum Gas Gathering and Utilization Division of "Surgutneftegas" of OJSC "Surgutneftegas" of 05.08.2009.

[17] Data of OJSC "Surgutneftegas"

GTPP								
Severo-Labatyuganskaya GTPP	mln m^3	0.354	77.86%	74.708	66.050	66.225	63.881	63.881
Zapadno-Chigorinskaya GTPP	mln m^3	0.44	82.62%	32.772	38.650	40.988	39.315	39.315
Verkhnenadymskaya GTPP	mln m^3	0.423	82.53%	23.563	64.481	71.721	76.703	76.703
Rogozhnikovskaya GTPP	mln m^3	0.389	13.85%	20.353	86.892	92.683	104.955	104.955
Rogozhnikovskaya GTPP -2	mln m^3	0.389	13.85%			13.167	104.955	104.955
Severo-Labatyuganskaya GTPP-2	mln m^3	0.354	77.86%			7.398	89.620	89.620
* – forecast								

All gas turbine equipment used by OJSC "Surgutneftegas" at its GTPPs is produced in Russia or in CIS. All of its installed turbines are based on airline engines and are reliable, robust and not very demanding in terms of fuel quality: capable of operating on wide range of APG mixes.

Table A.4.2-9. Summary of gas turbine equipment employed by OJSC "Surgutneftegas"

Turbine type	Producer of equipment	Unit capacity, MW	No. of units installed	Total capacity, MW
GTU-12PG-2PS	OJSC "Aviadvigatel"	12	13	156
NK-16 ST	JSC "Sumy Frunze NPO"	12	20	240
GTD-6 RM	OJSC "Saturn"	6	8	48
Total			41	444

Saturn GTA-6RM gas turbine

This gas-turbine is designed on the basis of the D-30KU/KP turbine series[18], which are relatively low-cost aircraft engines that are considered to be the most reliable Russian engines. Aircraft as the IL-62M, TU-154M and IL-76 are equipped with this type of engines. Total operating time of all produced engines of this type exceeds 45 million hours.

The turbine can be operated in base and semi-peak modes intended for electric and heat and power generation. The turbines can run on various types of fossil fuel: fuel gas (natural gas, casing head gas), as well as on liquid fuel (kerosene, diesel oil).

Table A.4.2-9. Technical characteristics of Saturn GTA-6RM gas turbine

Parameter	Unit	Value
Power output (nominal / maximum)	kW	6000 / 7200
Shaft rotation speed	RPM	3000
Fuel consumption	kg/h	1880
Efficiency	%	24.5
Service life	hours	120000
Maintenance overhauls	hours	30000

[18] According to http://www.gt.npo-saturn.ru/ (as of 03.03.2011)

Aviadvigatel GTU-12PG-2 gas turbine

This gas turbine is designed on the basis of the PS-90A aircraft engine which is a unique Russian engine of the fourth generation for a civil aviation having the Certificate of the international standard[19]. These engines are installed in aircrafts as the IL-96-300PU, the airplane of the President of the Russian Federation, long-range passenger airliner IL-96-300, mid-range passenger and cargo airplanes TU-204, TU-214 and their modifications.

The underlying PS-90A turbofan was certified in 1992. As of August 1, 2010 the total operating time of all engines operated at passenger and cargo services since its serial operation, reached 2,430,809 hours.

GTU-12PG-2 can use multiple fuels including natural gas, oil-dissolved gas or some types of liquid fuels, subject to manufacturer's approval. As of 2009 a total of 23 GTU-12PG-2 units were in operation. Since operation start all units have accumulated 485 149 hours.

Table A.4.2-9. Technical characteristics of Aviadvigatel GTU-12PG-2 gas turbine

Parameter	Unit	Value
Power turbine shaft output	MW	12.9
Power turbine shaft efficiency	%	34.1
Power at generator terminals	MW	12.3
Efficiency at generator terminals	%	32.6
Compressor pressure ratio	π_c	15.9
Power turbine exit gas temperature (at exhaust)	°C	496
Power turbine exit gas flow (at exhaust)	kg/s	45.9
Power turbine rotor speed	RPM	6500
Heat power at exhaust, when exhaust gases temperature reduces to 110 °C (without fuel re-burn)	Gcal/hr	16.45
Total efficiency (electric + thermal)	%	83.7
Operating life: - to overhaul - assigned	hours	 25 000 100 000

Sumy Frunze NPO NK-16 ST

This gas turbine is designed and produced by JSC "Sumy Frunze NPO". Like the other engines, NK-16 ST gas turbine, was built on the basis of NK-8-2U aviation engine providing high reliability and ability to use gaseous and liquid fossil fuels[20].

These types of turbines are used for power generation and gas transportation since 1980. There are over 1000 turbines of this type installed in Russia. This equipment has proven to be very reliable, total operation of the manufactured turbines exceeds 1 million hours.

Table A.4.2-9. Technical characteristics of "Sumy Frunze NPO" NK-16 ST gas turbine

Parameter	Unit	Value
Power output	kW	16000
Shaft rotation speed	RPM	5300

[19] According to http://www.avid.ru/products/gtu_energy/gtu_12pg-2/ (as of 10.03.2011)

[20] According to http://www.aviamotor.ru/projects/detail.php?ID=1112 (as of 10.03.2010)

Control range	RPM	70-105%
Efficiency	%	29
Service life	hours	100000
Maintenance overhauls	hours	25000

Table A.4.2-10. Technical characteristics of power generators used in the project

GTPP	Generator type	Nominal active power (MW)	Nominal full capacity (MVA)	Nominal voltage (kV)	Nominal power of stator (A)	RPM[21]	Cos *f*	Efficiency (%)
Lukyavinskaya GTPP	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65
Lyantorskaya GTPP-1	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65
Lyantorskaya GTPP-2	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65
Russkinskaya GTPP	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65
Bittemskaya GTPP	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65
Konitlorskaya GTPP-2	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65
Muryaunskaya GTPP	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65
Yukyaunskaya GTPP	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65
Tromyeganskaya GTPP	TK-6-2R UHLZ	6	7,5	6,3	687	3000	0,8	97,4
Zapadno-Kamynskaya GTPP	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65
Severo-Labatyuganskaya GTPP	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65
Zapadno-Chigorinskaya GTPP	TK-6-2R UHLZ	6	7,5	6,3	687	3000	0,8	97,4
Verkhnenadymskaya GTPP	TK-6-2R UHLZ	6	7,5	6,3	687	3000	0,8	97,4
Rogozhnikovskaya GTPP	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65
Rogozhnikovskaya GTPP -2	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65
Severo-Labatyuganskaya GTPP-2	TS-12-2RUHLZ	12	15	6,3	1375	3000	0,8	97,65

Table A.4.2-11. Technical characteristics of power transformers used in the project

GTPP	Switching substation	Power transformer type	Nominal full capacity (MVA)	Nominal voltage (kV)	Ampere rating (A)
Lukyavinskaya GTPP	SS 110/35/6 kV	TDTN 40000/110-79U1	40	115/38.5/6.6	200,8/600/3500
Lyantorskaya GTPP-1	SS 110/35/6 kV	TDTN 25000/110-79U1	25	115/38.5/6.3	125,5/375/2187
Lyantorskaya GTPP-2	SS 110/35/6 kV	TDTN 40000/110-79U1	40	115/38.5/6.6	200,8/600/3500
Russkinskaya GTPP	SS 110/35/6 kV	TDTN	25	115/38.5/6.3	125,5/375/2187

[21] Rotations Per Minute

		25000/110-79U1			
Bittemskaya GTPP	SS 110/35/6 kV	TDTN 25000/110-79U1	25	115/38.5/6.3	125,5/375/2187
Konitlorskaya GTPP-2	SS 110/35/6 kV	TDTN 25000/110-79U1	25	115/38.5/6.3	125,5/375/2187
Muryaunskaya GTPP	SS 110/35/6 kV SS 6/35 kV	TDTN 40000/110-79U1 TRNDS 25000/35 HL1	40	115/38.5/6.6 36.75/6.3	200,8/600/3500 390,6/2293,8
Yukyaunskaya GTPP	TS-12-2RUHLZ	TDTN 40000/110-79U1	25	115/38.5/6.6	200,8/600/3500
Tromyeganskaya GTPP	SS 110/35/6 kV SS 6/35 kV	TDTN 40000/110-79U1 TDNS 10000/35	40	115/38.5/6.6 36.75/6.3	200,8/600/3500 164,96/962,25
Zapadno-Kamynskaya GTPP	SS 110/35/6 kV	TDTN 25000/110-79U1	40	115/38.5/6.6	125,5/375/2187
Severo-Labatyuganskaya GTPP	SS 110/35/6 kV	TDTN 25000/110-79U1	10	115/38.5/6.3	125,5/375/2187
Zapadno-Chigorinskaya GTPP	SS 110/35/6 kV SS 35/6 kV	TDTN 25000/110-79U1 TDNS 16000/35	25	115/38.5/6.3 36.75/6.3	125,5/375/2187 263,93/1539,6
Verkhnenadymskaya GTPP	SS 110/35/6 kV	TDTN 16000/110-U1	25	115/38.5/6.6	80,3/240/1400
Rogozhnikovskaya GTPP	SS 110/35/6 kV SS 35/6 kV	TDTN 40000/110-79U1 TRNDS 25000/35 HL1	25	115/38.5/6.6 36.75/6.3	200,8/600/3500 393/2290
Rogozhnikovskaya GTPP -2	SS 110/35/6 kV SS 35/6 kV	TDTN 40000/110-79U1 TRNDS 25000/35 HL1	16	115/38.5/6.6 36.75/6.3	200,8/600/3500 392,8/1145,5
Severo-Labatyuganskaya GTPP-2	SS 110/35/6 kV	TDTN 40000/110-79U1	16	115/38.5/6.6	200,8/600/3500

Surgutneftegas' GTPPs 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:

- Compressor operator;
- Gas turbine operator;
- Process unit operator;
- Processing unit repairman;
- Gas and steam equipment repairman;
- Gas equipment maintenance technician;
- Maintenance technician;
- Boiler house operator;
- Check meter and automatics maintenance technician;
- Electrician;
- Rigger.

Human Resources Division of OJSC "Surgutneftegas" is responsible for proper training and qualification of employees involved in the project. In general about 630 persons were trained. The amount of trained personal is presented in the Table A.4.2-11 below.

Table A.4.2-12. The amount of personal trained for the project's operation[22]

GTPP	Training courses for	Amount of trained people
Lukyavinskaya GTPP	Technical staff	23
	Electricians	11
	Control and measuring apparatus	7
Lyantorskaya GTPP-1	Technical staff	16
	Electricians	11
	Control and measuring apparatus	6
Lyantorskaya GTPP-2	Technical staff	22
	Electricians	10
	Control and measuring apparatus	7
Russkinskaya GTPP	Technical staff	21
	Electricians	8
	Control and measuring apparatus	5
Bittemskaya GTPP	Technical staff	23
	Electricians	12
	Control and measuring apparatus	7
Konitlorskaya GTPP-2	Technical staff	23
	Electricians	11
	Control and measuring apparatus	8
Muryaunskaya GTPP	Technical staff	22
	Electricians	12
	Control and measuring apparatus	5
Yukyaunskaya GTPP	Technical staff	23
	Electricians	10
	Control and measuring apparatus	6
Tromyeganskaya GTPP	Technical staff	22
	Electricians	10
	Control and measuring apparatus	5
Zapadno-Kamynskaya GTPP	Technical staff	22
	Electricians	11
	Control and measuring apparatus	6
Severo-Labatyuganskaya GTPP	Technical staff	22
	Electricians	11
	Control and measuring apparatus	6
Zapadno-Chigorinskaya GTPP	Technical staff	22
	Electricians	9
	Control and measuring apparatus	6
Verkhnenadymskaya GTPP	Technical staff	24
	Electricians	12
	Control and measuring apparatus	7
Rogozhnikovskaya GTPP	Technical staff	23
	Electricians	12
	Control and measuring apparatus	8
Rogozhnikovskaya GTPP -2	Technical staff	23
	Electricians	13
	Control and measuring apparatus	7

[22] The evidences confirming implementation of appropriate trainings have been provided to verifiers.

Severo-Labatyuganskaya GTPP-2	Technical staff	22
	Electricians	12
	Control and measuring apparatus	6
TOTAL	Technical staff	353
	Electricians	175
	Control and measuring apparatus	102

Table A.4.2-13. Implementation schedule of the project

Milestones	Starting date of construction	Commissioning date[23]
Lukyavinskaya GTPP	October 2002	25 December 2003
Lyantorskaya GTPP-1	December 2002	30 August 2004
Lyantorskaya GTPP-2	March 2003	24 September 2004
Russkinskaya GTPP	October 2002	25 March 2004
Bittemskaya GTPP	October 2002	25 December 2003
Konitlorskaya GTPP-2	February 2005	21 December 2005
Muryaunskaya GTPP	March 2005	27 June 2006
Yukyaunskaya GTPP	April 2005	26 July 2006
Tromyeganskaya GTPP	October 2005	22 December 2006
Zapadno-Kamynskaya GTPP	January 2005	27 March 2006
Severo-Labatyuganskaya GTPP	February 2006	12 December 2006
Zapadno-Chigorinskaya GTPP	December 2006	30 September 2007
Verkhnenadymskaya GTPP	December 2006	20 December 2007
Rogozhnikovskaya GTPP	August 2007	19 August 2008
Rogozhnikovskaya GTPP -2	October 2009	19 July 2010
Severo-Labatyuganskaya GTPP-2	February 2010	16 December 2010

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:

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 GTPPs 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 GTPPs 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;

[23] According to acts of commissioning

- In the absence of the proposed project it would be possible to avoid risks associated with the lack of experience in GTPP 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 till 2012.

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[24]. 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	1,229,256
2009	1,420,863
2010	1,560,378
2011	2,005,816
2012	2,117,986
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	8,334,300
Estimated average annual emission reductions over the crediting period (tonnes of CO_2 equivalent)	1,666,860

A.5. Project approval by the Parties involved:

According to the Russian legislation, the letter of approval for the project will be issued by the Russian Government 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.

[24] 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.

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 02 (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 Executive Board of clean development mechanism (CDM).

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 02.

In order to justify the most plausible and realistic baseline scenario, detailed analyses 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

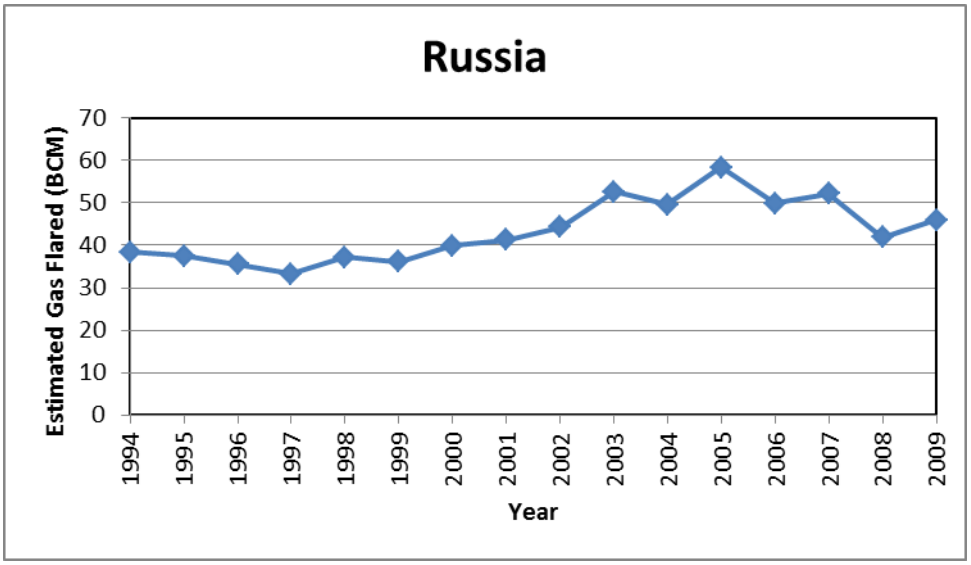
Identification and listing of plausible baseline scenarios

The proposed project involves the construction of sixteen GTPPs with the total installed capacity 444 MW. GTPPs are fuelled with APG from nearby oilfields developed by OJSC "Surgutneftegas. Electricity produced by the GTPPs 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 2002 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 40 bln. m^3 of APG were flared in Russia in 2002. 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[25].

[25] 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 2002 was 344[26] RUB/ths. m^3 whereas price for natural gas was about 819 RUB/ths. m^3. Besides, oilfields are usually located faraway 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[27] oil companies in Russia prefer to invest in their core business – oil extraction and processing rather than in development of APG utilization.

Besides that APG utilization is not financially attractive for oil companies in Russia, 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. Before 2009 the fee for emission of methane equals 0.2 RUR/t. of methane within emission limit values[28]. According to the Decree #7 dated 8 January 2009 issued by the Government of the Russian Federation[29] the fee for emission of methane (including methane contained in APG) into the atmosphere, increased to 50 RUR/t. of methane. 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 Piston 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;

[26] http://www.gks.ru/free_doc/new_site/prices/prom/CENA-PR.xls

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

[28] According to the Decree #344 dated 12 June 2003 issued by the Government of the Russian Federation

[29] Efficient as of 01.03.2011

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. Licenses for oilfields development did not include any obligations to utilize APG[30] or even any conditions which could encourage OJSC "Surgutneftegas" to utilize APG. 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".

Prior to the project implementations two pilot GTPPs were constructed, Konitlorskaya GTPP and Tyanskaya GTPP. The cost of electricity produced by these two GTPPs was higher than purchasing electricity from the external power grid of IPS "Urals".

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. The investment analysis implemented in the Section B.2 below shows that energy generation is also less preferable than purchasing from the power grid.

Conclusion

Based on the analysis above and investment analysis presented in Section B.2 below it is considered that Alternative Scenario 1 is the most plausible and credible baseline scenario for all GTPPs in the project except Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP. The transparent analysis of the baseline scenario for these three GTPPs is presented in the analysis of the alternative Scenario 3 below.

Alternative Scenario 2: Construction of Gas Piston Power Plants. This alternative is similar to the project scenario except that power would be produced by Gas Piston Power Plants (hereinafter GPPP) instead of Gas Turbine Power Plants. GPPPs would cover on-site power demand of the oilfields. Same as in the project scenario, construction of GPPPs would lead to significant increase of APG utilization and reduction of power supply from the external power grid of Integrated Power System "Urals". This alternative cannot be considered as a plausible alternative scenario for the project because of the following reasons:

1. GPPPs do not provide sufficient static and dynamic stability for power generation in comparison with the GTPPs when operating in parallel with the grid and in off-line mode. GTPPs do not provide load-up of a 100%, therefore, starting high-power electric motors and other large consumers is not possible. Power supply of the power consumers of the oilfields is carried out via 6-35kV networks of long distance, which often results in short-circuits, especially during the thunderstorm period. Under such conditions, and also due to continuous shut downs and due to repairs of power network sections, the load may drop, up to 100 %. Because of low overload capability of GPPPs the load drops lead to the emergency stops of GPPPs;

[30] Licenses for oilfields operated by OJSC "Surgutneftegas" confirming that APG utilization was not mandatory were provided to verifiers.

2. No gas pistons power units (hereinafter GPU) of high individual capacity (comparable to one gas turbine unit unit of 12 MW capacity) running on APG existed or exists neither at the time of decision making to implement the project (2001-2002) nor in 2011. Power generation units of less capacity normally have lower efficiency than units with higher capacity. Even at the time of PDD preparation (2011) no GPPPs running on APG only and with the same power capacity as the most GTPPs included in the project (24-36 MW) can be observed. Russian GPPP producer JSC Zvezda-Energetika proposes single gas piston units with the maximum power capacity 1.7 MW. The biggest GPPP (which operates stable) has a power capacity of 12 MW which is not comparable with the biggest part of GTPPs on the project with power capacities ranging from 12 to 36 MW (14 of 16 GTPPs in the project have power capacity 24-36 MW). Even for 2011 (the project started in 2001) there are no examples of GPPPs running stable on APG with higher than 12 MW capacity;
3. APG-fired GPPPs constructed in the same or bordering regions are commonly constructed with involving of Kyoto mechanism[31]. As the common practice shows that GPPPs running on APG are commonly implemented as Kyoto projects they cannot be considered as the alternative for the project.
4. Gas piston units require higher quality of fuel than gas turbine units. Fractions composition in APG can vary and APG includes the row of heavy fractions. Changes in a fuel composition as well as presence of heavy fractions lead to uncontrollable detonations during compression of APG in combustion chamber of GPUs. The uncontrollable detonations lead to emergency stops of GPPPs[32].

Conclusion

Based on the analysis above it is considered that Alternative Scenario 2 cannot be considered as a 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 (not included in the project) and from Lyantorskoe and Russkinskoe oilfields. Surgut SDPPs are operating on mixture of APG and natural gas which was received from the natural gas transmission pipeline owned by OJSC "Gazprom".

Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP are fueled by APG which was supplied to Surgut SDPP-1 and Surgut SDPP-2 prior to the GTPPs construction. As APG consumed by these three GTPPs was supplied historically to Surgut SDPPs and there is no obstacles to discontinue this practice, supply of APG can be considered as the most plausible baseline scenario for Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP.

Efficiency of power generation at Surgut SDPP-1 and Surgut SDPP-2 is higher that the efficiency at Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP. Using the same amount of APG Surgut SDPP-1 Surgut SDPP-2 will generate more electricity than Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP.

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

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[31] http://www.bureau-veritas.ru/wps/wcm/connect/8da051804e4747508911ab7cc78c87dd/VP-PDD-Ver%5B2%2C3%5D.pdf?MOD=AJPERES&CACHEID=8da051804e4747508911ab7cc78c87dd

http://www.bureau-veritas.ru/wps/wcm/connect/886d43804f5bd142a9e3a904ded6671c/%D0%9E%D1%82%D1%87%D1%91%D1%82+%D0%BE+%D0%BC%D0%BE%D0%BD%D0%B8%D1%82%D0%BE%D1%80%D0%B8%D0%BD%D0%B3%D0%B5_v2_En.pdf?MOD=AJPERES&CACHEID=886d43804f5bd142a9e3a904ded6671c

[32] "Oil gas treatment for gasreciprocating power stations feeding" M.Yu. Tarasov, S.S. Ivanov, OJSC "GiproTyumenneftegas", 2009. This study has been provided to verifiers.

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 GTPPs;
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 2002 the amount of flared APG only at Fedorovskoe and Lyantorskoe oilfields amounted 650 mln. m^3 (about 65% of the annual APG consumption by 16 GTPPs 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 4 can be considered as the most plausible scenario for Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP and cannot be considered as a plausible and credible baseline scenario for the remaining 13 GTPPs included in 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 GTPPs 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 a 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 eachother. 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.

4. The most of APG processing plants constructed in the same or border regions are implementing as Kyoto projects[33] and thus construction of a new APG processing plant cannot be considered as an alternative for the project scenario.

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 a 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 a 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 combination of the Alternative scenario 1 and Alternative scenario 3. The baseline can be formulated as follows. In the absence of the project, APG consumed by all GTPPs included in the project except Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP would be flared and APG consumed by Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP would be supplied to Surgut SDPPs. On-site power demand for the OJSC "Surgutneftegas" oilfields would be supplied by electricity by the IPS "Urals" grid.

The 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	$PL_{SNG,y}$
Data unit	%
Description	The power losses in the power network of OJSC "Surgutneftegas" in the year *y*

[33] 1) The utilization of associated petroleum gas of the Sugmut oilfield of JSC "Gazpromneft - Noyabrskneftegaz"

2) Utilization of Associated petroleum gas (APG) at the Romanovskoye oil-field, Yamalo-Nenetzky autonomous okrug, Tumen oblast', Russian Federation;

3) Utilization of Associated Petroleum Gas from Zapadno-Salymskoe and Nizhne-Shapshinskoe oil fields, Khanty-Mansiysk Yugra autonomous district Region, Russia

Time of determination/monitoring	Annually
Source of data (to be) used	This parameter is calculated by the Power Division of OJSC "Surgutneftegas" on the basis of "Instructions for calculation and analysis of technological electricity consumption for transmission in a grid" I 34-70-030-87 and adopted annually by Regional Energy Commission (REC) of Tyumen region and Khanty-Mansiysk Autonomous Okrug. Only values of losses adopted by REC are subjects for monitoring.
Value of data applied (for ex ante calculations/determinations)	% of annual losses / Year / Source[34] 3.14 / 2008 / Adopted by REC 3.14 / 2009 / Adopted by REC 3.10 / 2010 / Adopted by REC 3.10 / 2011 / Assumed equal to 2010 value 3.10 / 2012 / Assumed equal to 2010 value
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Values are adopting by official Russian authority - Regional Energy Commission (REC) of Tyumen region and Khanty-Mansiysk Autonomous Okrug.
QA/QC procedures (to be) applied	Not applicable.
Any comment	

Data/Parameter	$V_{h, GTPP\ i, m}$
Data unit	%
Description	Volume of hydrocarbon of type *h* in associated petroleum gas consumed by GTPP *i* in a month *m*
Time of determination/monitoring	Monitored monthly
Source of data (to be) used	Volumetric fractions of hydrocarbons in APG are monitored monthly for each GTPP 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* (%)[35]** Methane (CH_4) / 79.79 Ethane (C_2H_6) / 6.59 Propane (C_3H_8) / 6.10 i-butane (methylpropane; C_4H_{10}) / 0.99 n-butane (C_4H_{10}) / 1.95

[34] Documental evidences confirming used parameters for 2008-2010 have been provided to verifiers.

[35] Preliminary ER calculations are made on the basis of average APG composition in 2010 for each oilfield. Weighted average composition of APG at 13 oilfields in 2010 is given in the table. The exact APG composition for each particular oilfield can be found in the Annex 4 below.

	i-pentane (methylbutane; C_5H_{12})	0.42
	n-pentane (C_5H_{12})	0.45
	C_6+ (Hexanes and higher)	0.36
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 2010 for each oilfield. The exact APG composition for each particular oilfield can be found in the Annex 4 below.	

Data/Parameter	$b_{GTPP,y}$					
Data unit	g.f.e. / kWh					
Description	Specific fuel consumption factor for generation of electricity at Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP in year *y*.					
Time of determination/monitoring	Annually					
Source of data (to be) used	Intra-field Petroleum Gas Gathering and Utilization Division of "Surgutneftegas" (hereinafter IPGGUD)					
Value of data applied (for ex ante calculations/determinations)	**GTPP**	**2008**	**2009**	**2010**	**2011**	**2012**
	Lyantorskaya GTPP-1	388	378	378	378	378
	Lyantorskaya GTPP-2	404	399	399	399	399
	Russkinskaya GTPP	404	404	404	404	404
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Power meters are checked and calibrated according to the Russian legislation.					
QA/QC procedures (to be) applied	Power meters are checked and calibrated according to the Russian legislation.					
Any comment	Data for 2008-2010 – factual values; 2011-2012 – forecasted values;					

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 GTPPs included in the project are located in Khanty-Mansiysk Autonomous Okrug which pertains to IPS "Urals"[36].

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

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"[37]
Value of data applied (for ex ante calculations/determinations)	

Year	Grid emission factor (t. CO_2 / MWh)
2008	0.576[38]
2009	0.576
2010	0.582
2011	0.609
2012	0.649

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.
Any comment	-

Data/Parameter	$EF_{NG,CO2}$
Data unit	kg CO_2/GJ
Description	Emission factor for natural gas combustion.
Time of determination/monitoring	Determined at the stage of the PDD preparation and fixed ex-ante.
Source of data (to be) used	Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Chapter 2: Stationary Combustion (corrected chapter as of April 2007), IPCC, 2006
Value of data applied (for ex ante calculations/determinations)	56.1 kg CO_2/GJ
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The value is recommended as default by Intergovernmental Panel on Climate Change.
QA/QC procedures (to be) applied	The value is recommended as default by Intergovernmental Panel on Climate Change.
Any comment	

Data/Parameter	UF
Data unit	%

[37] The study (report) is available at the following website, the referenced information is located on page 4-19: http://www.ebrd.com/downloads/sector/eecc/Baseline_Study_Russia.pdf

[38] 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.

Description	Underburning factor for combustion of APG
Time of determination/monitoring	Determined at the stage of the PDD preparation and fixed ex-ante.
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 GTPPs (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[39].

Data/Parameter	$density_h$
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 on GOST 31369-2008, Intergovernmental Standard "Natural gas. Calculation of calorific values, density, relative density and Wobbe index from composition"[40]
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;	3,15

[39] 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

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

	C_5H_{12})	
	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 on 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	

Data/Parameter	$PL_{grid,y}$
Data unit	%
Description	The power losses in the external power grid
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"[41]
Value of data applied (for ex ante calculations/determinations)	12 %
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The applied value was positively determined by TÜV Süd.
QA/QC procedures (to be) applied	The applied value was positively determined by TÜV Süd.
Any comment	-

Data/Parameter	b_{SDPP}

[41] The study (report) is available at the following website, the referenced information is located on page 2-29: http://www.ebrd.com/downloads/sector/eecc/Baseline_Study_Russia.pdf

<table>
<tr><td>Data unit</td><td>g.f.e. / kWh</td></tr>
<tr><td>Description</td><td>Specific fuel consumption factor for generation of electricity at Surgut SDPP-1 and SDPP-2.</td></tr>
<tr><td>Time of determination/monitoring</td><td>Determined at the stage of the PDD preparation and fixed ex-ante.</td></tr>
<tr><td>Source of data (to be) used</td><td>Surgut SDPP-1 is operated by OJSC “Second Generation Company” (OKG-2) and Surgut SDPP-2 is operated by OJSC “Forth Generation Company” (OKG-4).
Specific fuel consumption factos for power generation for the period 2007-2009 were studied for both companies and the lowest specific fuel consumption factor was applied.
<table>
<tr><th>Company</th><th colspan="3">Specific fuel consumption (g.f.e. / kWh)</th></tr>
<tr><th></th><th>2007[42]</th><th>2008[43]</th><th>2009[33]</th></tr>
<tr><td>OGK-2</td><td>344.5</td><td>347.5</td><td>347.2</td></tr>
<tr><td>OGK-4</td><td>324.1</td><td>325.5</td><td>322.2</td></tr>
</table></td></tr>
<tr><td>Value of data applied
(for ex ante calculations/determinations)</td><td>322.2</td></tr>
<tr><td>Justification of the choice of data or description of measurement methods and procedures (to be) applied</td><td>The most conservative value was applied.</td></tr>
<tr><td>QA/QC procedures (to be) applied</td><td>Not applicable.</td></tr>
<tr><td>Any comment</td><td>-</td></tr>
</table>

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 02, 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 that an accredited independent entity has already positively determined that a comparable project (to be) implemented under comparable circumstances (same GHG mitigation measure, same country, similar technology, similar scale) would result in a reduction of anthropogenic emissions by sources or an enhancement of net anthropogenic removals by sinks that is additional to any that would otherwise occur and a justification why this determination is relevant for the project at hand;

[42] According to the report “Functioning and Development of Russian Power Sector in 2007” prepared by Closed Joint-Stock Company «Energy Forecasting Agency», page 64. The report is available on the official website of the Agency after free registration. http://www.e-apbe.ru/analytical/doklad2007/anons_doklada2007.php

[43] According to the report “Functioning and Development of Russian Power Sector in 2009” prepared by Closed Joint-Stock Company «Energy Forecasting Agency», page 71. The report is available on the official website of the Agency after free registration. http://www.e-apbe.ru/analytical/detail.php?ID=44418&login=yes

(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 two 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 latest version, 05.2, of the "Tool for the demonstration and assessment of additionality" (further referred as "the Tool") is applied.

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 turbine power plants for utilization of associated petroleum gas at oilfields in Khanty-Mansiysk Autonomous Okrug, Russian Federation".

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 Piston 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" also did not contain any obligations for utilization of APG[44].

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 IRR as a financial indicator during the benchmark analysis is used.

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" as of the moment when the final decision to implement the project was taken. 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	kRUR	8,658,000	Preliminary cost estimation
Lifetime of the project	Year	20	Lifetime of the project was taken equal to the lifetime of the main equipment - GTU[45]
IRR benchmark (real)	%	15	The benchmark for the current project was calculated on the basis of "Methodological recommendations on evaluation of investment projects efficiency. Approved by Ministry of Economy of the RF, Ministry of Finance of the RF, State Committee of the RF on Construction, Architecture and Housing Policy of the RF 21.06.1999 N VK 477". This methodology is commonly used in

[44] Licenses have been provided to verifiers for review.

[45] Documental evidences confirming the lifetime of a GTU have been provided to verifiers.

			Russia as a basis for investment analysis. The benchmark was calculated as follows = Refinance rate of the Russian Federation from 2000 till 2002 (25%) – inflation rate for 2001 (12.7%) + 3 % risk adjustment = 15.3 %. Benchmark was conservatively assumed 15%.
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	%	24.00	Article 284 of the Tax Code of the RF
Average electricity cost	k. RUR/MWh	0,701	Calculated on the basis of factual prices of electricity purchased by OJSC "Surgutneftegas" from the grid
Cost of 1 MW power capacity	k. RUR/MW	19 500,00	Factual cost of 1 MW power capacity for Konitlorskaya GTPP and Tyanskaya GTPP[46]
Operation expenses	%	10	The applied operational cost value (OPEX = 10% of CAPEX) was assumed by the project participants on the basis of operational data for Tyanskaya and Konitlorskaya GTPPs. The actual operational expenses of the two pilot GTPPs for 2001 were about 7% of CAPEX for less than half of the year. It was conservatively assumed that for the whole year operational expenses will be about 10%.[47]

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

Data name	Unit	Project activity
Investments	kRUR	8,658,000
IRR	%	7.79%

Sub-step 2d: Sensitivity analysis

Sensitivity analysis was carried out by several factors:

- Investment expenditures level;
- Electricity price;

[46] The extract from accounting data which confirms the cost 1 MW power capacity has been provided to verifiers.

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

- Operation costs.

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 and t.c.e. price. The variation interval is taken from -10% to +10%.

Table B.2-3. Economic indexes of sensitivity analysis

Parameter		IRR, %
Investment	-10%	10.03%
	+10%	5.85%
Electricity price	-10%	5.65%
	+10%	9.81%
Operation costs	-10%	8.57%
	+10%	7.00%

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. Thus, the project activity is not the most 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[48]. Other APG utilization projects implemented in Khanty-Mansiysk Autonomous Okrug and located nearby Yamal Nenets Autonomous Okrug are also implemented as JI projects[49]. As per the Tool, other JI activities are not to be considered in the common practice analysis.

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.

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

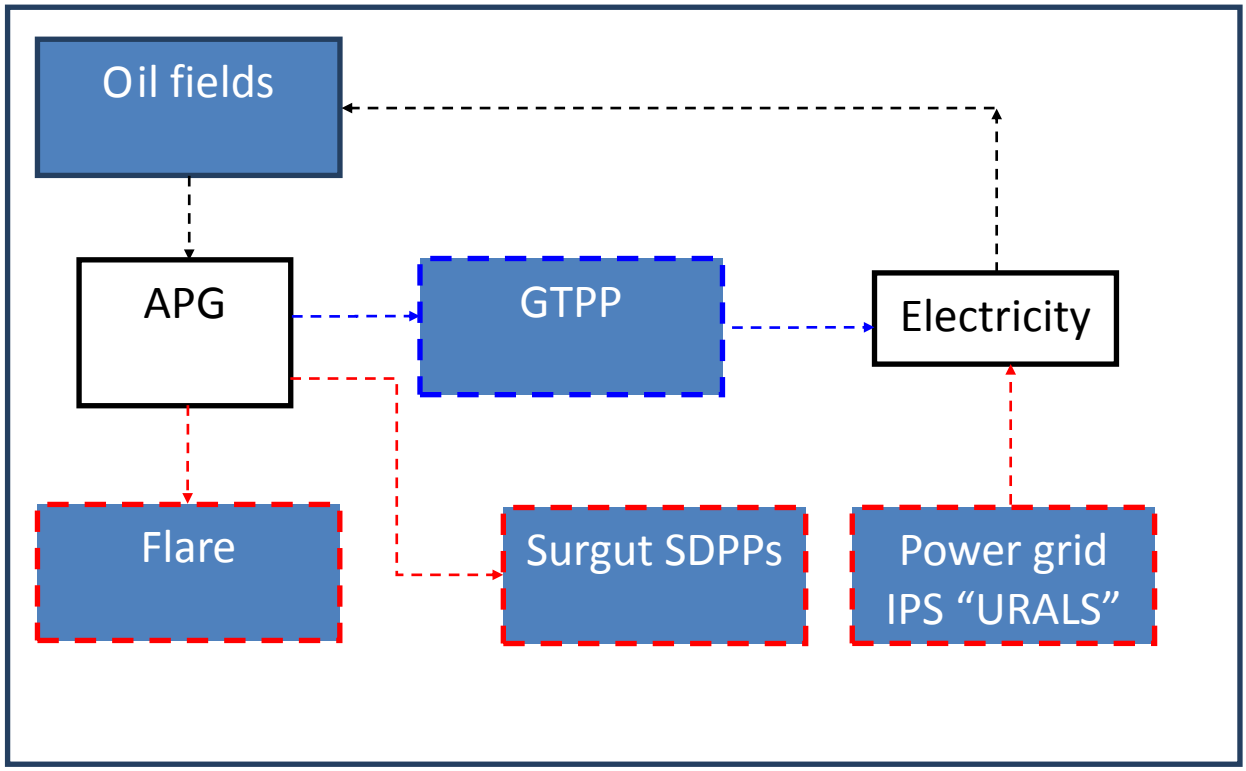
[49] http://www.bureau-veritas.ru/wps/wcm/connect/bv_ru/local/home/news/news-ghg-yugragasprocessing?presentationtemplate=bv_master/news_full_story_presentation

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

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.



Natural gas from the gascap of Verkhnenadymskoe oilfield may be used at Verkhnenadymskaya GTPP as a backup fuel. Small amounts of natural gas were used only once through the period 2007-2010. Emissions from natural gas firing in 2009 composed about 0.2% from annual emission reductions generated by the project. Baseline emissions for that amount of natural gas probably will be almost the same as it would be combusted anyway. Taking into account that the amount of consumed natural gas was very small and emissions from its combustion are less than 1% of the annual emission reductions generated by the project in 2009 this kind of emissions was considered negligibly small and excluded for simplification[50].

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 GTPPs 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

[50] This approach is in line with sub clause (iii), clause 14 of "Guidance on Criteria for Baseline Setting and Monitoring"

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[51].

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[52].
		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 GTPPs 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 scenario are included here.
		CH_4	Excluded	Considered to be negligibly small.

[51] 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

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

	Source	Gas	Included?	Justification/Explanation
		N_2O	Excluded	
	Emissions due to decreased generation of power at Surgut SDPP-1 and SDPP-2.	**CH_4**	**Included**	**Main source of emissions.**

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: 14/01/2010

The baseline was developed by Gazprom Marketing&Trading Ltd.

Tel.: +44 (0) 207 756 0000

E-mail: emissions@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:

23/04/2002 (date of contract signing for supplying of equipment for the first GTPP - Lukyavinskaya)

C.2. Expected operational lifetime of the project:

20 years / 240 months (The operational period of the main equipment – gas turbines)

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" and given the requirements of Decision 9/CMP.1, Appendix B "Criteria for baseline setting and monitoring".

Elements of approved monitoring methodology AM0029 "Grid Connected Electricity Generation Plants using Non-Renewable and Less GHG Intensive Fuel", version 03 are also used here.

The monitoring plan is designed to calculate and record the GHG emission reductions at sixteen GTPPs 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. Three 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 GTPPs. 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, sixteen GTPPs with the total installed capacity of 444 MW are installed. GTPPs are fuelled with APG from nearby oilfields developed by OJSC "Surgutneftegas. GTPPs 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.

Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP are fueled by APG which was supplied to Surgut SDPP-1 and Surgut SDPP-2 prior to the GTPPs construction. Efficiency of power generation at Surgut SDPP-1 and Surgut SDPP-2 is higher that the efficiency at Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP. Using the same amount of APG Surgut SDPP-1 Surgut SDPP-2 would generate more electricity than Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP. Project emissions accounts emissions from undergeneration of power at Surgut SDPP-1 Surgut SDPP-2.

The electricity net output from 16 GTPPs will amount to about 3.3 mln 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 and emissions from undergeneration of power are included in project emissions.

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

- Volume of associated petroleum gas consumed by GTPP *i* in a month *m* for the purposes of power generation (m^3);
- Volume of hydrocarbons of different types in associated petroleum gas consumed by GTPP *i* in a month *m* (%);
- Annual power output of GTPP *i* in a year *y* (MWh);
- Specific fuel consumption factor for generation of electricity at Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP in year *y*.

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 GTPP *i* in a year *y* (MWh).
- Percentage of electricity losses in power grid of OJSC "Surgutneftegas" in year *y*(%).

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 GTPPs 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;
- Emissions due to undergeneration of power in the project scenario because of the less efficiency of GTPPs compared to Surgut SDPP-1 and SDPP-2.

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*	Data variable	Source of data	Data unit	Measured (m), calculated (c),	Recording frequency	Proportion of data to be	How will the data be	Comment

numbers to ease cross-referencing to D.2.)				estimated (e)		monitored	archived? (electronic/ paper)	
1. $FC_{APG, GTPP\ i, m}$	Volume of associated petroleum gas consumed by GTPP i in a month m	IPGGUD	m^3	m	continuously	100 %	Electronic and paper	Gas meters readings
2. $V_{h, GTPP\ i, m}$	Volume of hydrocarbon of type *h* in associated petroleum gas consumed by GTPP *i* in a month *m*	IPGGUD	%	m	monthly	100 %	Electronic and paper	Determined by laboratory tests once per month
3. $EG_{PJ, GTPP\ i, y}$	Annual power output by GTPP *I* in a year *y*	Power Division	MWh	m	continuously	100%	Electronic and paper	Annual power output is measured directly.
4. $b_{GTPP,y}$	Specific fuel consumption factor for generation of electricity at Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP in year *y*.	IPGGUD	g.f.e. / kWh	c	annually	100%	Electronic and paper	

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 CO_2 emissions from undergeneration of power at Surgut SDPPs and are calculated as follows:

$$PE_y = PE_{OX,y} + PE_{PU,y} \quad \text{(D.1.1.2-1)}$$

Where:

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

$PE_{OX,y}$ – Emissions from complete oxidation of hydrocarbons in year *y* (t. CO_2). These emissions are calculated using the formula D.1.1.2-2 below;

$PE_{PU,y}$ – Emissions from undergeneration of power at Surgut SDPPs in year *y* (t. CO_2). These emissions are calculated using the formula D.1.1.2-3 below;

$$PE_{OX,y} = \sum (FC_{APG,\ GTPP\ i,\ m} * V_{h,\ GTPP\ i,\ m}) * density_h * UF * SMF_h \quad \text{(D.1.1.2-2)}$$

Where:

$PE_{OX,y}$ – Project emissions from oxidation of hydrocarbons in year *y* (t. CO_2);

$FC_{APG,\ GTPP\ i,\ m}$ – Volume of associated petroleum gas consumed by GTPP *i* in a month *m* (m^3). For calculation of annual project emissions the sum of products of twelve monthly values of the parameters 1 and 2;

$V_{h,\ GTPP\ i,\ m}$ – Volume of hydrocarbon of type *h* in associated petroleum gas consumed by GTPP *i* in a month *m* (%);

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

UF – 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.

$$PE_{PU,y} = EG_{PJ,\ GTPP\ i,\ y} * (b_{GTPP,y} / b_{SDPP} - 1) * EF_{ELEC,grid,y} \quad \text{(D.1.1.2-3)}$$

Where:

$PE_{PU,y}$ – emissions associated with undergeneration of power at Surgut SDPP-1 Surgut SDPP-2 in year *y* ($t.CO_2eq$);

$EG_{PJ,\ GTPP\ i,\ y}$ – Annual power output by GTPP *i* in a year *y*. Power output from Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP is accounted for calculation of this type of emissions (MWh);

$b_{GTPP,y}$ – specific fuel consumption factor for generation of electricity at Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP in year *y* (g.f.e. / kWh). For more details please refer to the Section B.1 above.

b_{SDPP} – Specific fuel consumption factor for generation of electricity at Surgut SDPP-1 and SDPP-2 (g.f.e. / kWh). For more details please refer to the Section B.1 above.

$EF_{ELEC,grid,y}$ – 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.

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

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1. $EG_{PJ,\ GTPP\ i,\ y}$	Annual power output by GTPP *I* in a year *y*	Power Division	MWh	m	continuously	100%	Electronic and paper	Annual power output is measured directly.
2. $PL_{SNG,y}$	Percentage of electricity losses in power grid of OJSC "Surgutneftegas" in year *y*	Power Division	%	c	annually	100%	Electronic and paper	This parameter is adopted annually by Regional Energy Commission. For more details please refer to the Section B.1 above.

3. $FC_{APG, GTPP\ i, m}$	Volume of associated petroleum gas consumed by GTPP i in a month m	IPGGUD	m^3	m	continuously	100 %	Electronic and paper	Gas meters readings
4. $V_{CH4, GTPP\ i, m}$	Volume of methane in associated petroleum gas consumed by GTPP i in a month m	IPGGUD	%	m	monthly	100 %	Electronic and paper	Determined by laboratory tests once per month

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).

$$BE_{EL,y} = \sum EG_{PJ,\ GTPP\ i,\ y} * (1- PL_{SNG,y}) / (1- PL_{grid,y}) * EF_{ELEC,grid,y} \quad \text{(D.1.1.4-2)}$$

Where:

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

$PL_{SNG,y}$ – The power losses in the power network of OJSC "Surgutneftegas" in the year *y* (%). For more details please refer to the Section B.1 above;

$PL_{grid,y}$ – The power losses in the external power grid" in the year *y* (12 %). For more details please refer to the Section B.1 above;

$EF_{ELEC,grid,y}$ – 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.

$BE_{CH4,y} = \sum (FC_{APG, GTPP\ i, m} * V_{CH4, GTPP\ i, m}) * UF * density_{CH4} * GWP_{CH4}$ (D.1.1.4-3)

Where:

$FC_{APG, GTPP\ i, m}$ – Volume of associated petroleum gas consumed by GTPP *i* in a month *m* (m^3). For calculation of annual project emissions the sum of products of twelve monthly values of the parameters 1 and 2;

$V_{CH4, GTPP\ i, m}$ – Volume of methane in associated petroleum gas consumed by GTPP *i* in a month *m* (%);

UF – 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;

$density_{CH4}$ – The density of CH_4 used to convert volume of CH_4 to mass of CH_4 (0.67 kg/m^3). This parameter is taken constant, for the whole crediting period. 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 leakages 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). *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 July 27th of 2001 # 53 "On the establishment of the statistical tools for the arrangement of statistical monitoring over the environment and agriculture"(version from 14.07.2004)[53]);
- 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. November 13th of 2000 # 110 "On the establishment of statistical tools for the arrangement by the MNR of Russia of the statistical monitoring over the mineral reserves, geologic exploration operations and their funding, use of water and the accrued payments for environmental contamination" (version from 19.10.2009)[54]);
- 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 17th of 2005 #1 "The order of filling out and submission of the form of federal statistical monitoring N 2-TP (wastes)[55]).

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.

[53] http://infopravo.by.ru/fed2001/ch04/akt16181.shtm

[54] http://infopravo.by.ru/fed2000/ch02/akt12385.shtm

[55] http://www.mnogozakonov.ru/catalog/date/2005/1/17/11478/

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.
D.1.1.1, D.1.1.3 - $FC_{APG, GTPP\ i, m}$	Low	Amount of APG consumed by the GTPPs 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 will be done on terms prescribed by meters passports by specialized accredited metrology organizations. A calibration schedule will also be established.
D.1.1.1- $V_{h, GTPP\ i, m}$	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.
D.1.1.3 - $V_{CH4, GTPP\ i, m}$	Low	Specialized licensed laboratory is responsible for analysis of APG and measuring of methane fraction in the gas. 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.
D.1.1.1,D.1.1.3 - $EG_{PJ, GTPP\ i, y}$	Low	The data on the electricity supply by new GTPPs 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 will be done on terms prescribed by meters passports by specialized accredited metrology organizations. A calibration schedule will also be established. The data from power meters are automatically and regularly transferred to the computer system and archived.
D.1.1.3 - $PL_{SNG,y}$	Low	This value is adopted annualy by official Russian authority - Regional Energy Commission (REC) of Tyumen region and Khanty-Mansiysk Autonomous Okrug.
D.1.1.2 - $b_{GTPP,y}$	Low	This parameter is calculated by Intra-field Petroleum Gas Gathering and Utilization Division of OJSC "Surgutneftegas" based mainly on parameters of fuel consumption and power output by GTPPs. Uncertainty level of this data is low because this parameter is calculated on the basis of data from certified meters which undergo checking and calibration in full compliance with Russian legislation.

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 supply 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. Percentage of losses in the power grid of OJSC "Surgutneftegas" is determined by specialist of power division and afterwards is submitted to the Regional Energy Commission of Tyumen region and Khanty-Mansiysk Autonomous Okrug for checking and adoption. Only the values adopted by REC are used for monitoring.

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.

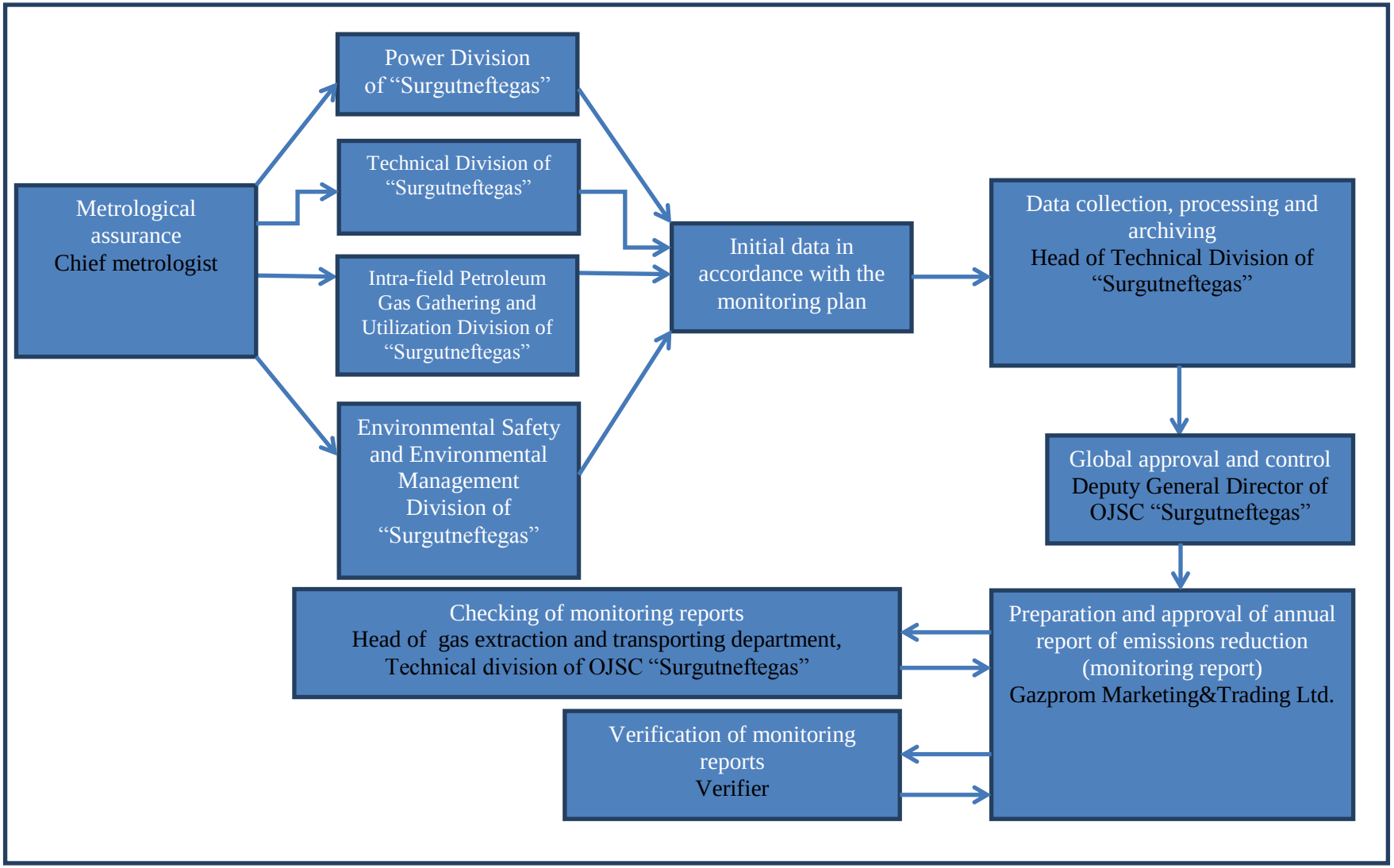
In case of a monitored parameter cannot be measured by an appropriately calibrated device an alternative method of monitoring can be developed for calculation of emission reductions. The alternative method should guarantee the same level of accuracy. If the same level of accuracy as in the initial monitoring plan cannot be achieved a conservative adjustment should be made.

The main monitored parameters are:

- Volume of associated petroleum gas consumed by GTPPs for the purposes of power generation;
- Volume fraction of methane and other hydrocarbons in associated petroleum gas consumed by GTPPs;
- Annual power output of GTPPs;
- Specific fuel consumption factor for generation of electricity at Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP;
- Percentage of electricity losses in power grid of OJSC "Surgutneftegas".

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 plan data should be stored for at least 2 years after the last transfer of ERUs for the project.
The basic management structure is shown below in the fig. D.3-1.

Figure D.3-1 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: 14/01/2010

Monitoring plan was developed by Gazprom Marketing & Trading Ltd.

Tel.: +44 (0) 207 756 0000

E-mail: emissions@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 GTPPs emissions due to underproduction of power are presented in the Tables E.1-1 – E.1.2 below.

Ex-ante calculations of the project GHG emissions from complete oxidation of hydrocarbons in GTPPs are made on the ground of 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 GTPPs over the crediting period, t CO_2e

Year	GHG emissions under the project
2008	55,192
2009	62,038
2010	67,200
2011	83,326
2012	83,326
2008-2012	351,081

Table E.1-2. Project GHG emissions underproduction of power over the crediting period, t CO_2e

Year	GHG emissions under the project
2008	85,309
2009	84,613
2010	77,055
2011	86,838
2012	92,542
2008-2012	426,358

Table E.1-3. Project GHG emissions over the crediting period, t CO_2e

Year	GHG emissions under the project
2008	140,501
2009	146,651
2010	144,255
2011	170,164
2012	175,868
2008-2012	777,439

E.2. Estimated leakage:

There are no associated leakages 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	140,501
2009	146,651
2010	144,255
2011	170,164

2012	175,868
2008-2012	777,439

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	260,052
2009	289,822
2010	314,113
2011	381,355
2012	381,355
2008-2012	1,626,698

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 underburning of methane under the baseline
2008	1,109,705
2009	1,277,692
2010	1,390,520
2011	1,794,625
2012	1,912,499
2008-2012	7,485,041

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

Year	GHG emissions under the baseline
2008	1,369,757
2009	1,567,514
2010	1,704,633
2011	2,175,980
2012	2,293,854
2008-2012	9,111,739

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	1,229,256
2009	1,420,863
2010	1,560,378

2011	2,005,816
2012	2,117,986
Total estimated emission reductions over the crediting period (tonnes of CO_2e)	8,334,300

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	140,501	0	1,369,757	1,229,256
2009	146,651	0	1,567,514	1,420,863
2010	144,255	0	1,704,633	1,560,378
2011	170,164	0	2,175,980	2,005,816
2012	175,868	0	2,293,854	2,117,986
Total (tonnes of CO_2 equivalent)	777,439	0	9,111,739	8,334,300

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 GTPPs 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 GTPPs constructed before 2008).

Before February 2007 all capital construction objects i.e. GTPPs were subjects for two major state expertise assessment: environmental expertise and state expertise. All GTPPs 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 GTPPs stopped to be subjects for environmental expertise. Environmental Impact Assessment of Rogozhnikovskaya GTPP-2 and Severo-Labatyuganskaya GTPP-2 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 two positive conclusions were obtained.

The authorities (expert organizations) responsible for EIA approval of the GTPPs 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

GTPP	Expert organization responsible for EIA approval	Date of EIA approval	Document number
Lukyavinskaya GTPP	Head Department on Natural Resources and Environment, Ministry of Natural Resources in Khanty-Mansiysk Autonomous Okrug	September 2002	№1875
Lyantorskaya GTPP-1	Head Department on Natural Resources and Environment, Ministry of Natural Resources in Khanty-Mansiysk Autonomous Okrug	August 2002	№1678
Lyantorskaya GTPP-2	Head Department on Natural Resources and Environment, Ministry of Natural Resources in Khanty-Mansiysk Autonomous Okrug	August 2002	№1677
Russkinskaya GTPP	Head Department on Natural Resources and Environment, Ministry of Natural Resources in Khanty-Mansiysk Autonomous Okrug	August 2002	№1749
Bittemskaya GTPP	Head Department on Natural Resources and Environment, Ministry of Natural Resources in Khanty-Mansiysk Autonomous Okrug	September 2002	№1874
Konitlorskaya GTPP-2	Department of Federal Service in the sphere of environment (Rosprirodnadzor) in Khanty-Mansiysk Autonomous Okrug	November 2004	№ 113
Muryaunskaya GTPP	Department of Federal Service in the sphere of environment (Rosprirodnadzor) in Khanty-Mansiysk Autonomous Okrug	April 2005	№ 872
Yukyaunskaya GTPP	Department of Federal Service in the sphere of	November 2004	№ 282

	environment (Rosprirodnadzor) in Khanty-Mansiysk Autonomous Okrug		
Tromyeganskaya GTPP	Department on technological and environmental supervision, Rostekhnadzor branch in Khanty-Mansiysk Autonomous Okrug	July 2005	№ 168
Zapadno-Kamynskaya GTPP	Head Department of Natural Resources and Environment, Ministry of Natural Resources in Khanty-Mansiysk Autonomous Okrug	November 2004	№ 125
Severo-Labatyuganskaya GTPP	Department on technological and environmental supervision, Rostekhnadzor branch in Khanty-Mansiysk Autonomous Okrug	July 2005	№ 167
Zapadno-Chigorinskaya GTPP	Department on technological and environmental supervision, Rostekhnadzor branch in Khanty-Mansiysk Autonomous Okrug	September 2006	№ 1470
Verkhnenadymskaya GTPP	Department on technological and environmental supervision, Rostekhnadzor branch in Khanty-Mansiysk Autonomous Okrug	September 2006	№ 1471
Rogozhnikovskaya GTPP	Department on technological and environmental supervision, Rostekhnadzor branch in Khanty-Mansiysk Autonomous Okrug	February 2007	№ 203
Rogozhnikovskaya GTPP-2	Head Department of State Examination (Glavgosexpertiza), Ekaterinburg branch	September 2009	№319-09/EGE-0937/03
Severo-Labatyuganskaya GTPP-2	Head Department of State Examination (Glavgosexpertiza), Ekaterinburg branch	January 2010	№017-10/EGE-1041/03

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 16 GTPPs. GTPPs are united in four oil-and-gas production departments (OGPD, in Russian - NGDU). The list of oil-and-gas production departments with corresponding GTPPs, 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

GTPP	Oil-and-gas production departments	Numbers of in-force permissions for pollutant emission into the atmosphere	Date of issuing/ responsible authority
Lukyavinskaya GTPP	Nizhnesortymskneft	89-10 P	29.07.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision

GTPP	Oil-and-gas production departments	Numbers of in-force permissions for pollutant emission into the atmosphere	Date of issuing/ responsible authority
Lyantorskaya GTPP-1	Lyantorneft	103-10	09.08.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Lyantorskaya GTPP-2	Lyantorneft	103-10	09.08.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Russkinskaya GTPP	Komsomolskneft	53-10	28.04.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Bittemskaya GTPP	Nizhnesortymskneft	89-10 P	29.07.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Konitlorskaya GTPP-2	Komsomolskneft	53-10	28.04.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Muryaunskaya GTPP	Nizhnesortymskneft	89-10 P	29.07.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Yukyaunskaya GTPP	Nizhnesortymskneft	89-10 P	29.07.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Tromyeganskaya GTPP	Nizhnesortymskneft	89-10 P	29.07.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Zapadno-Kamynskaya GTPP	Lyantorneft	103-10	09.08.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Severo-Labatyuganskaya GTPP	Nizhnesortymskneft	89-10 P	29.07.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Zapadno-Chigorinskaya GTPP	Nizhnesortymskneft	89-10 P	29.07.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Verkhnenadymskaya GTPP	Nizhnesortymskneft	89-10 P	29.07.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Rogozhnikovskaya GTPP	Bystrinskneft	51-09 P	09.08.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision

GTPP	Oil-and-gas production departments	Numbers of in-force permissions for pollutant emission into the atmosphere	Date of issuing/ responsible authority
Rogozhnikovskaya GTPP-2	Bystrinskneft	51-09 P	09.08.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision
Severo-Labatyuganskaya GTPP-2	Nizhnesortymskneft	89-10 P	29.07.2010 North-Ural Federal Service for Ecological, Technological and Nuclear Supervision

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[56]:

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 examination of industrial safety;
6. Permissions on emissions into the atmosphere;
7. Sanitary-and-epidemiologic resolution.

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.

[56] 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[57].

[57] http://www.iskra-energy.ru/press/publications/111/

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Organisation:	Joint Stock Company "Surgutneftegas"
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Represented by:	
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URL:	http://www.gazprom-mt.com
Represented by:	
Title:	Head of Origination Russia & FSU, Clean Energy
Salutation:	Mrs.
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Middle name:	Alfredovna
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Annex 2

BASELINE INFORMATION

Summary of key elements of the baseline is presented in table below[58]:

Parameter	Monitored/not monitored parameter	Value	Data unit	Description
$FC_{APG, GTPP\ i, m}$	Monitored	-	m^3	Volume of associated petroleum gas consumed by GTPP i in a month m
$V_{CH4, GTPP\ i, m}$	Monitored	-	%	Volume of methane in associated petroleum gas consumed by GTPP i in a month m
$V_{h, GTPP\ i, m}$	Monitored	-	%	Volume of hydrocarbons of different types in associated petroleum gas consumed by GTPP i in a month m
$EG_{PJ, GTPP\ i, y}$	Monitored	-	MWh	Annual power output by GTPP *I* in a year *y*
$PL_{SNG,y}$	Monitored	-	MWh	Percentage of electricity losses in power grid of OJSC "Surgutneftegas" in year *y*
$b_{GTPP,y}$	Monitored	-	g.f.e. / kWh	Specific fuel consumption factor for generation of electricity at Lyantorskaya GTPP-1, GTPP-2 and Russkinskaya GTPP in 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.
$EF_{NG,CO2}$	Not monitored	56.1	kg CO_2/GJ	Emission factor for natural gas combustion
UF	Not monitored	3.5	%	Underburning factor for combustion of APG
$density_h$	Not monitored	0.67	-	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	tCO_2e/tCH_4	Global Warming Potential of methane
$PL_{grid,y}$	Not monitored	12	%	The power losses in the external power grid
b_{SDPP}	Not monitored	322.2	g.f.e. / kWh	Specific fuel consumption factor for generation of electricity at Surgut SDPP-1 and SDPP-2.

[58] 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 2010 APG compositions for 13 oilfields were used. APG composition for each of 13 oilfields can be found in the table below.

Oilfield	LUKYAVINSKOE	LYANTORSKOE	RUSSKINSKOE	BITTEMSKOE	KONITLORSKOE	MURYAUNSKOE	YUKYAUNSKOE	TROMYEGANSKOE	ZAPADNO-KAMYNSKOE	SEVERO-LABATYUGANSKOE	ZAPADNO-CHIGORINSKOE	VERKHNENADYMSKOE	ROGOZHNIKOVSKOE
Volumetric fraction %	100	100	100	100	100	100	100	100	100	100	100	100	100
Methane (CH_4)	82.22	92.30	83.35	71.65	81.45	84.67	90.14	89.48	72.20	76.20	81.50	83.74	68.97
Ethane (C_2H_6)	5.15	1.63	4.75	10.09	4.26	4.28	1.71	1.48	11.40	8.41	5.92	4.70	12.22
Propane (C_3H_8)	5.46	2.03	4.95	10.55	6.43	3.98	2.15	2.16	9.26	8.35	6.47	5.49	7.10
i-butane (methylpropane; C4H10)	0.99	0.75	1.02	1.17	1.34	0.86	1.02	0.96	0.90	0.91	0.93	1.01	0.86
n-butane (C_4H_{10})	2.05	0.63	1.66	3.01	2.31	1.71	1.52	1.79	2.31	2.26	1.73	1.66	1.46
i-pentane (methylbutane; C5H12)	0.49	0.24	0.43	0.42	0.45	0.50	0.46	0.53	0.32	0.78	0.27	0.30	0.20
n-pentane (C_5H_{12})	0.62	0.14	0.40	0.58	0.45	0.63	0.46	0.63	0.45	0.44	0.29	0.28	0.22
C_6+ (Hexanes and higher)	0.52	0.36	0.36	0.26	0.46	0.63	0.36	0.52	0.28	0.37	0.21	0.24	0.14
Carbon Dioxide (CO_2)	1.25	1.44	1.68	0.98	1.37	1.38	0.76	1.04	1.79	1.10	1.32	0.96	6.65
Nitrogen (N_2)	1.25	0.48	1.40	1.29	1.48	1.36	1.42	1.41	1.09	1.18	1.36	1.62	2.18