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:

Heating mains losses decline in settlements of Tuva Republic, Russian Federation.

Sectoral scope: (2) Energy distribution.

Version: 03
Dated: 30.03.2012

A.2. Description of the project:

Purposes of the Project:
The goal of the project is the decrease in fuel consumption for heat energy production for feed water (heat carrier) heating. That is the result of leaks (spills) decrease from the non compactnesses of warn-out heating mains by their reconstruction.
Implementation of this project is based on sustainable development, it means the decrease of impact on the environment. As a result of less quantity of carbon fuel used for the supply of the same number of customers with heat, is the reduction of GHGs and soot emissions. This helps to mitigate "greenhouse" effect and improves the envi5onment conditions of Kyzyl city and in the whole Tuva Republic.

Situation prior the project activity
Before the Project's start on the heating mains occurred high consumption of heating carrier. Thus, municipal boiler houses burnt hightened amount of fuel for feed water heating. Old heating mains (tubes) were tremendously warn-out (80-90% wornt). They didn't provide enough preservance to heat carrier during its transfer for the long distance as they were put into operation in 1970-80 years and were not repaired for a long time, considering that their estimated operational life is not more than 20-25 years.

Project
The Project presumes to apply state-of-the-art materials for heating maines reconstruction in Tuva Republic by virtue of the substitution of the old-fashioned and warn-out isolation of heating maines by new state-of-the-art isolation and by means of the avoidance of heat carrier leaks through non compactnesses of the old tubes by their substitution. This results to reduction in heat losses through isolation during heat energy transfer and also leads to heat lossess due to heat carrier leaks. Thus, boiler houses loading of Tuva Republic decreases and, therefore, leads to reduction in fuel consumption for heat energy generation. The project leads to considerable economy in fossil fuel consumption (coal) that otherwise would be burnt for generation of the equal amount of heat for the supply of heat energy customers in the absence of the Project.
The project activity is performed by GazTekhStroy LLC which makes all the works regarding reconstruction of heating mains in accordance with assignment of Ministry of industry and energy of Tuva Republic in accordance with mechanisms of Kyoto Protocol based on its own investments.

Project plans the sealing of roads, the sealing of heating mains' canals, dismantling of old heat isolation (mineral wadding), dismantling of old leaking heating mains', dismantling of canals, mantling of canals, mantling of new heating mains with the use of urethane foam (UF) isolation, covering of canals with germetisation of joints and renewal of roads with territories rehabilitation.

For the long years of its activity GazTekhStroy LLC is guided by sustainable development principals and its responsibilities in ecological, industrial and social aspects.

Therefore the Project supposes aims:
-reduction of heating system of Tuva Republic loading due to reduction of fuel consumption for heat energy generation for feed water heating;
-supply of customers with the heat carrier of necessary quality by consumption of minimal quantity of energy sources (stable quality of hot water);
-improvement of heaviest ecological conditions[1] by means of reduction of GHGs emissions due to reduction of carbon fossil fuel (coal) consumption for heat generation.

The quantity of customers connected to every hating main is stable and did not change in comparison with situation prior to the massive reconstruction.

GazTekhStroy LLC due to the project implementation solves not only local and regional problems of heating, but also improves environment of Kyzyl and Tuva Republic.

Main facts that help to implement the Project.

-possibility of its implementation in accordance with Kyoto Protocol mechanisms for mitigation of expenses on heating mains reconstruction. It is impossible to perform any important repair-prevention report, by the revenues from the existing tariffs on heat energy due to their negligible values and high prices of operational expenses. So the company took into account the chance to receive investments from emission reductions trade and decided to implement the Project.
-increase of reliability and quality of heat carrier on the municipal objects. This will considerably reduce pollutants emissions in the region and will improve quality of people life in Kyzyl and Tuva Republic.

Implementation of the Project faced series of economy obstacles. However, GazTekhStroy LLC plans to receive investments from emission reduction units (ERUs) trade, that will be obtained and this will help to overcome the obstacles in the process of implementation and approval of the Project as JI activity.

Baseline scenario
Under the baseline practice of heat production with the use of higher amount of fossil fuel (coal) for heating greater amount of feed water due to considerable leaks of the heat carrier and heat through the bad isolation on heating mains.

In favor of baseline says the fact as follow:

- Absence of sufficient stimulus for Project's implementation: making of insufficient planned repairs in the frames of tariffs and the absence of responsibility to reconstruct with the sum that exceeds the tariffs income, doesn't pose the company that supplies the heat energy, to invest money in measures for fossil fuel combustion economy that leads to GHGs emission reductions.

- Absence of investment attractiveness for such projects due to the absence of municipals support. In the presence of low values for heat transfer tariffs investing in municipal sector is unprofitable.

History of the project (incl. JI component)
The situation before the start of the project activity was complicated: old heating mains were worn out tremendously (80-90%). The money for their reconstruction were absent. The local authority has money only for emergency and routine repairs. Hence it was decided to attract private company GasTekhStroy LLC for making massive reconstruction of heating mains under JI mechanisms and delegation of

[1] State report of environmental situation in Tuva Republic in 2010 year.

emission reductions rights to it. The decision was made at the meeting at the Deputy Prime Minister of the Republic of Tyva in Kyzyl/Protocol Tuva Republic Government meeting #14 from 17.12.2007. Followed by Order of the First Deputy Minister of Industry and Energy of the Republic of Tuva № 27 of 16.05.2008 on the approval of a plan of additional measures works for the replacement of heating system for the period 2008-2011 on the territory of the Republic of Tuva.
08-09.2008 – Start of reconstruction works.
01.06.2011 - End of reconstruction works according to the Project

Emission reductions
As a result of the Project:
- reconstruction of heating mains for the arrangement of state-of-the-art energy efficient sections in average on 53% from the total length;
- reduction of coal consumption by 1983 thousand tonnes for 2008 – 2012 or 396 thousand tonnes per annum;
- reduction of heat carrier (feed water) leaks in average by 18%;
- reduction of heat losses on feed water heating by 68%;
- reduction of soot emissions by 74%;
- reduction of CO2 emissions due to coal combustion by 1 116 910 thousand tons per year, or 4,839,942 for the period 2008-2012.

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 – The Russian Federation (host Country)	"GazTekhStroy" LLC	No
Party B - No	-	-

A.4. Technical description of the project:

A.4.1. Location of the project:

Project is implementing on different heating mains that are situated on the territory of Tuva Republic in cities: Kyzyl, Chadan, Turan, Shagonar, Ak-Dovurak and in settlements: Sukpak, Tselinnoye, Khayyrakan (shagonar teplo), Chaa-Khol, Kaa-Khem, Bai-Khaak, Khovy-Aksy, Kyzyl-Mazhalyk.

A.4.1.1. Host Party(ies):

The Russian Federation.

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

Tuva Republic.

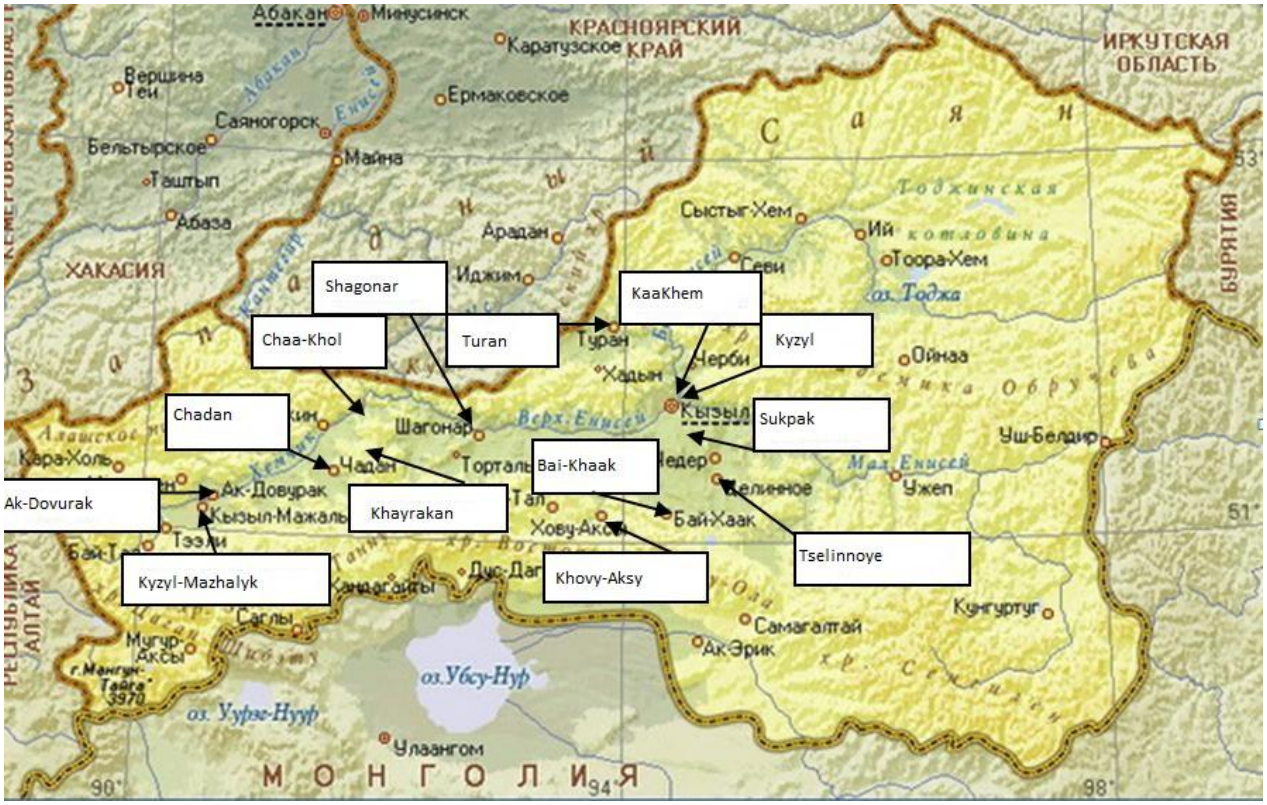
A.4.1.3. City/Town/Community etc.:

Cities: Kyzyl, Chadan, Turan, Shagonar, Ak-Dovurak. Settlements: Sukpak, Tselinnoye, Khaiyrakan, Chaa-Khol, Kaa-Khem, Bai-Khaak, Khovy-Aksy, Kyzyl-Mazhalyk.

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

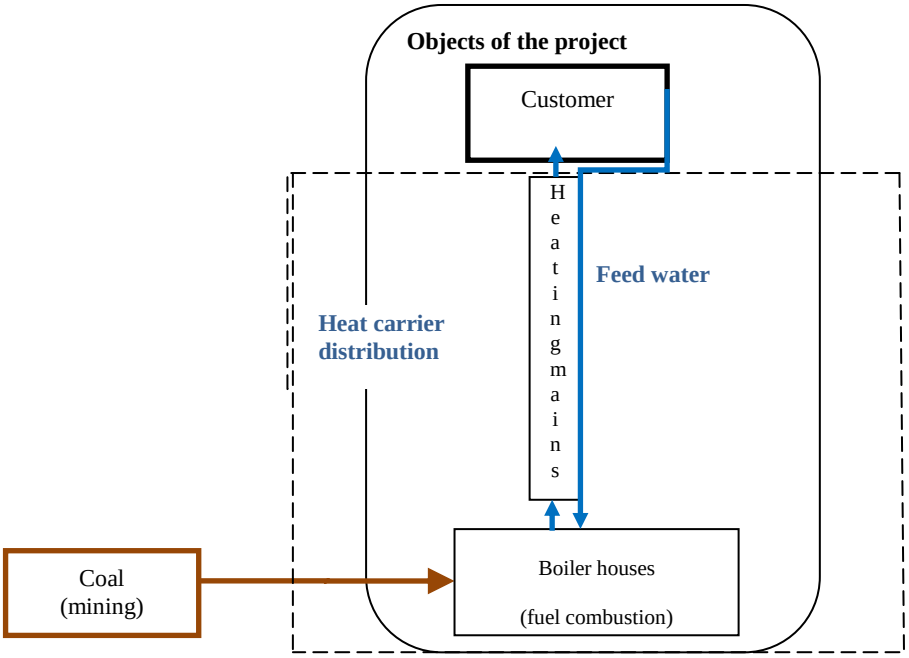
Baruun-Khemchikskiy kozhuun **settlement Kyzyl-Mazhalyk MUP «ZhKKh»** Provincial capital — settlement Kyzyl-Mazhalyk in Tuva Republic, located in 4 kms far from Ak-Dovurak city
Dzun-Khemchikskiy kozhuun Chadan city MUP «Chadan» Chadan (Tuvin "Chadaana") — city in Tuva Republic, provincial capital of Dzun-Khemchikskiy kozhuun, located in 220 kms far from Kyzyl.
Kaa-Khemskiy kozhuun MUP «Kommunalnoye khozyaistvo» Kaa-Khemskiy kozhuun— municipal region of Tuva Republic in 90 kms far from Kyzyl.

Kyzylskiy kozhuun settlement Sukpak MUP «Achylyg» Sukpak — settlement in Kyzylskiy kozhuun in Tuva Republic, located in 14 kms westward from Kyzyl
Kyzylskiy kozhuun settlement Tselinnoye UK «Tselinnoye» Kyzylskiy kozhuun — municipal region of Tuva Republic. Provincial capital — urban settlement Kaa-Khem, remote part of Kyzyl city. One kozhuun consists of 1 urban and 9 rural settlements, the kozhuun embraces 12 settlements including Tselinnoye settlement.
Turan city MUP «Teplovik» Turan — city in Tuva Republic in 74 kms north-westward from Kyzyl.
MUP «Bai-Khaakskaya central boiler house» Tandinskiy kozhun — municipal region of Tuva Republic. Administrative centre — settlement Bai-Khaak in 75 kms far from Kyzyl.
GUP RT «Progress-teplo» Chaa-Khol Chaa-Kholskiy kozhuun — municipal region in Tuva Republic. Provincial capital — settlement Chaa-Khol (Jakul).
GUP RT «Ak-Dovurak teplo» Ak-Dovurak — is the city in Barun-Khemchikskiy kozhuun in Tuva Republic, in 309 kms westward from Kyzyl
GUP RT «Shagonarteplo» Shagonar — city in Tuva Republic, municipal capital of Ulug-Khemskiy kozhuun in 115 kms westward from Kyzyl
GUP RT «Shagonarteplo» **Khaiyrakan settlement boiler house** Dzun-Khemchikskiy kozhuun — municipal region in Tuva Republic. Provincial capital — city of Chadan. The kozhuun consists of 1 urban settlement — Chadan city and 11 rural settlements including settlement Khayyrakan that is located 220 kms far from Kyzyl.
GUP RT «Khovy-Aksy teplo» Chedi-Kholskiy kozhuun — municipal region in Tuva Republic. Provincila capital of the kozhuun is Khovy-Aksy settlement former urban settlement. Municipally kozhuun is devided on 4 sumons. Khovy-Aksy is located 120 kms far from Kyzyl.
GUP «Kyzylteplo» Kyzyl — is the city of republican subordination, capital of Tuva Republic. It is located 390 kms far from railway station Minusinsk.



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

Fig. A.4.2. Scheme of project activity



Description of technological scheme.

Under the Project activity the sealing of roads, the sealing of heating mains' canals, dismantling of old heat isolation (mineral wadding), dismantling of old leaking heating mains', dismantling of canals,

mantling of canals, mantling of new heating mains with the use of urethane foam (UF) isolation, covering of canals with germetisation of joints and renewal of roads with territories rehabilitation are performed.

Previously the mantling of tubes of heating mains were performed in canals of concrete ducts. When it rains hard these ducts are filled by water. Mineral wadding that is used for thermal isolation of tubes absorbs moisture and increase corrosion of steel tubes. Eventually due to this process on tubes walls flaws and disruptions emerged. Tube hole accumulated carbonate and other sediments that pose the increase of heat losses.

GazTekhStroy LLC uses new concrete ducts that allows to exclude usage of mineral wadding as heat isolator. It replace this material by watertight shell made with urethane foam. Instead of roll-fed internal and treated external wrapping the company applies new technologies in isolation - gumming (wrapping of steel tube with rubber plates and liquid rubber mixtures) together with mantling of glued external isolation. The main difficulty of this method is its high price.

Tubes durability increase manifold was achieved due to reconstruction with the use of modern tubes with industrially applied multilayer moisture, heat and soil isolation made with solid urethane foam and polyethylene (so called pro-isolated tubes). These materials allows to mantle heating mains and water pipes both in passes and in common tranches. Partly application of slender pro-isolated tubes "KASAFLEX" and "IZOPROFLEX" types that include stainless steel and sewn polyethylene with hard internal and external multilayer isolation as well as existing cable-satellite will allow to apply non-tranches way of mantling – method of horizont directed drilling.
The technologies described above allows to use heating systems for 50 years without repairs.

Table A.4.2.1 Characteristics of reconstructed heating mains

№	District	Average dimater of heating main, mm	Length, kms.	Reconstruction of heating mains
1	Baruun-Khemchikskiy kozhuun settl. Kyzyl-Mazhalyk MUP «ZhKKh»	159 mm	4,4	2,2kms August – September of 2008, 2,2 kms June-August 2011
2	Dzun-Khemchiksky kozhuun Chaadan town MUP «Chadan»	219 mm	5,7	5,0 substitution June-August 2008, 0,3 kms July 2009, 0,4 kms June 2011
3	Kaa-Khemskiy kozhuun MUP «Kommunalnoye khozyaistvo»	219 mm	3,0	2,0 kms July-August 2008, 1,0 kms June 2009
4	Kyzylskiy kozhuun settl. Sukpack MUP «Achylyg»	159 mm	9	5,3 kms June-August 2008, 3,7 kms June-August 2009
5	Kyzylskiy kozhuun settl. Tselinnoye UK «Tselinnoye»	159 mm	3,12	3,12 kms July-August 2008

6	Turan city MUP «Teplovik»	200 mm	7,5	5,3 kms June-August 2008, 1,86 June-August 2009
7	MUP «Bai-Khaakskaya central boiler house»	159 mm	5,7	5,2 kms June-August 2008, 0,5 kms June 2009
8	GUP RT «Progress-teplo» Chaa-Khol	219 mm	8,6	50 m (August-September 2008) 70 m. (August-September 2009) 120 m (August-September 2010)
9	GUP RT «Ak-Dovurak teplo»	219 mm	32	480 m (August-September 2008) 500 m (August-September 2009) 560 m (August-September 2010)
10	GUP RT «Shagonarteplo»	219 mm	38.2	450 m (August-September 2008) 490 m (August-September 2009) 580 m (August-September 2010)
11	GUP RT «Shagonarteplo» Khaiyrakan settlement boiler house	108 mm	5.1	100 m (August-September 2008) 90 m (August-September 2009) 110 m (August-September 2010)
12	GUP RT «Khovy-Aksy teplo»	Steam pipeline 4,6 kms Heating mains from boiler houses Average diameter 108 mm	26,5	350 m (August-September 2008) 400 m (August-September 2009) 460 m (August-September 2010)
13	GUP «Kyzylteplo»	273 mm.	124	2100 m (August-September 2008) 2500 m (August-September 2009) 2850 m (August-September 2010)

Project's "mile stones":
17.12.2007 – Discussion of intentions to implement the Project on massive reconstruction of heating mains as JI project (protocol of Tuva Republic Government meeting #14)
08-09.2008 – Start of reconstruction works.
01.06.2011 - End of reconstruction works according to the Project[2].

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:

[2] Every object has received act of commissioning. These acts can be provided to the auditor on request.

Project by reconstruction of heating mains leads to reduction in heat carrier (hot water) losses through the noncompactnesses of tubes and losses due to bad isolation when transferring of heat energy. This poses a decrease in loading of bolier houses in Tuva Republic hence the reduction in fuel consumption for heat energy production.
Consequently, the fossil fuel (coal) savings are considerable, hence emission reductions of GHGs (mainly CO2) happens.
Project activity is ecologically and socially important for Tuva Republic and Kyzyl city due to reduction of environmental impact by heat generating industry. In accordance with Tuva Republic Rosprirodnadzor board data[3] human induced impact on air is still very significant:

- complex pollution index (IZA5) is 21,89 for benzapyrene; while standard index (IS): 19.0;
- the major frequency of maximum allowable concentration (MAC) is 18.8 of MAC for soot;
- avrage annual concentrations of suspended particulate matters (SPM), soot, formaldehyde, benzapyrene exceed established hygienic norms[4].
- for 2006-2010 is observed trend on increase of atmosphere pollution of the city in accordance with IZA5 from "high" to "very high"[5].
- it is observed that there is an upward trend of annual average concentration of benzapyrene.

In the absence of the Project it would be impossible to achieve the reductions as modern tariffs on municipal heat energy exclude any private investing in the sector. Hence heightened heat carrier consumption would exist due to its permanent leaks, and it would couse more consumption of fossil fuel for heating and more GHGs emissions that is hazardous for the environment.
All the above mentioned arguments and also analysis performed in Section B below shows that GazTekhStroy LLC will not reduce emissions of GHGs without mechanisms of Kyoto Protocol.

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

	Years
Length of the crediting period	4.33
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2008	430 253
2009	1 021 626
2010	1 105 759
2011	1 138 464
2012	1 143 840
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	4 839 942
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	1 116 910

[3] State report of environmental situation in Tuva Republic in 2010 year.

[4] Benzapyrene. Average concentration for 12 months in 2010 was 6,5 x10-6 mg/m3 (6,5 MAC day.aver.). In January and in December average month concentrations of benzapyrene exceeds the norm by 10 times. Source: State report of environmental situation in Tuva Republic in 2010 year.

[5] Summarized emission pollutants (from the stationary combustion) in 2010 for Tuva Republic were on 11,9 % more than in 2009.

In the case of extension of Kyoto credit period beyond 2012, a plan for monitoring the project activities and the calculation of emissions reductions achieved will remain unchanged and will be based on the formulas presented in Section D.

A.5. Project approval by the Parties involved:

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On September 15, 2011 the Chairman of the Russian Federation Government signed Resolution 780 "On measures for realization of Article 6 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change". This document depicts a JI-project approval procedure in the Russian Federation.

According to item 4 of the Provision the approval of projects will be carried out by the Ministry of Economic Development of the Russian Federation based on consideration of submitted project proposals. Competitive selection of demands is carried out by the operator of carbon units (Sberbank of RF) according to the item 10 of the Government Decree of the Russian Federation № 780.
According to item 7 of the Provision the application structure includes «the positive expert opinion on the project design documentation prepared according to the international requirements by the accredited independent entity chosen by the applicant».

Thus, according to the legislation of the Russian Federation in the field of JI projects realization, the Project approval is possible after reception of the positive determination opinion from AIE.

SECTION B. Baseline

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

Description of baseline setting approach

For the description and setting of baseline a JI specific approach was applied. It was developed in accordance with paragraph 9 (a) of the "Guidance on criteria for baseline setting and monitoring" Version 03[6].

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

Below the indicated steps are provided more detailed.

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

Baseline is setting based upon analyses of different alternative scenarios including the proposed project activity without JI component. Criteria for baseline setting are established as "key factors". All the alternatives will be scrutinized for the sake of their dependence on these key factors. The most plausible alternative is the one that is less influenced by these factors. So the applied approach consists of the stages:

- *Description of alternative scenarios;*
- *Description of key factors;*
- *Analysis of influence of key factors on indicated alternatives;*
- *Choosing of the most plausible alternative scenario.*

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

Step. 2. Application of chosen approach

For the transfer of heat energy on the objects of GazTekhStroy LLC were observed two plausible alternative scenarios:

Alternative scenario 1. Business as usual, it means continuation of insignificant routine repairs that doesn't completely avoid heat carrier leaks. This leads to heightened fuel consumption in order to provide necessary heat for the customers.

Alternative scenario 2. Project itself without JI component, it presumes reduction of fuel consumption for heat energy generation for feed water (heat carrier) heating by avoidance of heat carrier leaks through non compactnesses and holes of worn-out heating mains due to their massive reconstruction.

Stage 1. Applicability of chosen alternative scenarios to existing regulations and laws.

Projects on heating mains reconstruction are not restricted by the existing regulations and norms, as well as the practice of standard routine repairs. Therefore it can be concluded that both alternatives are in line with the existing Russian legislation and can be assessed in further analysis.

Stage 2. Key factors analysis

The stage includes definition of factors that could hinder implementation of alternative scenarios defined above. It contains an analysis of key factors influence on alternative scenarios. As a result of the analysis is made a conclusion regarding to plausibility of every alternative.
The result of above mentioned stages is definition of the most plausible alternatives that are not hindered by the observed factors.

Definition of factors that could hinder the Alternative scenarios implementation.
In the purpose of the analysis were scrutinized technological factors, such as:

Technical feasibility. In the purpose of the factor influence from technical and economical point of view is observed the feasibility of the alternative scenarios taking into account the remote location of the object, capital investments value, availability and development of infrastructure. In case of indicated factor is not pulled trough by one of the assessed alternative scenario it would not be scrutinized in firther analysis.

Analysis of key factors influence on indicated alternative scenarios.

Influence of technical feasibility factor

Alternative scenario 1. Business as usual, it means continuation of insignificant routine repairs that doesn't completely avoid heat carrier leaks. This leads to hightened fuel consumption in order to provide necessary heat for the customers.

This alternative scenario is quite feasible as it doesn't require additional investments. All the repairs (regular preventive and emergency) are made exceptionally in tariff frames in the process of heating

period preparations; hence lack of the investments and scale (repair works are limited[7]) and their possible absence. This is justified by the enormous outspent of heating mains participating in the project. Their average degradation is 82%.
In accordance with the information of Tuva Republic tariff survey, the total sum of investments from regional budget that was spent for regular preventive and emergency repairs of housing and public utilities is 9.7 mln of rubles for the period 2008-2011.
Routine repair works in tariffs frames of regional budget for exploitation organizations that rent state property (GUP or MUP) is the most common practice in all regions.

Hence this alternative scenario is feasible from both technical and economical points of view.

Alternative scenario 2. Project itself without JI component, it presumes reduction of fuel consumption for heat energy generation for feed water (heat carrier) heating by avoidance of heat carrier leaks through noncompactnesses of worn-out heating mains due to their reconstruction.

Nowadays in heating supply sector only 0.5 – 1% of total heating mines length is reconstructed instead of standard 4 – 5 %. Thereby routine repairs have been replaced by emergency repairs that are 3-4 times more expensive and have worse quality. Taking into account the considerable over exhaust of main facilities it is necessary to perform a shock-load reconstruction by 10-12% per year. In other words it is necessary to replace not tens meters of heating mains length but tens kilometres of them.
The described fact can be explained by the situation when municipal authorities, as a rule, don't have their own budget investment funds for reconstruction and implementation of new equipment. Federal and municipal authorities release a series of documents (modernisation of municipal heating supply system is called "Fourth national project") for supporting the reconstruction of old-fashioned, inefficient heating and heat delivery equipment. At the same time they do not provide any financial support as project of modernisation and reconstruction are treated as "investing" and should be realised with the funds of private investors.
The case is that the tariffs for heating supply are set by regional administration (based on an official accounting). Private investors are not interested in participating in such projects due to their economical inexpediency and due to the absence of recoupment.

Implementation of this alternative scenario by means of massive heating mains reconstruction (over 50% of total length) could reduce heat carrier (hot water) leaks through the noncompactnesses of tubes and heat losses from isolation when transferring of heat energy; this leads to decrease of boiler house loading in Tuva Republic hence it reduces fuel consumption on heat energy generation.
Thus, considerable saving of fossil fuel (coal) occurs that leads to GHGs and soot emission reductions from its combustion.
However, this alternative scenario presumes private investing in municipal sector. GasTekhStroy LLC by investing 218 mln of rubles performed the Project.
Taking into account the existing situation regarding heat energy tariffs (particularly on distribution), major private investments it can be concluded that in the absence of additional finances this alternative was unlikely to be viable, because capital investments were 218 mln of rubles that is much higher (by 22 times) than state financing of similar activity.
Hence the possibility of this alternative scenario realization is low, nevertheless it will be scrutinized in investment analysis.

Stage 3. Selection of the Alternative scenario that is less hindered by the key factors

Table B1.1. Key factors analysis

[7] Nowadays in heating supply sector only 0.5 – 1% of total heating mines length is reconstructed instead of standard 4 – 5 %. The source: http://www.rosteplo.ru/Tech_stat/stat_shablon.php?id=1901.

№	Key factor	Scenario 1	Scenario 2
1.	Sector's reform policies and existing regulations and norms	Favor the implementation	Does not promote implementation
2.	Economical situation in housing and public utilities and heating supply sectors	Makes this scenario the most possible for being baseline	Does not favor the implementation
3.	Investments availability	Favor the implementation as applies governmental investments	Is the most serious barrier for the scenario

Based on the performed analysis the conclusion is that Alternative scenario 1 is less hindered by the key factors, therefore this Alternative Scenario – business as usual is baseline.

Theoretical description of baseline.
Key information and data for baseline setting are listed in tables below.
Baseline emissions are calculated as follows:

(B.1) $BE_{i,y} = HC_{i,y,BL} \cdot t_{i,y}/1000 \cdot 24 \cdot d_{i,y,n} \cdot sfc_i \cdot 0.0293 \cdot EF_{coal}$
где:
$BE_{i,y}$ – baseline emissions on object i in year y, tCO2;
$t_{i,y}$ – temperature difference twixt outlet and input water of object *i* in year *y*, under the baseline ^{0}C;
$HC_{i,y,BL}$ – heat carrier (water) consumption by object i in year y, under the baseline m3/hour;
1/1000 – conversion factor that represents specific heat capacity of water, Gcal/tonne·^{0}C;
24 – hours per day;
$d_{i,y,n}$ – number of days of heating period from object i, in year y, number of days;
sfc_i – specific fuel consumption on the object *i*, tonnes of fuel equivalent/Gcal;
0.0293 – net calorific value of fuel equivalent, TJ/tonne of fuel equivalent;
EF_{coal} – emission factor of coal, tCO2/TJ.

Heat carrier consumption by object i under the baseline is defined as average value for 3 previous year.
Temperature difference twixt outlet and input water is defined by the plant's data.

Data/Parameter	$HC_{i,y,BL}$
Data unit	m3/hour
Description	Heat carrier consumption by object i, connected to the heating main, in year y under the baseline;
Time of determination/monitoring	Once at the stage of determination
Source of data (to be) used	Plant data, obtained from measuring complex
Value of data applied (for ex ante calculations/determinations)	Kyzyl - Mazhalyk: 271; Chadan: 847; Kaa-khemskiy: 436; Sukpak: 1109; Tselinnoye: 385; Turan: 975; Bai-Khaak: 703; Chaa-Khol: 370; Ak-Dovurak: 750; Shagonar: 720; Khovy-Aksy: 940; Kyzyl: 720; Shagonar Teplo: 250.
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Data were collected for the previous 3 years and is calculated the average value.
QA/QC procedures (to be) applied	Periodic calibrations and checks of measuring complex.
Any comment	-

Data/Parameter	$t_{i,y,BL}$
Data unit	^0C
Description	Temperature difference twixt outlet and input water of object *i* in year *y*, under the baseline
Time of determination/monitoring	Continuous monitoring performed by the plant on the stage before the Project.
Source of data (to be) used	Historical data of the plant based on measurements of measuring complex
Value of data applied (for ex ante calculations/determinations)	Kyzyl-Mazhalyk: 35; Chadan: 40; Kaa-Khemskiy: 40; Sukpak: 45; Tselinnoye: 35; Turan: 40; Bai-Khaak: 40; Chaa-Khol: 40; Ak-Dovurak: 45; Shagonar: 45; Khovy-Aksy: 50; Kyzyl: 40; Shagonar Teplo: 40.
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Monitoring of the parameter is an integral part of monitoring system on the boiler house and is performed in accordance with internal procedures.
QA/QC procedures (to be) applied	Periodic calibrations and checks of measuring complex.
Any comment	-

Data/Parameter	$d_{i,y,n}$
Data unit	Days
Description	Number of days of heating period from object i, in year y
Time of determination/monitoring	Once at the stage of determination
Source of data (to be) used	Reporting data of the plant
Value of data applied (for ex ante calculations/determinations)	First half: 133 days; Second half: 106 days.
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Determined based on plant data.
QA/QC procedures (to be) applied	Based on actual data.
Any comment	-

Data/Parameter	sfc_i
Data unit	tonnes of fuel eq./Gcal
Description	specific fuel consumption on the object i
Time of determination/monitoring	Once at the stage of determination
Source of data (to be) used	Plant data
Value of data applied (for ex ante calculations/determinations)	Kyzyl-Mazhalyk: 0.256; Chadan: 0.273; Kaa-Khemskiy: 0.265; Sukpak: 0.268; Tselinnoye: 0.262; Turan: 0.262; Bai-Khaak: 0.271; Chaa-Khol: 0.368; Ak-Dovurak: 0.279; Shagonar: 0.269; Khovy-Aksy: 0.273; Kyzyl: 0.198; Shagonar Teplo: 0.269.

Justification of the choice of data or description of measurement methods and procedures (to be) applied	Value of the parameter is provided by municipal boiler house in the form of reporting.
QA/QC procedures (to be) applied	Official data that are provided by municipal boiler houses to the Ministry of economy and energy of Tuva Republic will be used. This is an official reporting in Tuva.
Any comment	-

Data/Parameter	EF_{coal}
Data unit	tCO2/TJ
Description	Coal emission factor
Time of determination/monitoring	Once at the stage of determination
Source of data (to be) used	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Chapter 2, Table 2.2.
Value of data applied (for ex ante calculations/determinations)	94.6
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Reference value/ other bituminous coal category refers to the energy coals, often burned for energy. In addition, the emission factor IPCC 2006 for this category is the lowest, ie, conservative.
QA/QC procedures (to be) applied	Determined based on reference data
Any comment	-

Data/Parameter	1/1000
Data unit	Gcal/tonn^{0}C
Description	Conversion factor that represents specific heat capacity of water
Time of determination/monitoring	Once on determination stage
Source of data (to be) used	http://www.global-cis.ru/page/teplo1_theory.html
Value of data applied (for ex ante calculations/determinations)	1/1000
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Reference value
QA/QC procedures (to be) applied	Determined based on reference data
Any comment	Determined based on water specific heat and its heating by 1^0C.

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:

Additionality was demonstrated according to the paragraph 2 (a) of the Annex I to the "Guidance on criteria for baseline setting and monitoring" version 03 by "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".
Analysis made in Section B.1 shows that the proposed project is not baseline.
Demonstration and assessment of additionally is made by consecutive analysis that includes 5 stages. If the investment analysis shows that Project is not the most financially attractive, then from the stage 2 the stage 4 should be performed.

Stage 1. Identification of alternatives;
Stage 2. Investment analysis, and (or)
Stage 3. Barrier analysis;
Stage 4. Common practice analysis.
Stage 5. Provision of additionally proofs

Application of the chosen approach

Stage 1. Identification of alternatives

Identification of alternatives for further analysis were made in Section B.1.

Alternative scenario 1. Business as usual, it means continuation of insignificant routine repairs that doesn't completely avoid heat carrier leaks. This leads to hightened fuel consumption in order to provide necessary heat for the customers.

Alternative scenario 2. Project itself without JI component, it presumes reduction of fuel consumption for heat energy generation for feed water (heat carrier) heating by avoidance of heat carrier leaks through noncompactnesses and holes of worn-out heating mains due to theirmassive reconstruction.

Stage 2. Investment analysis

On the stage is determined:
- Whether Project alternative is the most financially and economically attractive;
- If the project is economically or financially viable without revenue from ERUs sales.

Substage 2a: Determine of appropriate analysis method
There are three methods applicable for investment analysis: simple cost analysis, investment comparison analysis and benchmark analysis.
A simple cost analysis (Option I) shall be applied if the proposed JI project and the alternatives identified on Stage 1 generate no financial or economic benefits other than JI related income. The proposed JI project doesn't pose any revenue from heat energy sale or fuel economy. Company GazTekhStroy LLC only transport heat energy (by feed water) to the customers and cannot receive revenues from heat energy sale or coal savings. Therefore simple cost analysis is applied.

Substage 2b: Option 1. Simple cost analysis
Under the baseline heating mains would be routinely repaired or repaired on emergency that doesn't fully prevent leaks of heat carrier and losses through bad isolation due to insignificance of repairs' scale. In such case GazTekhStroy company – project investor wouldn't invest any funds. The routine and emergency repairs are invested by the regional authorities and the necessary investments are less than under the Project. For the period of Project implementation costs for routine and emergency repairs were not included in heat energy tariffs. Compensation of emergency and routine repair works was made by funds of regional budget of Tuva Republic. The sum was 9.7 mln. of rubles.

The project scenario, without registration as JI project, would be implemented in larger scale by the private funds of project investor and would not receive any revenue as GasTekhStroy LLC performs only transport of heat energy (feed water) to the customers and can not receive any revenue from heat energy sales and coal savings. Large scale reconstruction by the funds of company investor cost 218 mln. of rubles and embraces more objects than would be possible to reconstruct by government financing.
Hence company investor GasTekhStroy LLC can not receive any revenue due to the Project, except income from sale of emission reduction units.

Comparison of investments by Alternative scenario 1 and 2:

	Alternative scenario 1	Alternative scenario 2 (the Project)
Investments, mln. of rubles	9.7	218
Type of investments	State	Private

By the comparison of investments by the two scenarios it can be concluded that Alternative scenario 2 is unprofitable for the project participant against the Alternative scenario 1.

Stage 4. Common practice analysis
The stage amplifies assessments made on previous stages and provides common practice analysis of massive reconstruction of heating mains by private company in housing and public utilities sector. The common practice analysis is the criteria for demonstration of the Project additionality.

Major of the public utilities in Russian regions belong to local municipal companies and rarely to private ones. Since the end of 80-s, beginning of 90-s, municipal heating supply systems lack the investments. Thus major part of heating units and systems of heating supply in regions, especially far from the centre, have become out-dated and inefficient.
Municipalities are not able to invest considerable funds in existing heating supply systems or development of new heating mains due to regular short of money in municipal budget and inflation level rising. Still there is no large influx of funds in municipal budgets of regional and federal levels. Received money are enough only for occasional routine and emergency repairs in much less scale than is need.
Besides, tariffs on heat energy are established by regional administration (based on official calculations) and include private investing, that is why private companies do not invest in municipal sector without additional commercial motivation. It is heat tariff limits on the regional levels that make private companies to use existing worn-out heating supply systems in housing and public utilities sector.
For the repair works in tariff frames or with municipal budget funds the cheaper technologies are used due to the shortage in money for emergency repairs. It is necessary to make cheaper repairs, thus outdated and non state-of-the-art materials – mineral wadding and non rust resistant tubes are used. Nowadays in heating supply sector only 0.5 – 1% of total heating mines length is reconstructed instead of standard 4 – 5 %. Thereby routine repairs have been replaced by emergency repairs that are 3-4 times more expensive and have worse quality.[8]

The implemented Project of massive reconstruction of heating mains differs enormously from the common practice due to investing by private company GasTekhStroy LLC by its own funds. The project presumes to replace more than 50% from the total length of heating mains, though usual practice is not more than 1%.

[8] http://www.stscom.ru/sts/library/?id_document=18

The performed analysis clearly shows that the project activity is not the common practice, therefore the Project is additional.

Stage 5. Provision of additionally proofs
The information to support above documentation is contained in the following documents:
-Discussion of intentions to implement the Project on massive reconstruction of heating mains as JI project (protocol of Tuva Republic Government meeting #14)
- Confirmation of project investments
- Confirmation of baseline investments

Explanations on how GHG gases emission reductions are achieved

Baseline emissions
Under the baseline practice of heat production with the use of higher amount of fossil fuel (coal) for heating greater amount of feed water due to considerable leaks of the heat carrier and heat through the bad isolation on heating mains

Project emissions
Project by reconstruction of heating mains leads to reduction in heat carrier (hot water) losses through the noncompactnesses of tubes and losses due to bad isolation when transferring of heat energy. This poses a decrease in loading of bolier houses in Tuva Republic hence the reduction in fuel consumption for heat energy production.
Consequently, the fossil fuel (coal) savings are considerable, hence emission reductions of GHGs (mainly CO2) happens.

Leakage
Taking into account that the project activity is a reduction in coal consumption, and accordingly, and coal mining, it can be argued that a reduction in physical losses of methane from coal mining beyond the project boundary. However, for conservatism, they will not be taken into account.

GHG emission reductions
Emission reduction is determined through deduction of the project emissions from the baseline emissions.

Detailed calculations are presented in the section E.

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

>>
The project boundary embraces GHG emission sources attributed to the project activity. It is only those sources are taken into account emissions from which are above (1%) in the overall quantity of GHG emissions. In the following table the emission sources and GHG types are considered as to including them in the baseline or project boundary.

Table B 3.1. GHG emission sources

Scenario	Source	GHG type	Include/Do not include	Comment
Baseline	Coal combustion for heating of more volume of feed water	CO_2	Include	Main baseline emission source
		N_2O	Do not include	Negligibly small [9]
		CH_4	Do not include	Negligibly small [10]
Project	Coal combustion for heating of lesser volume of feed water	CO_2	Include	Main project emission source
		N_2O	Do not include	Negligibly small [11]
		CH_4	Do not include	Negligibly small [12]

Leakage assessment

In accordance with "Guidance on criteria for baseline setting and monitoring", (Version 03) the leakage is determined as "the net change of anthropogenic emissions by sources and/or removals by sinks of GHGs which occurs outside the project boundary, and that can be measured and is directly attributable to the JI project." In case the potential leakage is determined the project participants must undertake an assessment of the potential leakage of the proposed JI project and explain which sources of leakage are to be calculated, and which can be neglected[13].

The main emissions potentially attributable to leakage in the context of the outside of project are emissions arising from:

- Physical methane (CH4) leaks from coal extraction, production and transportation

Taking into account that the project activity is a reduction in coal consumption, and accordingly, and coal mining, it can be argued that a reduction in physical losses of methane from coal mining beyond the project boundary. However, for conservatism, they will not be taken into account.

Schematically the project boundary including project heating pipelines and boiler house (fuel combustion)

[9] Calculations presented in Excel form attached at PDD

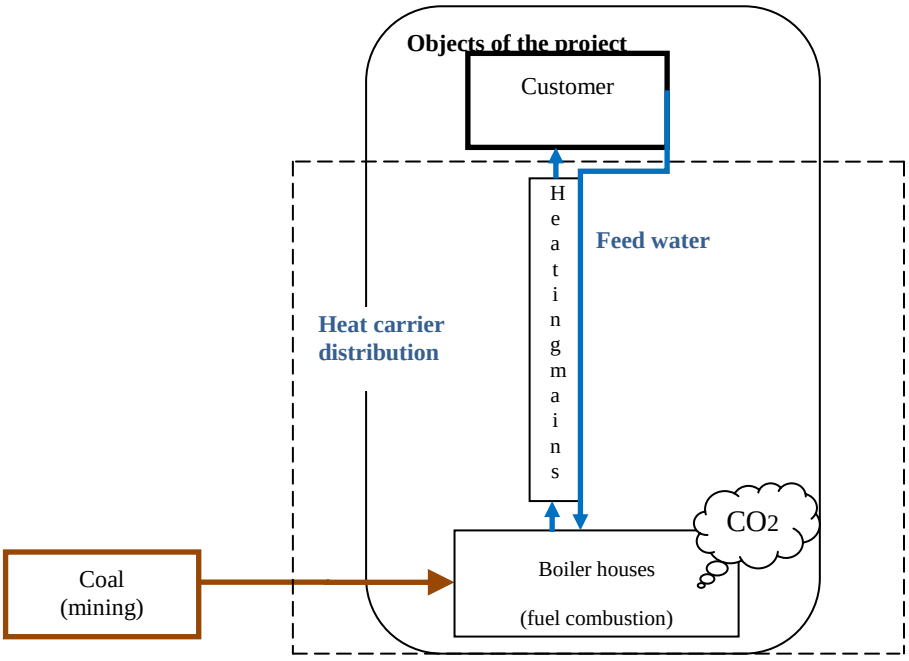
[10] Calculations presented in Excel form

[11] Calculations presented in Excel form attached at PDD

[12] Calculations presented in Excel form attached at PDD

[13] In accordance with the paragraph 18 of the Guidance on criteria for baseline setting and monitoring (Version 03).

Figure B.3.1. The project boundary



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: 26.01.2012.

The baseline has been designed by GasTekhStroy LLC, Barnaul
Contact persons:
Butakov Mikhail, General Director
Tel: 8 (385)-2-56-34-97
Fax: 8 (385)-2-56-34-97
E-mail: ant.zemtsova@mail.ru

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

>>

The project's starting date is 01.08.2008 – Start of construction works.

C.2. Expected operational lifetime of the project:

>>

Expected operational lifetime of the project is 25 years or 300 months: from 01/09/2008 till 01/09/2033

C.3. Length of the crediting period:

>>

Crediting period is determined within the budget period of Kyoto Protocol from 01/01/2008 till 31/12/2012 and making 5 years or 60 months.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

>>

The monitoring plan is described throughout a section D in accordance with paragraph 30 of the Guidance on criteria for baseline setting and monitoring. Project developer applies a JI specific approach for monitoring plan in accordance with paragraph 9 (a) of the Guidance on criteria for baseline setting and monitoring (Version 03), and other applicable JI guidelines. The JI-approach includes consideration of the following steps:

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

Below the approach is presented in more detail.

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

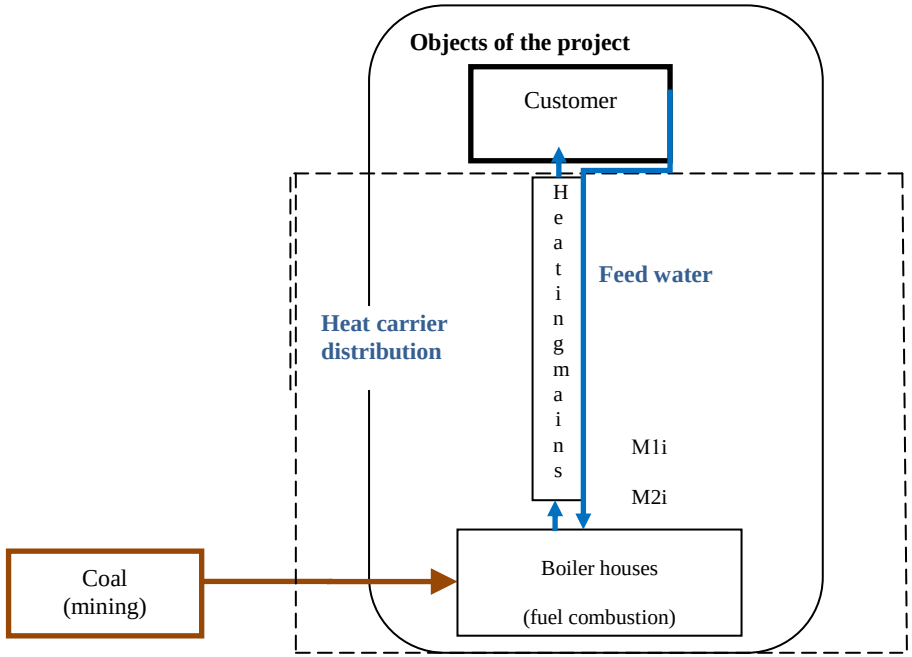
The monitoring will involve only the project of heating pipelines and boiler house adjacent to them, which have been modernized or replaced and, accordingly, will be monitored the power consumption of quantities of feed water (heat carrier) and its temperature data.

The monitoring plan provides for the direct monitoring of parameters on which would be calculated to emissions reductions. That is, Option 2 is used for monitoring the plan.

Key emission factors
CO2 emission factors to determine emissions from coal combustion are stable parameters from the 2006 IPCC guidelines.

Monitoring points for determining these parameters are presented on the following figure.

Figure D.1.1. Monitoring points



Symbols

	Heat carrier (feed water)
	Coal

Monitoring points and variable parameters for monitoring

M2i	M1i
Temperature difference twixt outlet and input water of object i, °C	Heat carrier (water) consumption by object i, m3/h

Table D.1-1. Data and parameters fixed during the crediting period and available at the determination stage

#	Parameter	Unit of measurement	Value	Source of data
1.	CO_2 emission factor of coal	tCO_2/TJ	94.6	2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2, table 2.2
2.	Conversion factor that represents specific heat capacity of water, Gcal/tonne^{0}C;	Gcal/tonne^{0}C	1/1000	http://www.global-cis.ru/page/teplo1_theory.html
3.	Number of days of heating period from object i, in year y	number of days	1-st half a year: 133; 2-st half a year:106.	The value is stated based on the order of local authority.
4.	Net calorific value of fuel equivalent	TJ/tonne of fuel equivalent	0.0293	7,000 kcal/ t.c.e. × 4.187 kJ/kcal / 1.000.000 = 29.3TJ/tonne of fuel equivalent
5.	Specific fuel consumption on the object i,	tonnes of fuel equivalent/Gcal	See the tabular forms of Section B.1	Value of the parameter is provided by municipal boiler houses in the form of reporting to the Ministry of economy and energy of Tuva Republic. This is an official reporting in Tuva. The value is assumed equal for baseline and project scenario and stated as constant, because boiler houses do not take part in project monitoring plan.

Step2. Application of the approach chosen.

Please see next option 1.

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

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

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
P.1 $HCC_{i,y,PJ}$	*Heat carrier (water) consumption by object i in year y, at project*	*Instrumental meter complex TCPB-024*	*m3/h*	*m*	*constantly*	*100%*	*paper*	
P.2 $t_{i,y,PJ}$	*Temperature difference twixt outlet and input water of object i in year y, at project*	*Instrumental meter complex TCPB-024*	*^0C*	*m*	*constantly*	*100%*	*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):

(D1) $PE_{i,y} = HC_{i,y,PJ} \cdot t_{i,y,PJ} / 1000 \cdot 24 \cdot d_{i,y,n} \cdot sfc_i \cdot 0{,}0293 \cdot EF_{coal}$

where:

$PE_{i,y}$ – project emissions on object *i* in year *y*, tCO2/year;

$t_{i,y,PJ}$ – temperature difference twixt outlet and input water of object i in year y, at project, ^0C;

$HC_{i,y,PJ}$ – heat carrier (water) consumption by object i in year y, at project m3/hour;

1/1000 – conversion factor that represents specific heat capacity of water, Gcal/tonne^0C;

24 – hours per day;
$d_{i,y,n}$ – number of days of heating period from object i, in year y, number of days;
sfc_i – specific fuel consumption on the object i, tonnes of fuel equivalent/Gcal;
EF_{coal} – emission factor of coal, tCO2/TJ;
0.0293 – net calorific value of fuel equivalent, TJ/tonne of fuel equivalent;

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
B.1 $HCC_{i,y,PJ}$	*Heat carrier (water) consumption by object i in year y, at baseline*	*Plant data*	*m3/h*	*e*	-	*100%*	*paper*	*Determined based on average data for3 year before project starting. Assumed as constant for 2008-2012*
B.2 $t_{i,y,PJ}$	*Temperature difference twixt outlet and input water of object i in year y, at baseline*	*Plant data*	^0C	*e*	-	*100%*	*paper*	*Determined based on average data for3 year before project starting. Assumed as constant for 2008-2012*

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

(D2) $BE_{i,y} = HC_{i,y,BL} \cdot t_{i,y,BL} / 1000 \cdot 24 \cdot d_{i,y,n} \cdot sfc_i \cdot 0{,}0293 \cdot EF_{coal}$

where:
$BE_{i,y}$ – baseline emissions on object *i* in year *y*, tCO2/year;
$t_{i,y,BL}$ – temperature difference twixt outlet and input water of object i in year y, at baseline, ^0C;
$HC_{i,y,BL}$ – heat carrier (water) consumption by object i in year y, at baseline, m3/hour;
1/1000 – conversion factor that represents specific heat capacity of water, Gcal/tonne^0C;
24 – hours per day;
$d_{i,y,n}$ – number of days of heating period from object i, in year y, number of days;
sfc_i – specific fuel consumption on the object i, tonnes of fuel equivalent/Gcal;
EF_{coal} – emission factor of coal, tCO2/TJ;
0.0293 – net calorific value of fuel equivalent, TJ/tonne of fuel equivalent;

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

Not applicable.

D.1.2.1. Data to be collected in order to monitor emission reductions from the project, and how these data will be archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

Not applicable.

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

>>

Not applicable.

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

The main leakage potentially attributable in the context of the outside of project are emissions arising from:

- Physical methane (CH4) leaks from coal extraction, production and transportation

Taking into account that the project activity is a reduction in coal consumption, and accordingly, and coal mining, it can be argued that a reduction in physical losses of methane from coal mining beyond the project boundary. However, for conservatism, they will not be taken into account.

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

Not applicable.

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

>>

Not applicable/please see D.1.3

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

(D3) $ER_{i,y} = BE_{i,y} – PE_{i,y}$

where:
$ER_{i,y}$ – emission reductions at object i, in year y, tonne CO2/year;
$BE_{i,y}$ – baseline emissions *i* in year *y*, tCO2/year;
$PE_{i,y}$ – project emissions *i* in year *y*, tCO2/year;

(D4) $ER_y = \Sigma ER_{i,y}$

where:
ER_y – emission reductions in year y, tonne CO2/year;

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

By the Russian ecological legislation a plant is obliged to control its emissions, discharges and waste storage treatment. The plant must provide due reporting documents to authorized state institutes (i.e. Federal State agency on ecological, technical and nuclear supervision).
GasTekhStroy LLC as the entity that only transports the heat carrier is not the energy generating organization and should perform reporting documents regarding the project activity.
Project activity is in line with Federal Laws #261 (on energy efficiency) and # 190 (on district heating), because it helps to save energy consumption and supply the customer with heat energy.

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.
P1, P2, Table D.1.1.1	low	Main monitoring devices are verified and calibrated in accordance with established regulations.

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

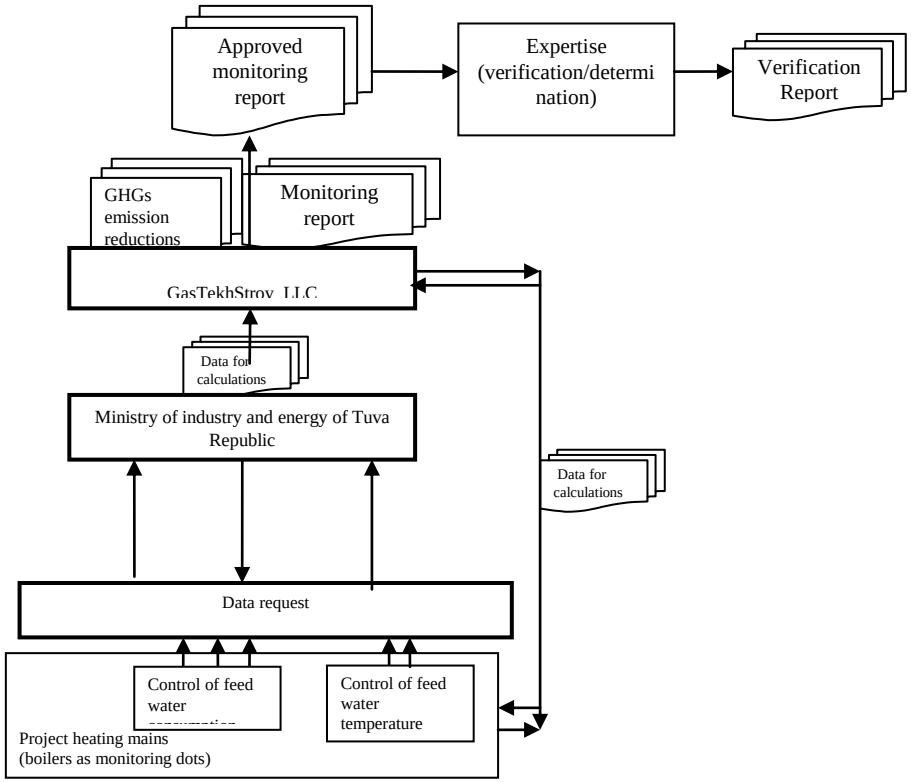
Structure of emission reductions monitoring plan of the Project is in accordance with the monitoring and accounting procedures adopted in the company. Roles and responsibilities of persons and organization participating in monitoring process are defined in the table below.

Organizations	Department	Targets/Aims
GazTekhStroy LLC, Barnaul	Directorate	Calculations of ex-post GHGs emission reductions by the formulae of Section D.
Managed heating mains (boiler houses of GUP and MUP)	Directorate	Transfer of production activity materials (from monitoring points) to GasTekhStroy LLC and Ministry of industry and energy by request.
Ministry of economy and energy	-	Systematization and transfer of annual production data of the objects participating in the activity to GasTekhStroy LLC by request.

Necessary information for emission reduction calculations are collected in the following way: data from the monitoring control points are collected in the places according to operational routine activity of the boilers that supply the heat carrier (hot water) through the project objects to the customers.
Calculation of GHGs emission reductions is made based on the annual production data of heating supply system.
When the data regarding the heat carrier consumption and its temperature are not available because of the measuring tools failure, the gap will be bridged by the analogue average data for the similar period on the object.
Storage of monitoring data of the use of raw parameters in «GasTechStroy» LLC carried out in electronic and paper form on the network resources. Shelf life -5 years. Data of the heat carrier consumption & temperature difference twixt outlet and input water stored in electronic and paper form - 5 years.
All monitored data (for period 2008-2012) carried out in electronic form and paper form 5 years after the last transfer of ERUs.

Ready and signed annual production reports reflecting the monitored data are to be transferred from the project object to Ministry of industry and energy and to GasTekhStroy LLC. Ministry of industry and energy of Tuva Republic is performed an internal check of received data for avoiding of errors and mistakes.
GasTekhStroy LLC annually makes emission reduction calculations of GHGs and provide monitoring reports based on received data.
Approved annual report is addressed to the accredited independent entity to verify achieved emission reductions. Graphically the structure of emission reductions monitoring is shown on Scheme D.3

Scheme D.3. Operational and management structure of the project



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

>>

The monitoring plan was established by GasTekhStroy LLC, Barnaul

Contact persons:

Butakov Mikhail, General Director

Tel: 8 (385)-2-56-34-97

Fax: 8 (385)-2-56-34-97

E-mail: ant.zemtsova@mail.ru

SECTION E. Estimation of greenhouse gas emission reductions

In assessing the GHG emissions resulting from implementation of project and baseline emissions determined by formulas presented in section D.

E.1. Estimated project emissions:

>>

Table E.1.1. Project emissions from period 2008-2012

Item	Index	2008	2009	2010	2011	2012
Kyzyl-Mazhalyk	tCO2	4 070	9 214	9 214	7 979	6 504
Chadan	tCO2	16 133	33 790	30 673	27 973	24 850
Kaa-Khem	tCO2	5 684	9 429	9 782	9 782	9 782
Sukpak	tCO2	25 500	48 921	38 323	38 323	38 323
Tselinnoye	tCO2	5 675	12 850	12 850	12 850	12 850
Turan	tCO2	5 675	12 850	12 850	12 850	12 850
Bai-Khaak	tCO2	14 599	29 009	24 207	24 207	24 207
Chaa-Khol	tCO2	15 209	31 769	28 722	28 722	28 722
Ak-Dovurak	tCO2	23 331	48 969	41 320	37 602	37 602
Shagonar	tCO2	32 193	69 401	62 248	58 530	58 530
Khovy-Aksy	tCO2	37 683	70 585	43 870	33 125	33 125
Kyzyl	tCO2	29 571	61 153	48 884	42 360	42 360
Khayyrakan	tCO2	8 839	19 373	17 221	15 461	15 461
All	tCO2	224 163	457 313	380 164	349 763	345 164

E.2. Estimated leakage:

>>

This option not used

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

>>

Without leakage sum does not change

E.4. Estimated baseline emissions:

>>

Table E.4.1. Baseline emissions from period 2008-2012

Item	Index	2008	2009	2010	2011	2012
Kyzyl-Mazhalyk	tCO2	17 141	38 810	38 810	38 648	38 648
Chadan	tCO2	65 233	147 083	147 698	147 083	147 698
Kaa-Khem	tCO2	32 589	73 478	73 786	73 786	73 786
Sukpak	tCO2	94 309	212 641	213 531	213 531	213 531
Tselinnoye	tCO2	24 895	56 365	56 365	56 365	56 365
Turan	tCO2	72 051	162 455	163 135	163 135	163 135
Bai-Khaak	tCO2	53 735	121 158	121 665	121 665	121 665
Chaa-Khol	tCO2	38 405	86 592	86 592	86 954	86 954
Ak-Dovurak	tCO2	66 398	149 708	149 708	150 335	150 335
Shagonar	tCO2	61 457	138 569	138 569	139 149	139 149
Khovy-Aksy	tCO2	90 477	203 999	203 999	204 853	204 853
Kyzyl	tCO2	40 210	90 662	90 662	91 041	91 041

Khayyrakan	tCO2	18 968	42 768	42 768	42 947	42 947
All	tCO2	675 868	1 524 288	1 527 288	1 529 491	1 530 106

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

>>

Emission reductions resulting from the project are calculated using the formula D1 in section D.1.2.2
Numeric values are given in section E.6

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

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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 CO2 equivalent)
2008	224 163	-	675 868	430 253
2009	457 313	-	1 524 288	1 021 626
2010	380 164	-	1 527 288	1 105 759
2011	349 763	-	1 529 491	1 138 464
2012	345 164	-	1 530 106	1 143 840
Total (tonnes of CO_2 equivalent)	1 756 568	-	6 787 042	4 839 942

SECTION F. Environmental impacts

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

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In accordance with the Resolution of the State Committee on Ecology and Natural Resources of Russian Federation from 15.04.2000 № 372 «On approval of regulations to implement the planned economic and other activities and their impact on the environment» developers should include environmental impact assessment in project documentation.
The reconstruction of the existing heating pipelines not require specialized design documentation, which may be subject to environmental expertize.
LLC "GazTehStroy" is a company-investor, which transports of heat carrier from the boiler house to end users and does not apply to the retailing companies and therefore does not prepare reports on the effect on the environment as a result of the boundary of the project.

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:

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Project activity does not adversely impact on the environment, as directed on the savings of fossil fuels, then, respectively, in its implementation will be saving carbon-intensive fuels (coal) and, accordingly, will be less than the emissions from extraction, processing, distribution and transportation of fuel, that automatically reduces the harmful effects on the environment.

Project activity doesn't adversely impact on environment since it's directed on coal consumption (burning) reduction. It leads to significant carbon dioxide emission reductions in the amount of 4 839 942 tCO2 eq in a period of 2008 – 2012.

SECTION G. Stakeholders' comments

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

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The project has not been any stakeholders' comments.

The project activity improves the ecological environment, since it reduces the implementation of pollution by harmful substances in connection with the burning of coal and soot emissions.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Organisation:	GasTekhStroy LLC
Street/P.O.Box:	Komsomolskiy st
Building:	118-345
City:	Barnaul
State/Region:	Altay krai
Postal code:	656038
Country:	Russian Federation
Phone:	8(385)-2-56-34-97
Fax:	8(385)-2-56-34-97
E-mail:	ant.zemtsova@mail.ru
URL:	-
Represented by:	-
Title:	General director
Salutation:	Mr
Last name:	Butakov
Middle name:	Urevich
First name:	Mikhail
Department:	-
Phone (direct):	8(385)-2-56-34-97
Fax (direct):	8(385)-2-56-34-97
Mobile:	8-905-083-7654; 8-913-279-0011;
Personal e-mail:	ant.zemtsova@mail.ru

Annex 2

BASELINE INFORMATION

Data/Parameter	$HC_{i,y,BL}$
Data unit	m3/hour
Description	Heat carrier consumption by object i, connected to the heating main, in year y under the baseline;
Time of determination/monitoring	Once at the stage of determination
Source of data (to be) used	Plant data, obtained from measuring complex
Value of data applied (for ex ante calculations/determinations)	Kyzyl - Mazhalyk: 273; Chadan: 847; Kaa-khemskiy: 436; Sukpak: 1109; Tselinnoye: 385; Turan: 975; Bai-Khaak: 703; Chaa-Khol: 370; Ak-Dovurak: 750; Shagonar: 720; Khovy-Aksy: 940; Kyzyl: 720; Shagonar Teplo: 250.
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Data were collected for the previous 3 years and is calculated the average value.
QA/QC procedures (to be) applied	Periodic calibrations and checks of measuring complex.
Any comment	-

Data/Parameter	$t_{i,y,BL}$
Data unit	^0C
Description	Temperature difference twixt outlet and input water of object *i* in year *y*, under the baseline
Time of determination/monitoring	Continuous monitoring performed by the plant on the stage before the Project.
Source of data (to be) used	Historical data of the plant based on measurements of measuring complex
Value of data applied (for ex ante calculations/determinations)	Kyzyl-Mazhalyk: 35; Chadan: 40; Kaa-Khemskiy: 40; Sukpak: 45; Tselinnoye: 35; Turan: 40; Bai-Khaak: 40; Chaa-Khol: 40; Ak-Dovurak: 45; Shagonar: 45; Khovy-Aksy: 50; Kyzyl: 40; Shagonar Teplo: 40.
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Monitoring of the parameter is an integral part of monitoring system on the boiler house and is performed in accordance with internal procedures.
QA/QC procedures (to be) applied	Periodic calibrations and checks of measuring complex.
Any comment	-

Data/Parameter	$d_{i,y,n}$
Data unit	Days
Description	Number of days of heating period from object i, in year y

Time of determination/monitoring	Once at the stage of determination
Source of data (to be) used	Reporting data of the plant
Value of data applied (for ex ante calculations/determinations)	First half: 133 days; Second half: 106 days.
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Determined based on plant data.
QA/QC procedures (to be) applied	Based on actual data.
Any comment	-

Data/Parameter	sfc_i
Data unit	tonnes of fuel eq./Gcal
Description	specific fuel consumption on the object i
Time of determination/monitoring	Once at the stage of determination
Source of data (to be) used	Plant data
Value of data applied (for ex ante calculations/determinations)	Kyzyl-Mazhalyk: 0.256; Chadan: 0.273; Kaa-Khemskiy: 0.265; Sukpak: 0.268; Tselinnoye: 0.262; Turan: 0.262; Bai-Khaak: 0.271; Chaa-Khol: 0.368; Ak-Dovurak: 0.279; Shagonar: 0.269; Khovy-Aksy: 0.273; Kyzyl: 0.198; Shagonar Teplo: 0.269.
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Value of the parameter is provided by municipal boiler house in the form of reporting.
QA/QC procedures (to be) applied	Official data that are provided by municipal boiler houses to the Ministry of economy and energy of Tuva Republic will be used. This is an official reporting in Tuva.
Any comment	-

Data/Parameter	EF_{coal}
Data unit	tCO2/TJ
Description	Coal emission factor
Time of determination/monitoring	Once at the stage of determination
Source of data (to be) used	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Chapter 2, Table 2.2.
Value of data applied (for ex ante calculations/determinations)	94.6
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Reference value
QA/QC procedures (to be) applied	Determined based on reference data
Any comment	-

Data/Parameter	1/1000
Data unit	Gcal/tonn^{0}C
Description	Conversion factor that represents specific heat capacity of water
Time of determination/monitoring	Once on determination stage
Source of data (to be) used	http://www.global-cis.ru/page/teplo1_theory.html
Value of data applied (for ex ante calculations/determinations)	1/1000
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Reference value
QA/QC procedures (to be) applied	Determined based on reference data
Any comment	Determined based on water specific heat and its heating by 1^{0}C.

Annex 3

MONITORING PLAN

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