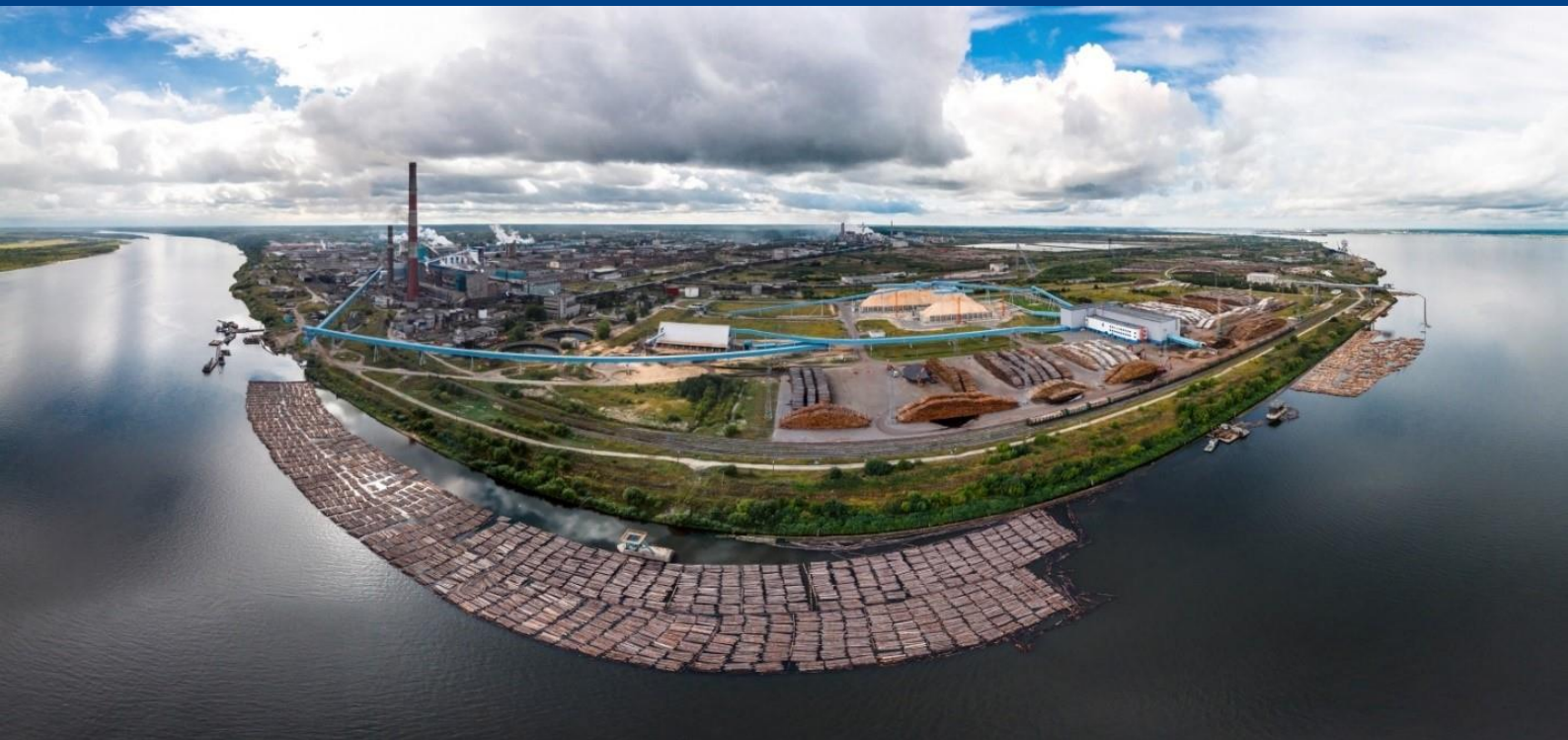


JSC Arkhangelsk PPM

GREENHOUSE GAS EMISSIONS REPORT 2019



**IN COMPLIANCE WITH THE GREENHOUSE GAS PROTOCOL: A CORPORATE
ACCOUNTING AND REPORTING STANDARD**

ARKHANGELSK, 2020

APPROVED

First Deputy General Director -
Chief Operating Officer
JSC Arkhangelsk PPM



N.M. Kostogorov

2020

L.S.

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ARKHANGELSK, 2020

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INTRODUCTION

This report has been produced by CCGS LLC for and in close cooperation with JSC Arkhangelsk PPM and is a follow-up to a corporate greenhouse gas (GHG) management system development at JSC Arkhangelsk PPM, which has been ongoing since 2000.

The purpose of this report is to make a registry of JSC Arkhangelsk PPM's GHG emissions that occurred over the period from January 1, 2019, to December 31, 2019, in compliance with the requirements of the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard.

In 2000 JSC Arkhangelsk PPM launched the Biomass to Energy Joint Implementation Project at JSC Arkhangelsk Pulp and Paper Mill within the framework of Article 6 of the Kyoto Protocol. The project covered modernization (replacement) of two utilizing boilers and the fuel feed system at CHPP-3. Due to such upgrade it now became possible to burn more bark, wood waste and wastewater sludge, and to do it with higher efficiency. The GHG emissions reduction achieved due to this project were successfully validated, verified and sold in the international market as carbon units.

In 2003 JSC Arkhangelsk PPM with the assistance of ANO Environmental Investment Center took the first inventory of its GHG emissions for the years from 1990 to 2002. The results of this inventory were verified and approved by Environmental Resources Trust.

In 2003 Director General of JSC Arkhangelsk PPM, Mr. Vladimir Beloglazov, delivered a speech at the 9th Conference of the Parties to the UN Framework Convention on Climate Change in Milan, Italy, announcing JSC Arkhangelsk PPM's voluntary commitment for the period ending on December 31, 2012, to cap its GHG emissions at 2.6 Mt CO₂e per year with the projected pulp production of 1 Mt per year.

In 2004 ANO Environmental Investment Center on assignment coming from JSC Arkhangelsk PPM developed the fundamental concepts of the Climate Strategy for JSC Arkhangelsk PPM for the period towards 2012.

From 2003 onwards, JSC Arkhangelsk PPM has taken inventories of its GHG emissions occurring within the boundary of its Novodvinsk industrial site and from 2012 within the boundary of the whole organization including its daughter companies on a yearly basis. The GHG emission data are disclosed to the Mill's buyers and other interested parties on request.

In 2013 the Climate Strategy for the period towards 2020 was approved. In accordance with this strategy the company assumed a voluntary obligation to limit its GHG emissions at 2.2 Mt CO₂e per year with an increase in pulp cooking up to 1 Mt per year. Emissions per 1 tonne of pulp, therefore, should not exceed 2.2 tonnes of CO₂e.

Since 2013 GHG emissions reports of JSC Arkhangelsk PPM have been annually verified by an independent auditing company, which has an appropriate license for this. By the results of each verification the organization receives expert conclusion which certifies that the corporate GHG emissions management system and the quantification of GHG emissions meet the requirements of international carbon standards.

Since 2014, the company has been annually disclosing information on its climate activities in the framework of the CDP reporting system (The Carbon Disclosure Project - an international project for the disclosure of data on greenhouse gas emissions).

Since 2016 JSC Arkhangelsk PPM together with CCGS LLC has annually calculated the carbon footprint of its end products and services according to standard GOST R 56276-2014/ISO/TS 14067:2013, Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification and communication.

In 2018 JSC Arkhangelsk PPM approved the strategy of low-carbon development for the period up to 2030. According to it the company undertakes voluntary obligation to reduce total direct (Scope 1) and energy indirect (Scope 2) GHG emissions by 55% by 2030 compared to 1990 – up to 1.4 Mt CO₂e per year. It is necessary to reduce other indirect emissions (Scope 3) under the strategy by 20% by 2030 compared to 2015 up to 370 000 tCO₂e per year.

In 2019, as part of its low-carbon development strategy for the period up to 2030, Arkhangelsk PPM sent an official statement to SBTi of its intention to establish a scientifically based GHG emission reduction target that would meet the goals and objectives of the Paris Agreement in terms of mitigating climate change.

1. COMPANY PROFILE

1.1. General information about JSC Arkhangelsk PPM

Arkhangelsk Pulp and Paper Mill (APPM) was founded in 1940 and until 1992 used to be a state-owned industrial enterprise with all its industrial facilities based in Novodvinsk, Arkhangelsk Region. In 1992 the Mill was restructured into a joint stock company, Arkhangelsk Pulp and Paper Mill (JSC Arkhangelsk PPM), which later on was privatized. In JSC Arkhangelsk PPM's major shareholder is Austrian-German Group [Pulp Mill Holding GmbH](#) (based in Vienne, Austria) which owns 100% of shares of JSC Arkhangelsk PPM. Pulp Mill Holding produces pulp, cardboard and packaging in Russia and Ukraine.

JSC Arkhangelsk PPM has a fully operational integrated management system which incorporates:

- Quality management system according to ISO 9001:2015;
- Environment management system according to ISO 14001:2005;
- Occupational health and safety management system according to OHSAS 18001:2007.

Legal and mailing address of JSC Arkhangelsk PPM: 1, Melnikov Street, Novodvinsk, Arkhangelsk Region, 164900, Russia.

Web-site: www.appm.ru

1.2. Organizational structure

Apart from the pulp and paper mill in Novodvinsk, Arkhangelsk Region (hereinafter JSC Arkhangelsk PPM (Novodvinsk), JSC Arkhangelsk PPM has four daughter companies located in different areas of Russia (See Fig.1, 2):

- Arkhbum LLC (Novodvinsk);
- JSC Arkhbum (including three production branches in Podolsk, in Istra District of Moscow Region and in Voronezh Region);
- JSC Byt (Novodvinsk);
- Arkhbum Tissue Group LLC (Kaluga Region).

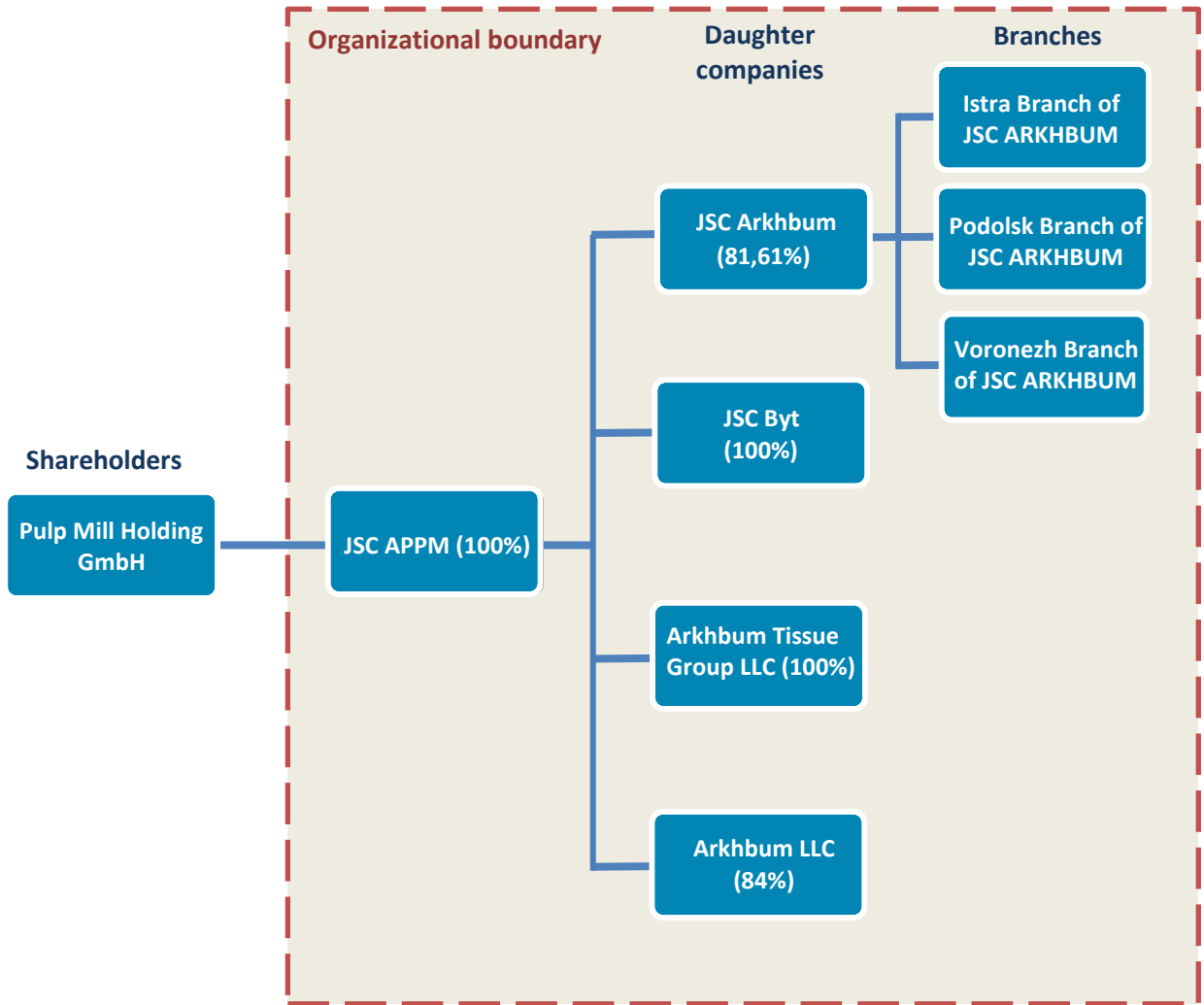


Fig.1. Shareholders and daughter companies of JSC Arkhangel'sk PPM



Fig.2. JSC Arkhangel'sk PPM on the map of Russia

2. OUTLINING THE BOUNDARIES FOR THE GHG REGISTRY

2.1. Organizational boundaries

In accordance with GHG Protocol and considering the operational specifics of JSC Arkhangelsk PPM and its affiliated companies, it was decided to establish the organizational boundaries and to consolidate the GHG emissions following the **control approach**, which implies that the organization accounts for all quantified GHG emissions from its industrial facilities over which it has financial or operational control.

So, JSC Arkhangelsk PPM's boundaries for registering GHGs shall comprise all organizations and units mentioned in Section 1.2.

2.2. Operational boundaries

According to the GHG Protocol, defining operational boundaries involves identifying the GHG emissions associated with an organization's activities and dividing them into the following categories (sources):

- Direct GHG emissions (**Scope 1**);
- Energy indirect GHG emissions (**Scope 2**);
- Other indirect GHG emissions (**Scope 3**).

Direct GHG emissions (Scope 1) from JSC Arkhangelsk PPM include:

- Emissions of carbon dioxide (CO₂), methane (CH₄) and nitrogen oxide (N₂O) from stationary fuel combustion;
- Emissions of carbon dioxide (CO₂), methane (CH₄) and nitrogen oxide (N₂O) from mobile fuel combustion;
- Methane leakage (CH₄) from waste handling.

According to GHG Protocol (Chapter 9) carbon dioxide emissions from biomass combustion are accounted for separately and are not included in the total amount of GHG emissions.

Refrigerant emissions resulted from leakages from conditioners are insignificant and therefore are not considered.

Table 1 below shows direct emission sources of all industrial facilities included in the organizational boundaries with a breakdown by categories.

Table 1. Direct GHG emission sources in 2019

Industrial facility	Categories of GHG emission sources													
	Stationary fuel combustion								Mobile fuel combustion			Production processes (use of carbonates)		Methane leakage (waste handling)
	Fossil fuel					Biomass			Gasoline	Diesel fuel	Liquefied/compressed gas	CaCO ₃	Na ₂ CO ₃	
	Natural gas	Liquefied gas	Coal	Heavy fuel oil	Diesel fuel	Bark and wood waste	Liquor	Wastewater sludge						
JSC Arkhangelsk PPM (Novodvinsk)	-	✓	✓	✓	-	✓	✓	✓						
JSC Byt	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-
Arkbum Tissue Group LLC	✓	-	-	-	✓	-	-	-	✓	✓	✓	-	-	-
Arkbum LLC (Novodvinsk)	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Podolsk Branch of JSC Arkbum	✓	-	-	-	-	-	-	-	✓	✓	✓	-	-	-
Istra Branch of JSC Arkbum	✓	-	-	-	✓	-	-	-	✓	✓	✓	-	-	-
Voronezh Branch of JSC Arkbum	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	-

Energy indirect emissions (Scope 2) are typical for most industrial facilities and are related to generation of electric energy, received (imported) from the outside suppliers for own needs of organization (See Table 2).

Table 2. Consumers and suppliers of imported energy

Energy consumer	Energy supplier	Comments
JSC Arkhangelsk PPM (Novodvinsk)	Supplier of electric energy: - PJSC IDGC of the North-West; - LLC TGK-2 Energosbyt	Electricity demand of JSC Arkhangelsk PPM (Novodvinsk) is almost completely covered by in-house generation, and only a small amount of electricity is purchased from a grid company. The Mill's heat demand is entirely met by its own CHPPs 1, 2, 3. No heat is delivered from an outside supplier.
JSC Byt	Supplier of electric energy: - LLC TGK-2 Energosbyt	Electricity demand of JSC Byt is covered only from the power grid. All its heat demand is supplied by Arkhangelsk PPM.
Arkhum Tissue Group LLC	Supplier of electric energy: PJSC Kaluga Sales Company	Electricity demand of Arkhum Tissue Group LLC is covered from the power grid. Heat demand is completely met by the own boiler house.
Arkhum LLC (Novodvinsk)	Supplier of electric energy: - LLC TGK-2 Energosbyt	Electricity demand of Arkhum LLC (Novodvinsk) is covered from the power grid. All its heat demand is supplied by Arkhangelsk PPM.
Podolsk Branch of JSC Arkhum	Supplier of electric energy: PJSC Mosenergosbyt	Electricity demand of Podolsk Branch of JSC Arkhum is covered from the power grid. Heat demand is completely met by the own boiler house.
Istra Branch of JSC Arkhum	Suppliers of electric energy: - PJSC Mosenergosbyt; - Municipal enterprise Joint Istra electric networks.	Electricity demand of Istra Branch of JSC Arkhum is covered only from the power grid. Heat demand is completely met by the own boiler house.
Voronezh Branch of JSC Arkhum	Supplier of electric energy: JSC AtomSbyt	Electricity demand of Voronezh Branch of JSC Arkhum is covered only from the power grid. Heat demand is completely met by the own boiler house.

Other indirect GHG emissions (Scope 3) emissions are characteristic for all industrial units (facilities) of JSC Arkhangelsk PPM including daughter companies and their branches.

In this report only the most significant GHG emissions up the supply chain related to production and transportation of outside resources (raw materials, fuel, chemicals) used in production to the enterprise's gate in the Novodvinsk were taken into consideration for estimation of other indirect emissions (see Table 3). This approach conforms with GHG Protocol standard according to which other indirect GHG emissions are not obligatory for calculation.

Table 3. GHG sources considered in category "Other indirect GHG emissions" (Scope 3)

Name of the resource delivered to Arkhangelsk PPM (Novodvinsk)	GHG sources	
	Resource production	Resource transportation
Raw material		
Broadleaf pulpwood	✓	✓
Coniferous pulpwood	✓	✓
Purchased broadleaf chips	✓	✓
Purchased coniferous chips	✓	✓
Fuel		
Diesel fuel	✓	✓
Heavy fuel oil	✓	✓
Vorkuta coal	✓	✓
Khakass coal	✓	✓
Kuznetsk coal	✓	✓
Chemicals		
Ammonia water	✓	✓
Quicklime	✓	✓
Sulphuric acid	✓	✓
Sulphur dioxide	✓	✓
Caustic soda	✓	✓
Sodium sulfite	✓	✓
Chlorine	✓	✓
Sodium chlorate	✓	✓

3. BASE YEAR

The year 1990 was selected as the base year for the following reasons:

- The RF Presidential Decree No.752 of September 30, 2013, commissions to the Government of the Russian Federation to ensure that GHG emissions are reduced down to 75% of 1990 levels by the year 2020;
- The year 1990 is also the base year for Russia according to the Kyoto Protocol¹;
- Necessary input data for 1990 and the following years are available and can be used to identify sources and estimate GHG emissions;
- It is the year when pulp production volumes hit their historical maximum, which APPM is currently aiming to go back to.

¹ Russia did not make any quantitative commitments to limit and reduce its GHG emissions during the second Kyoto period (2013-2020), but neither did it bail out of the Kyoto Protocol, and it still remains its full participant.

4. GHG EMISSIONS QUANTIFICATION METHOD

Following the recommendations of the Intergovernmental Panel on Climate Change² in most cases GHG emissions were estimated using a calculation method that operates with the following formula:

$$E = A \times EF$$

Where E – GHG emissions;

A – data on the company's activity, causes GHG emissions over the reporting period, for example, data related to fuel combustion;

EF – emission factor.

The *First Order Decay* method was used to calculate methane emissions from landfills. *FOD* takes into consideration the specifics of anaerobic decomposition of bio-organic waste over time. The calculations were based on approaches and methods suggested by the IPCC in 2006.³

For direct and energy indirect GHG emissions the emissions are calculated separately for each type of GHG (carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O)) in tonnes of CO₂e and finally are summed up.

Other indirect GHG emissions are calculated straight as an aggregate emission in tonnes of CO₂e without separation by GHG types.

² See 2006 IPCC Guidelines for National Greenhouse Gas Inventories. <http://www.ipcc-nggip.iges.or.jp/public/2006gl/>

³ See 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5, Chapter 3: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf

5. GHG REGISTRY OUTPUTS

According to the calculations the total direct and energy indirect GHG emissions (Scope 1+2) at JSC Arkhangelsk PPM in the reporting year 2019 was 1 845 785 tCO₂e, that is 1 257 636 tCO₂e lower than in the base year 1990 and 40 386 tCO₂e higher than this figure of the previous year 2018 (see Table 4).

The total direct and energy indirect GHG emissions from JSC Arkhangelsk PPM in 2019 were 16.1% below the company's voluntary emission limit of 2 200 000 tCO₂e per year set for the period up to 2020.⁴ It means that in 2019 the **company succeeded in performing its voluntary commitment**.

However, it should be noted that APPM's voluntary GHG emissions limit allowed for an increase in pulp cooking volumes, which was expected to reach up to 1 million tonnes per year by 2020. However, in reality only 815 570 tonnes of pulp were cooked in 2019, which is 18.4 % less than the planned volume.

In order to bring the projected and actual GHG emissions and pulp cooking volumes down to a common denominator it might be worthwhile to introduce one more parameter: GHG emissions per 1 tonne of cooked pulp.⁵ This is an integral indicator of the product's carbon intensity.

GHG emissions per unit of output that correspond to JSC Arkhangelsk PPM's voluntary commitment are $2\,200\,000/1\,000\,000=2.2$ tCO₂e/tonne of cooked pulp. Actual GHG emissions per unit of output amounted in 2019 to 2.263 tCO₂e/tonne of cooked pulp. So, the carbon intensity of JSC Arkhangelsk PPM's output in 2019 was 2.9% higher the level set by its voluntary commitment.

In the total direct and energy indirect GHG emissions the largest amount (calculated to tCO₂e) is accounted for carbon dioxide – 92.3%, 6.8% for methane and 0.9% for nitrous oxide (see Table 5).

Other indirect GHG emissions are equal 440 641 tCO₂e (see Table 6). Other indirect GHG emissions decreased by 34 348 tCO₂e or 7.2% as compared to the previous year 2018.

Total direct and indirect GHG emissions (Scope 1+2+3) at JSC Arkhangelsk PPM in 2019 were 2 286 426 tCO₂e, that is 6 038tCO₂e or 0.3% higher than the emissions level in 2018.

⁴ Voluntary GHG emissions limit of Arkhangelsk PPM for the period up to 2020 set by the company's climate strategy is related to the sum of direct and energy indirect GHG emissions.

⁵ Only direct and energy indirect emissions are taken into account for calculation of specific GHG emissions.

Table 4. Summary table of GHG emissions, tCO₂e

Emission Categories	1990	2018	2019								Compared to 1990		Compared to 2018	
	APPM	JSC APPM	JSC APPM Novodvinsk	JSC Byt	Arkbum Tissue Group LLC	JSC Arkbum Novodvinsk	Branches of JSC Arkbum			Total for JSC Arkhangelsk PPM	tCO ₂ e	%	tCO ₂ e	%
							Podolsk	Istra	Voronezh					
DIRECT GHG EMISSIONS (Scope 1)	3 008 936	1 793 286	1 810 635	25	1 937	826	4 637	6 088	3 085	1 827 233	-1 181 703	-39,3%	33 947	1,9%
Stationary fuel combustion	2 909 045	1 650 051	1 669 670	–	1 887	–	4 224	5 629	3 064	1 684 474	-1 224 571	-42,1%	34 423	2,1%
Mobile fuel combustion	15 187	17 621	20 170	25	50	826	413	459	21	21 964	6 777	44,6%	4 343	24,6%
Industrial processes (use of carbonates)	30 383	0	0	–	–	–	–	–	–	0	-30 383	-100,0%	0	–
Leakage (waste management)	54 321	125 614	120 795	–	–	–	–	–	–	120 795	66 474	122,4%	-4 819	-3,8%
ENERGY INDIRECT GHG EMISSIONS (Scope 2)	94 485	12 113	2 812	389	2 453	50	3 774	6 216	2 858	18 552	-75 933	-80,4%	6 439	53,2%
TOTAL DIRECT AND INDIRECT GHG EMISSIONS (Scope 1+2)	3 103 421	1 805 399	1 813 447	414	4 390	876	8 411	12 304	5 943	1 845 785	-1 257 636	-40,5%	40 386	2,2%
OTHER INDIRECT GHG EMISSIONS (Scope 3)	NE	474 989	440 641	NE	NE	NE	NE	NE	NE	440 641	–	–	-34 348	-7,2%
TOTAL DIRECT AND INDIRECT GHG EMISSIONS (Scope 1+2+3)	NE	2 280 388	2 254 088	NE	NE	NE	NE	NE	NE	2 286 426	–	–	6 038	0,3%
Emissions with sold energy	528 105	135 041	118 288	–	–	–	–	–	–	118 288	-409 817	-77,6%	-16 753	-12,4%
CO ₂ emissions from biomass combustion	1 274 993	1 533 082	1 388 709	–	–	–	–	–	–	1 388 709	113 716	8,9%	-144 373	-9,4%

* NE – not estimated

Table 5. Distribution of direct and energy indirect emissions by GHG types

Emission Categories	GHG emissions in 2019										
	Metric tonnes			tCO ₂ e							
	t CO ₂	t CH ₄	t N ₂ O	CO ₂		CH ₄		N ₂ O		Total	
				tCO ₂ e	%	tCO ₂ e	%	tCO ₂ e	%	tCO ₂ e	%
DIRECT GHG EMISSIONS (Scope 1)	1 684 301	5 003	60	1 684 301	92,2%	125 083	6,8%	17 849	1,0%	1 827 233	100,0%
Stationary fuel combustion	1 662 720	169	59	1 662 720	98,7%	4 231	0,3%	17 523	1,0%	1 684 474	100,0%
Mobile fuel combustion	21 581	2	1	21 581	98,3%	57	0,3%	326	1,4%	21 964	100,0%
Industrial processes (use of carbonates)	0	–	–	0	0,0%	–	–	–	–	0	0,0%
Leakage (waste management)	0	4 832	–	–	–	120 795	100,0%	–	–	120 795	100,0%
ENERGY INDIRECT GHG EMISSIONS (Scope 2)	18 552	–	–	18 552	100,0%	–	–	–	–	18 552	100,0%
TOTAL DIRECT AND ENERGY INDIRECT GHG Emissions (Scope 1+2)	1 702 853	5 003	60	1 702 853	92,3%	125 083	6,8%	17 849	0,9%	1 845 785	100,0%
Emissions with sold energy	117 737	1	2	117 737	99,53%	28	0,02%	523	0,45%	118 288	100,0%
CO ₂ emissions from biomass combustion	1 388 709	–	–	1 388 709	100,0%	–	–	–	–	1 388 709	100,0%

Table 6. Other indirect GHG emissions

Name of the delivered resource	Other indirect GHG emissions related to production and transportation of outside resources					
	2018		2019		Variation compared to 2018	
	t CO ₂ e	% (by Scope 3)	t CO ₂ e	% (by Scope 3)	t CO ₂ e	%
Broadleaf pulpwood	89 747	18,9%	72 977	16,6%	-16 770	-18,7%
Coniferous pulpwood	53 287	11,2%	37 052	8,4%	-16 236	-30,5%
Purchased broadleaf chips	2 458	0,5%	2 347	0,5%	-111	-4,5%
Purchased coniferous chips	23 200	4,9%	28 867	6,6%	5 667	24,4%
Raw materials, total	168 692	35,5%	141 244	32,1%	-27 449	-16,3%
Diesel fuel	2 968	0,6%	4 131	0,9%	1 163	39,2%
Heavy fuel oil	27 169	5,7%	25 394	5,8%	-1 775	-6,5%
Vorkuta coal	80 435	16,9%	74 486	16,9%	-5 949	-7,4%
Khakass coal	101 537	21,4%	102 850	23,3%	1 314	1,3%
Kusnetsk coal	–	–	924	0,2%	924	–
Fuel, total	212 109	44,7%	207 785	47,2%	-4 324	-2,0%
Ammonia water	2 967	0,6%	3 222	0,7%	255	8,6%
Quicklime	4 859	1,0%	4 553	1,0%	-306	-6,3%
Sulphuric acid	2 020	0,4%	1 910	0,4%	-110	-5,4%
Sulphur dioxide	2 590	0,5%	2 734	0,6%	143	5,5%
Caustic soda	24 049	5,1%	20 266	4,5%	-3 782	-15,7%
Sodium sulfate	2 898	0,6%	2 647	0,6%	-252	-8,7%
Chlorine	3 882	0,8%	3 055	0,7%	-827	-21,3%
Sodium chlorate	50 923	10,7%	53 228	12,1%	2 305	4,5%
Chemicals, total	94 188	19,8%	91 613	20,8%	-2 575	-2,7%
TOTAL	474 989	100,0%	440 641	100%	-34 348	-7,2%

The company's key performance indicators were analyzed in order to identify the reasons for changes in emissions in regard to the base and the previous year.

The analysis has shown that the key factors that contributed to reduction in total direct and energy indirect GHG emissions from JSC Arkhangelsk PPM in 2019 as against 1990 base year are as follows:

- **Larger proportion increase of biomass in the fuel mix which raised from 28.1% to 43.5%;**
- **reduction in energy intensity of production at JSC Arkhangelsk PPM in Novodvinsk (in terms of heat consumption – by 30.5%, and in terms of power consumption by 15.3%);**
- **11.5% decline in pulp cooking, from 921 500 tonnes down to 815 570 tonnes;**
- **reduction in electricity consumption from outside sources by 86.4%, from 232 721 MWh down to 31 709 MWh.**

The key factors that determined the increase in GHG emissions at JSC Arkhangelsk PPM in 2019 as compared to the previous year 2018 are as follows:

- **reduction in the volume of bark waste generation by 61,013 tons or 12.3% due to a decrease in the supply and processing of wood raw materials at the plant;**
- **a disproportionate decrease in total fuel consumption and cooking volumes at the plant (1.9% versus 6.3%, respectively);**
- **operational commissioning of the Voronezh branch of Arkhbum JSC and Arkhbum Tissue Group LLC.**

The most important contribution in the decline of indirect GHG emissions in 2019 compared to 2018 was made by the decrease of deliveries of broadleaf pulpwood (by 222 404 m³ of dense timber or by 11.5%) and coniferous pulpwood (by 262 506 m³ of dense timber or by 21.7 %) with reduction of emission factors "from source to gate" for a given wood raw material. The decrease in emission factors for pulpwood is due to a decrease in the average specific consumption of diesel fuel for harvesting 1 m³ of wood in the reporting year.

6. VERIFICATION RESULTS

Since 2013 GHG emissions reports of JSC Arkhangelsk PPM have been annually verified by an independent auditing company. In the process of verification, the corporate GHG emissions management system and the results of GHG emissions quantification are verified according to the requirements of international carbon standards.

Principal data on the organization's GHG emissions verification for the base year 1990 and 2012-2019 are shown in Table 7.

Table 1. Verification data on GHG emissions of JSC Arkangesk PPM

Reporting year	Name of the applied standard		Level of assurance	Auditing company
	GHG emissions estimation (report preparation)	Verification of the GHG emissions report		
1990 (base year)	ISO 14064-1:2006 GOST R ISO 14064-1-2007	ISO 14064-3:2006 GOST R ISO 14064-3-2007	Reasonable	Bureau Veritas Certification Rus
2012-2018	ISO 14064-1:2006 GOST R ISO 14064-1-2007	ISO 14064-3:2006 GOST R ISO 14064-3-2007	Reasonable	Bureau Veritas Certification Rus
2019	GHG Protocol	ISAE 3410	Limited	KPMG

Verification statement of KPMG confirming limited level of assurance of the data on GHG emissions of JSC Arkhangelsk PPM for 2019 is attached below in Annex 1.

7. IMPLEMENTATION OF GHG EMISSIONS REDUCTION PROJECTS

According to the adopted climate strategy for the period till 2020 JSC Arkhangel'sk PPM implements or plans to implement a number of GHG emissions reduction projects at the production site in Novodvinsk.

By the results of 2019 total GHG emissions reduction for 2019 from the implementation of carbon projects was 327,8 thousand tCO₂e (see Table 8).

Table 8. The implementation process of GHG emissions reduction projects

Project	Implementation status	GHG emissions reduction in 2019, tCO ₂ e
Biomass waste utilization		
Biomass-to-energy project at CHPP-3	Implemented in 2000-2005	176 041
Construction of new multifuel boiler in CHPP-1	Implemented in 2014	55 574
Construction of wastewater sludge dewatering unit Flottweg	Implemented in 2015	33 956
Utilization of undercooked pulp produced at cellulose production	Implemented in 2017	336
Energy saving		
Upgrade of cardboard-making machines	In the process of implementation	6 605
Upgrade of washing unit at cellulose production department	Implemented in 2014	47 189
Construction of evaporator plant	Implemented at the end of 2019	–
Lower carbonate consumption		
Construction of new sulfate semi-chemical pulp plant	Implemented in 2015	–
Replacement of crushed limestone used in the lime kilns-3,4 with quicklime	Implemented in 2017	8 141
Total GHG emissions reduction in 2019		327 842

ANNEX 1. VERIFICATION STATEMENT



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Independent Practitioner's Limited Assurance Report in relation to Information on Greenhouse Gas Emissions of JSC «Arkhangelsk Pulp & Paper Mill» for 2019

To the Management of JSC «Arkhangelsk Pulp & Paper Mill»

Introduction

We were engaged by the Management of JSC «Arkhangelsk Pulp & Paper Mill» (hereinafter – the "Management") to undertake a limited assurance engagement on the information on direct greenhouse gas emissions, indirect energy greenhouse gas emissions, other indirect greenhouse gas emissions, greenhouse gas emissions from sold energy and CO₂ greenhouse gas emissions from biomass combustion for 2019 (hereinafter – the "information on GHG emissions") in the Greenhouse Gas Emissions Report of JSC Arkhangelsk PPM for 2019 (hereinafter – the "Report") with a conclusion providing limited assurance that nothing has come to our attention that causes us to believe that the Management's Statement that the information on GHG emissions is prepared, in all material respects, in accordance with the applicable criteria (set out below in "Applicable Criteria" section of this report) and is free from material misstatement, is not fairly stated.

The information on GHG emissions of the Company is presented in the attached Report in Table 4 « Summary table of GHG emissions, t CO₂e». Our conclusion does not extend to any other information provided in the Report.

Management's Responsibility

Management is responsible for the preparation of the information on GHG emissions in accordance with the applicable criteria (set out below in section "Applicable Criteria" section of this report) and for all information contained therein.

This responsibility includes designing, implementing and maintaining the system of internal control relevant to the preparation of the information on GHG emissions that is free from material misstatement, whether due to fraud or error. This responsibility also includes: selecting the applicable criteria; selecting and applying relevant GHG quantification methodologies and GHG reporting policies; preventing and detecting fraud; identifying of and complying with laws and regulations applicable to JSC «Arkhangelsk Pulp & Paper Mill»; making judgements and estimates that are reasonable in the circumstances; maintaining adequate records in relation to the information on GHG emissions.

Examined entity: JSC «Arkhangelsk Pulp & Paper Mill»

Entered in the United State Register of Legal Entities, IO39965-35-29903626

Moscow, Russia

Audit firm (Practitioner): JSC "KPMG", a company incorporated under the Laws of the Russian Federation and a member firm of the KPMG global organization of independent member firms affiliated with KPMG International Limited, a private English company limited by guarantee.

Registration in Register of Legal Entities № 1027700125626.

Member of the Self-regulatory Organization of Auditors Association "Sodruzhestvo" (SRO AAS). The Principal Registration Number of the Entry in the Register of Auditors and Audit Organizations: No. 12006020351.



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Our Responsibilities

Our responsibility is to express a conclusion on the Management's Statement on the information on GHG emissions based on procedures performed and evidence obtained. We conducted our limited assurance engagement in accordance with International Standard on Assurance Engagements 3410 *Assurance Engagements on Greenhouse Gas Statements*, issued by the International Auditing and Assurance Standards Board. That Standard requires that we plan and perform our procedures to obtain a meaningful level of assurance about whether the Management's Statement that the information on GHG emissions has been prepared, in all material respects, in accordance with the applicable criteria (set out in the "Applicable Criteria" section of this report) and is free from material misstatement, is fairly stated.

Our Independence and Quality Control

We have complied with the independence and ethical requirements established by the *Rules on Independence of Auditors and Audit Firms* and the *Code of Professional Ethics for Auditors* approved by the Audit Council of the Ministry of Finance of the Russian Federation and by the *International Code of Ethics for Professional Accountants (including International Independence Standards)* issued by the International Ethics Standards Board for Accountants, which are based on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

We apply the International Standard on Quality Control 1 and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Procedures Performed

A limited assurance engagement undertaken in accordance with ISAE 3410 involves assessing the suitability, in the circumstances of JSC «Arkhangelsk Pulp & Paper Mill», of the applicable criteria (set out below in the "Applicable Criteria" section of this report) as a basis for the preparation of the information on GHG emissions, assessing the risks of material misstatement of the information on GHG emissions whether due to fraud or error, responding to the assessed risks as required in the specific circumstances of the engagement, and evaluating the overall presentation of the information on GHG emissions. The nature, timing and extent of the procedures selected is a matter of our professional judgment, including the assessment of the risk of material misstatement in the preparation of the information on GHG emissions, whether due to fraud or error, our understanding of the activities of JSC «Arkhangelsk Pulp & Paper Mill», as well as other circumstances of the engagement.

In making this risk assessment, we considered the internal control relevant to the preparation of the information on GHG emissions, in order to design procedures that are appropriate in the circumstances, but not for the purposes of expressing a conclusion as to the effectiveness of the internal control.

Our engagement also included: assessing the appropriateness of the particular GHG emissions included in the information on GHG emissions; the suitability of the applicable criteria (set out below in the "Applicable Criteria" section of this report) used in preparing the information on GHG emissions in the circumstances of the engagement; evaluating the appropriateness of the GHG quantification methods, policies and procedures used in the preparation of the information on GHG emissions and the reasonableness of estimates made by Management.



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The procedures we performed were based on our professional judgment and included inquiries, observation of processes, inspection of documents, analytical procedures, assessment of the appropriateness of the GHG quantification methods, as well as reconciliation of information and data with the respective underlying records.

The procedures we developed based on the risk assessment included, but were not limited to, the following:

- Assessment of compliance of the information on GHG with applicable criteria (set out in the "Applicable criteria" section of this report);
- Assessment of the reasonableness and suitability of key assumptions;
- Inquiries to obtain an understanding of conditions of the operations impacting the information on GHG emissions;
- Interviewing responsible employees of JSC «Arkhangelsk Pulp & Paper Mill» regarding internal procedures regulating the collection of data used in the preparation of the information on GHG emissions;
- Inquiries regarding and analysis of information to assess the completeness of the emission sources, data collection methods, assessment of input data and assumptions relevant in the circumstances of the engagement;
- Corroboration of the data used in the preparation of the information on GHG emissions with data from other sources, to assess completeness, accuracy and consistency of such data;
- Recalculation of quantitative data and inspection of underlying documentation.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed.

Accordingly, we do not express a reasonable assurance opinion about whether the information on GHG emissions is prepared, in all material respects, in accordance with the applicable criteria (set out below in the "Applicable Criteria" section of this report).

Applicable Criteria

Applicable criteria comprise relevant requirements, contained in the following documents:

- The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard. Revised Edition ¹;
- The Greenhouse Gas Protocol: Corporate Value Chain (Scope 3) Accounting and Reporting Standard ²;
- Guidelines for National Greenhouse Gas Inventories IPCC, 2006 r. ³;
- Methodological Guidance on the Quantification of Greenhouse Gas Emissions by Entities Engaging in Business and Other Activities in the Russian Federation

¹ <https://ghgprotocol.org/corporate-standard>

² <https://ghgprotocol.org/standards/scope-3-standard>

³ <https://www.ipcc-nggip.iges.or.jp/public/2006gl/>



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(approved by Order No. 300 of the Ministry of Natural Resources and the Environment of Russia dated 30 June 2015) ⁴;

- Methodological Guidance on the Quantification of Energy Indirect Greenhouse Gas Emissions (approved by Order No. 330 of the Ministry of Natural Resources and the Environment of Russia dated 29 June 2017) ⁵.

Management's Statement

Management states that the following information on GHG emissions presented of the Company is presented in the attached Report in the Table 4 «Summary table of GHG emissions, t CO₂e ».

Direct greenhouse gas emissions (Scope 1)	1 827 233 t CO₂e
Energy indirect greenhouse gas emissions (Scope 2)	18 552 t CO₂e
Other indirect energy greenhouse gas emissions (Scope 3)	440 641 t CO₂e
Total direct and indirect greenhouse gas emissions (Scope1+Scope2+Scope3)	2 286 426 t CO₂e
Emissions with sold energy	118 288 t CO₂e
CO ₂ emissions from biomass combustion	1 388 709 t CO₂e

was prepared, in all material respects, in accordance with the applicable criteria (set out in section "Applicable Criteria" of this report) and is free from material misstatement.

Inherent Limitations

GHG quantification is subject to inherent uncertainty because of the incomplete scientific knowledge used to determine emission factors and the values needed to combine emissions of different gases.

Conclusion

Our conclusion has been formed on the basis of, and is subject to, the matters outlined in this report. We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

Based on the procedures that we have performed and the evidence that we have obtained, nothing has come to our attention that causes us to believe that the Management's Statement that the information on GHG emissions has been prepared, in all material respects, in accordance with the applicable criteria (set out in the "Applicable Criteria" section of this report) and is free from material misstatement, is not fairly stated.

⁴ <http://docs.cntd.ru/document/420287801>

⁵ <http://docs.cntd.ru/document/436079014>



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Restriction of Use of Our Report

Our report has been prepared for the Management solely for the purposes of providing the information on GHG emissions by JSC «Arkhangelsk Pulp & Paper Mill» in the Report and is not intended to be used for any other purposes or in any other context.



Misiura Egor Ivanovich
Director JSC "KPMG"
JSC "KPMG"
Moscow, Russia

14 December, 2020