ignitis group

Greenhouse gas inventory report

2021

Contents

Introduction

An international energy company Ignitis Group (hereinafter – the Group) is one of the largest energy groups in the Baltic region. The Group companies generate, distribute and supply energy as well as develop new Green Generation capacities and Energy Smart solutions.

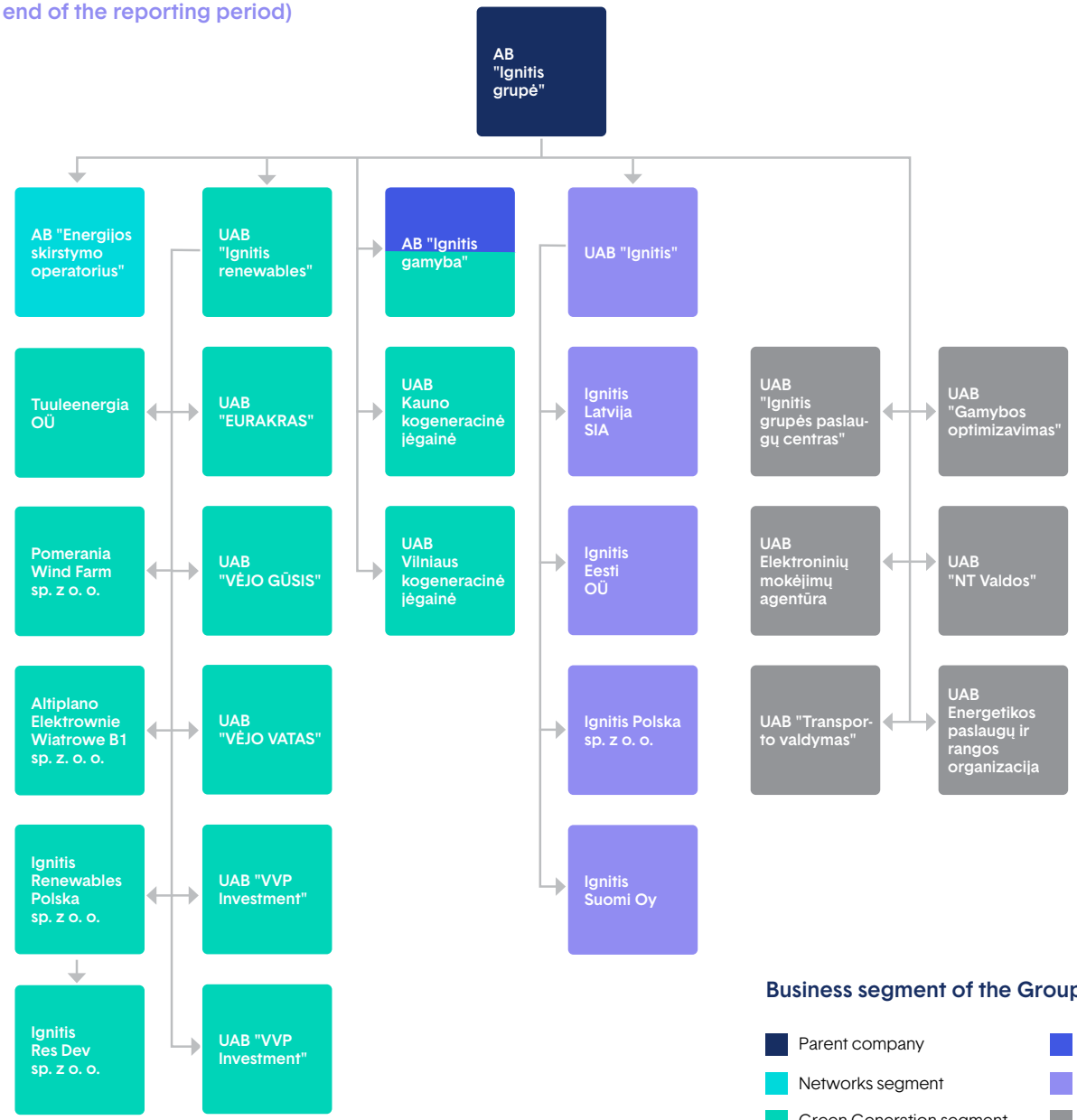
Activities of the Group

The Group is a leading utility and renewable energy company in the Baltic region. Its core business is focused on operating electricity and gas distribution networks and managing and developing its Green Generation portfolio. The Group also manages strategically important Flexible Generation assets and provides Customers & Solutions services, including the supply of electricity and gas, solar, e-mobility, energy efficiency, and innovative energy solutions for households and businesses. The Group operates in its home market (Lithuania, Latvia, Estonia, Poland and Finland). We also explore new opportunities in countries on the energy transition path.

Ignitis Group has fully endorsed the global commitment to avoid the worst effects of climate change by limiting the warming of the average Earth's surface temperature to 1.5 °C compared to pre-industrial levels. To achieve this, greenhouse gas (GHG) emissions must drop to net-zero by 2050. In 2021 the Science Based Targets Initiative (SBTi) approved the ambitious GHG reduction targets of the Group. We are the first Lithuanian capital organisation and one of roughly a thousand organisations worldwide which have their GHG reduction targets approved by this initiative, which is a collaboration between the largest global organisations fighting climate change. After assessing the targets of the Group, the SBTi confirmed that they are in line with the latest science-based recommendations on actions which should keep global warming below 1.5 °C compared to pre-industrial levels. According to scientists, this threshold should not be crossed in order to avoid catastrophic natural disasters, adversely affecting the health and wealth of the population.

The majority of the Group's investments are aimed at the reduction of GHG emissions. In the updated 2022–2025 Strategic Plan, the Group confirmed the investments of EUR 1.7–2.0 billion, mainly directed to Green Generation and Networks. With this, we aim to increase our Green Generation installed capacity to 2.0–2.2 GW by the end of 2025, from the current 1.2 GW, and to improve network reliability, enable digitalisation and expand the grid by connecting new customers.

The Group's corporate structure (at the end of the reporting period)



Detailed information about the activities of the Group is provided in the 2021 annual report. Emissions data provided in the annual report was not verified, thus, a detailed calculation of GHG emissions is provided in this report.

Networks

The core activities of the Networks segment are to operate, maintain, manage and develop electricity and gas distribution networks and to ensure safe and reliable operation as well as the electricity and gas supply of last resort. The Networks segment includes the activities carried out by Energijos skirstymo operatorius AB (ESO). ESO serves 1.6 million customers throughout Lithuania. The area serviced by the company in square kilometres is around 65,300. The company operates over 9,000 kilometres of natural gas distribution pipelines and more than 125,000 kilometres of overhead and underground power lines. The Networks segment investments in 2021 amounted to EUR 191.2 million and were EUR 50.1 million higher compared to 2020. 10-year investment plan was updated with investments planned for the period of 2021–2030, amounting to EUR 1.9 billion.

Green Generation

The main direction of the segment is generation of electricity and heat using sustainable energy sources, including wind, hydro, solar, biomass and waste-to-energy, while developing and operating new generation capacities . Strategically, our focus is on consistent expansion of capacity, development of new projects not only in Lithuania, but in the surrounding countries as well. Our current capacity includes 3 operating wind farms in Lithuania (58 MW), one in Poland (94 MW) and one in Estonia (18 MW). We also maintain significant hydropower capacity in Lithuania: Kruonis Pumped Storage Hydroelectric Plant (Kruonis PSHP) (900 MW) and Kaunas Hydroelectric Power Plant (Kaunas HPP) (101 MW). The Group operates two modern waste-to-energy cogeneration power plant in Vilnius (19 MWe, 60 MWth) and Kaunas (24 MWe, 70 MWth). Total installed capacity of the Green Generation segment is 1,214 MW. A large part, or around 50%, of investments will be directed towards the expansion of Green Generation capacity. We target to reach 2.0–2.2 GW of installed Green Generation capacity by 2025, and 4 GW – by 2030.

Flexible Generation

Flexible Generation segment operates the largest electricity generation facility in Lithuania, the Elektrėnai Complex, with a total gross installed capacity of 1,055 MW. The Elektrėnai Complex provides regulated system services (such as Tertiary Power Reserve Services and Isolated Regime Services) to ensure the flexibility and stability of Lithuania's electricity system. Flexible Generation segment includes activities carried out by Ignitis gamyba AB (except Kaunas HPP, Kruonis PSHP, Biofuel and Steam Boiler). Electricity generation (net) volume of Elektrėnai Complex was 0.82 TWh and decreased by 31.5% in 2021 compared to 2020. The decrease was mainly influenced by lower CCGT generation caused by market conditions (less favourable days for generation).

Customers & Solutions

Activities of Customers & Solutions segment include electricity and gas supply, trading and balancing, energy efficiency projects, construction of solar power plants for businesses and residents, installation and operation of electric vehicle charging stations, energy solutions (EV charging stations, heat pumps). The Customers & Solutions segment includes activities carried out by Ignitis UAB, Ignitis Eesti OÜ, Ignitis Latvija SIA, Ignitis Polska Sp. z o. o., Ignitis Suomi OY. Ignitis company already supplies electricity and natural gas to over 2 million clients while expanding its activities in the Baltic region. Total electricity sales in retail market in 2021 increased by 6.3% compared to 2020 and reached 6.77 TWh in total. The volume of natural gas sold in 2021 decreased by 21.4% and reached 11.55 TWh in total. The drop in B2B sales in Lithuania and Latvia was mainly the result of one-off natural gas transactions in 2020, which did not occur in 2021.

Other activities

- Support services (UAB "Ignitis grupės paslaugų centras")
- Non-core activities (UAB Energetikos paslaugų ir rangos organizacija, UAB "NT Valdos", UAB "Transporto valdymas")
- Additional services (UAB Elektroninių mokėjimų agentūra, UAB "Gamybos optimizavimas")
- Parent company – AB "Ignitis grupė"

Strategy

In 2020, we updated our Corporate Strategy by putting sustainability at the core of our strategy. We are accelerating our transition towards a decarbonized world, transforming our business models by developing and scaling smart solutions, expanding in our region, and exploring new opportunities in the markets undergoing energy transition.

In our strategy we focus on four key strategic priorities. First, we are striving to create a sustainable future where there is no place for coal or nuclear. ESG criteria are an integral part of our strategic goals with strong commitment to a more sustainable future. We align our business targets with the UN Sustainable Development Goals and we are committed to reducing net GHG emissions to zero by 2050. We also strive to align our businesses with science-based targets to have a 1.5 °Ccompliant business model. Second, we are striving to ensure the resilience and flexibility of the energy system as well as enable energy transition and evolution. Third, we are striving to grow renewables to meet regional energy commitments. Our target is to reach 4 GW of installed green generation capacity by 2030. Fourth, we are striving to capture growth opportunities and develop innovative solutions to make life easier and more energy smart.

Structure of the Group

The Group's governance structure and model have been developed on the basis of the most advanced international and national practices and by following the recommendations published by the OECD. The Group, directly or indirectly, controlled 27 companies at the end of 2021. Approximately 3,900 employees work at the Group. More information about the companies and their financial indicators can be found here.

The Group Sustainability unit is responsible for completeness, accuracy and validity of the information provided in this report. The data presented herein is based on the input received from internal data collection, management systems and external stakeholders. To provide feedback on the GHG inventory report please contact us at sustainability@ignitis.lt.

Methodology

This report presents the results of the carbon footprint of the entire Group and details the categories, boundaries, assumptions and methodology used in its creation. The Group defines the categories (scopes) of its direct and indirect emissions of operations within the limits of the organisation with the GHGs classified in accordance with the LST EN ISO 14064-1:2019 standard. The report also follows the good practice principles and has been prepared according to the following frameworks:

- World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI), 2004 A Corporate Accounting and Reporting Standard
- Intergovernmental Panel on Climate Change (IPCC), 2006 Guidelines for National Greenhouse Gas Inventories
- UK Department for Environment, Food & Rural Affairs (DEFRA), 2021 Government Greenhouse Gas Conversion Factors for Company Reporting
- The European Bank for Reconstruction and Development (EBRD), 2014 Methodology for the assessment of greenhouse gas emissions

The methodology used for the footprint calculations is covered in the Quantification of GHG emissions section, including the reporting principles of what the methodology is based on and how the baseline is broken down into different emission categories for reporting purposes. Sources of data and boundaries for data gathering are summarised in Organisational boundaries.

Principles

This report is carried out in accordance with the following key principles of GHG Accounting and Reporting Principles and ISO 14064-1, which are central to the assessment of the footprint and are applied throughout the calculation of the baseline year, and should be referred to for any subsequent annual calculations:

- Relevance: All identified sources of GHG emissions considered likely to make a material contribution to the sector footprint were included in the data collection exercise. No sources are knowingly excluded without initial quantification and assessment of their contribution to the overall footprint.
- Completeness: Account for and report all relevant GHG emission sources and activities within the defined inventory boundary.
- Consistency: Emissions category (scope), boundaries, data sources, calculation methodologies, assumptions and extrapolations used have been documented in this report so they can be consistently applied year on year to allow meaningful comparison of the footprint in the future. This footprint report is aligned with the Greenhouse Gas (GHG) Protocol and ISO 14064 standard, adding to the credibility and consistency of the emissions category (scope) and approach.
- Transparency: To assist the company in the communication of emissions to stakeholders and third parties, information on the scope, boundaries and overall output is provided in this report. Throughout the development of the CO_2 footprint, detailed records of input data, methods of calculation, assumptions and extrapolations have been made, with the objective of retaining a transparent and comparable audit trail for the assessment. A detailed calculation of the company's footprint is provided in the Quantification of GHG emissions section.
- Accuracy: In all aspects of emissions, uncertainty has been reduced as far as is practicable by the use of primary data relating to the Group. Where this was unavailable, historical data, where publicly available, and extrapolation based on data from other companies or national data has been used.

Organisational boundaries

The organisational boundaries define the businesses and operations that constitute the company for the purpose of accounting and reporting greenhouse gas emissions. Organisational boundaries determine which activities and operating facilities, such as grid and gas distribution and processing plants (collectively termed 'operations' in this report), shall be included in the inventory. Three 'consolidation' approaches can be used to set organisational boundaries:

- Operational control. A company accounts for 100% of the GHG emissions to/from an operation over which it has the authority to introduce and implement its own operating policies.
- Financial control. A company accounts for 100% of the emissions to/from an operation over which it has the ability to direct financial and operating policies with the aim of gaining economic benefits.
- Equity-share approach. A company accounts for the emissions to/from an operation according to its share of equity (or percentage of economic interest) in that operation.

In order to define the boundaries of the organisation, the operational control approach is selected since it represents the organisation's activities the best with respect to the units that perform operational control of their activity. It is also the approach that has greater potential for reducing GHG emissions.

Reporting boundaries

Defining the operational boundaries involves identifying the emissions associated with its operations. The WBCSB/WRI GHG Protocol classifies these emissions as Scope 1, Scope 2 and Scope 3. ISO 14064-1:2019 categorises them as follows:

- Direct GHG emissions and removals that occur inside the organisational boundary and that are directly controlled by the organisation (i.e., any owned or controlled activities that release emissions straight into the atmosphere).
- Indirect GHG emissions from imported energy – include only GHG emissions from fuel combustion associated with the production of final energy and utilities, such as electricity, heat, steam, cooling and compressed air.
- Indirect GHG emissions from transportation which are the consequence of the activities of the organisation but occur from sources not owned or controlled by the company. GHG emissions occur from sources located outside the organisational boundaries. Those sources are mostly due to fuel burned during transport of persons and goods (rail, maritime, air and road).
- Indirect GHG emissions from products used by the organisation which occur from sources located outside the organisational boundaries and are associated with the goods used by the organisation. Those sources are associated with all types of goods purchased by the reporting organisation.
- Indirect GHG emissions which are associated with the use of products sold by the organisation during the life stages occurring after the organisation's production process.
- Indirect GHG emissions from other sources – they are specific emissions (or removals) that cannot be reported in any other category.

Presenting the emissions by categories facilitates understanding of the key emissions sources in the organisation's footprint. It gives potential for the company and stakeholders in future years to target improvements in data collection and the areas where data has been identified to be less robust in this footprint.

Reporting period

This report refers to the GHG analysis and quantification for the calendar year 2021. This inventory report covers the period from 1 January 2021 to 31 December 2021. The base year for monitoring emissions reduction performance is 2020.

Qualitative estimation of uncertainty

The uncertainty associated with the calculation of GHG emissions is a combination of uncertainties associated with the activity data and the emission factors. The emission factors used to create the Group GHG inventory report are extracted from official sources and are specific to each source category. The emission factors and caloric data value used are not considered as uncertain because they come from official sources and they are beyond the control of the organisation. To minimise the uncertainty associated with the activity data, most of emission sources have environmental management systems that conform to the ISO 14001:2015 standard. Data for direct emissions is obtained from commercial invoices or the internal accounting system. Uncertainties in the accounting of the emissions are related to the following general assumptions:

- Fuel is bought using fuel cards from independent fuel suppliers. Fuel card data is provided by independent fuel suppliers to Fleet Services. Purchased fuel is recorded in fleet database and is matched against the supplier invoices.
- Fuel use (natural gas, waste, biomass) is measured using scales or meters and the uncertainty is calculated according to the GHG monitoring plan. Some facilities (Elektrėnai Complex, Vilnius Third Combined Heat and Power Plant and Kaunas CHP) are operating based on the EU emissions trading system. Uncertainties are identified and managed according to the system's requirements.
- Data of buildings classified as offices, plants, warehouses and customer service centres is submitted as actual meter readings or is estimated based on the billing system. Buildings (facilities) which companies of the Group operate are based on actual meter readings. Leased buildings' consumption is estimated as there are no meters in place.
- Waste generated during operations – there is lack of emissions factors for some waste types and waste treatment methods in the DEFRA database.
- The quantity of fugitive emissions of refrigerants is based on the amount which was used for refilling.
- The actual flight or employee commuting distance may not always be exactly accurate in respect of the route. The conversion factors used take into account the fact that distances travelled may not be representative of the journey due to changes in flight paths for safety/weather/etc.

Quantification of GHG emissions

Quantification approach

The emission factor approach involves the multiplication of business activity data by the relevant emission factor, which is a coefficient describing the amount of GHG flux per unit of activity. For instance, to calculate the GHG emissions from stationary combustion, emissions may be estimated by multiplying the quantity of natural gas by the emission factor that specifies how much GHG emissions are emitted during the combustion process. Default emission factors are largely based either on field measurements at individual research[1] sites or represent average values across a range of sites. The established emissions factors have been derived from reliable references for each emissions source.

The carbon footprint is measured in CO_2 equivalent (kg CO_2 eq) and is calculated by multiplying the activity data by the standard emission factors. The final emissions' total for each section is provided in tonnes of CO_2 equivalent (t CO_2 eq).

GHG emissions = $\Sigma\ (AD_i \times EF_i)$

GHG emissions – kg CO_2 eq

AD (Activity data) – activities of the organisation based on units of measure

EF (Emissions factor) – coefficient kg CO_2 eq / unit of measure

i (Index) – activity type

Once the emissions figures for each gas type (methane, nitrous oxide, and hydrofluorocarbon) are determined, the CO_2 eq value is determined by multiplying the figures by the appropriate Global Warming Potential (GWP) for that GHG (Table 1). These come from the fourth IPCC assessment report and are in line with DEFRA methodology, which explains that, even though the values from the sixth assessment report are already published, they have not been officially accepted for use under the United Nations Framework Convention on Climate Change. Therefore, these values will be updated to fifth or sixth assessment report when they are approved and taken into account by DEFRA.

For reporting purposes, these gases are converted to CO_2 equivalent, using their GWP:

Table 1. **Greenhouse gases and GWP**

Gas	Global Warming Potential[2] (GWP)
Carbon Dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous Oxide (N_2O)	298
Hydroflourocarbons (HFCs)	650–11,700*
Perflourocarbons (PFCs)	6,500–9,200*
Sulphur Hexafluoride (SF6)	23,500

**Depending on gas*

The gases generally chosen for quantification are the six "Kyoto Gases", as detailed in the ISO 14064-1 standard and the WBCSD/WRI GHG Protocol.

Direct emissions

Direct emissions and removals occur from GHG sources or sinks within the organisation's boundaries and that are owned or controlled by the organisation. Those sources can be stationary (e.g., heaters, electricity generators, industrial process) or mobile (e.g., vehicles).

Stationary combustion

These emissions are mainly from CO_2 emissions from combustion of natural gas and waste. The GHG Protocol and ISO 14064 requires that CO_2 emissions from biomass combustion at stationary sources are reported as biomass CO_2 emissions (in terms of total amount of biogenic CO_2 emitted) and are tracked separately from fossil CO_2 emissions. Biogenic CO_2 emissions are not included in the overall CO_2 equivalent emissions inventory

[1] *WRI, WBCSD, 2014. GHG Protocol Agricultural Guidance. World Resources Institute and World Business Council for Sustainable Development.*

[2] *The Fourth Assessment Report of the IPCC*

of organisations following this guidance. CH_4 and N_2O emissions from biomass and waste are included in the overall CO_2 equivalent emissions inventory. Natural gas consumption is converted to gross calorific value. For some facilities (e.g., Kaunas CHP) continuous emission monitoring systems (CEMS) are used as a tool to monitor the effluent gas streams resulting from combustion in industrial process. The quantities of fuel were obtained from internal accounting system. Emissions factors (secondary data) was taken from DEFRA, 2021 (version 2.0) and Lithuania's national inventory report, 2021.

Table 2. **Emissions from stationary combustion**

Category	Unit	Activity data	t, CO_2 eq
Natural gas	MWh	1,711,122	306,686
Waste (non-biogenic)	Tonnes	207,238	224,142
Waste (biogenic, only CH_4&N_2O)	Tonnes	153,105	3,014
Wood chips (CH_4&N_2O)	Tonnes	35,854	1,086
Total			**534,928**

Outside-of-scopes factors are used to account for the direct carbon dioxide (CO_2) impact of burning biomass and biofuels. The emissions are labelled 'outside of scopes' because the direct (Scope 1) impact of these fuels has been determined to be a net '0' (since the fuel source itself absorbs an equivalent amount of CO_2 during the growth phase as the amount of CO_2 released through combustion).

Table 3. **Biogenic emissions**

Category	Unit	Activity data	t, CO_2 eq
Biogenic waste (only CO_2)	Tonnes	153,105	160,412
Wood chips (only CO_2)	Tonnes	35,854	56,681
Total			**217,093**

Mobile combustion

The quantification methodology employed for calculating direct emissions is based on activity data (consumption of fuel). All vehicles owned or leased by the Group that burn fuels are producing greenhouse gases. Typically, these will be cars, trucks and locomotive powered by petrol or diesel engines. The quantities of fuel were obtained from the internal accounting system. Emissions factors (secondary data) was taken from DEFRA, 2021.

Table 4. **Emissions from mobile combustion**

Category	Unit	Activity data	t, CO_2 eq
Diesel	Litres	1,887,239	4,741
Petrol	Litres	250,400	449
Total			**5,291**

Fugitive emissions of methane

Natural gas comprises circa 90% methane. Thus, any natural gas leak to the atmosphere from distribution by pipelines is inherently related to the release of methane. In turn, methane is a greenhouse gas co-responsible for climate change. The quantities of gas losses were obtained from the internal accounting system. Emissions factors (secondary data) was taken from DEFRA, 2021.

Table 5. **Emissions from natural gas losses during the distribution process**

Category	Unit	Activity data	t, CO_2 eq
Natural gas losses	MWh	117,648	191,099
Total			**191,099**

Fugitive emissions of refrigerants

Emissions of hydrofluorocarbons occur from leakage when filling an air conditioner, its use and from the disposal of such equipment at the end of its lifecycle. Another gas – SF6 is used for electrical insulation and current interruption in equipment during the transmission and distribution of electricity. Most of the SF6 used in electrical equipment is used in gas insulated switchgear and substations and in gas circuit breakers. SF6 containing units used in medium voltage grid are hermetic. Leak proof is guaranteed and serviced by the producer. At the end of their service period, the units will be returned to the manufacturer. Any leakage of SF6 was not observed in 2021. The quantities of refrigerants were obtained from the internal accounting system. Emissions factors (secondary data) was taken from DEFRA, 2021.

Table 6. **Refrigeration losses on site**

Category	Unit	Activity data	t, CO_2 eq
R-410A	kg	34	71
R-32	kg	3	2
R-134A	kg	7	10
Total			**83**

Indirect GHG emissions

Indirect emissions are generated as a consequence of company activities and do not derive from controlled or owned sources. These indirect emissions concern the Group's entire value chain, from generation and transportation to the sale of energy. The emissions fall into several indirect categories of the ISO 14064 standard that are described below.

Indirect GHG emissions from imported energy

Electricity

Indirect GHG emissions from imported energy, deriving from the generation of electricity and heat that was purchased and consumed by the Group. Actual and estimated electricity consumption is taken from the network for office buildings or for energy generation in thermoelectric and hydroelectric plants. Primarily, two methods are used to "allocate" the GHG emissions from electricity generation to the end consumers of a given grid. These are the location-based method[3] and the market-based method. The location-based method reflects the average emissions intensity of grids on which energy consumption[4] occurs, while the market-based method reflects emissions from electricity that companies have purposefully chosen (or not chosen).

Actual and estimated electricity consumption in the Group offices, premises and customer service buildings was accounted for. Activity data (primary data): electricity quantities were collected by internal administration. The newest emissions factors were used (secondary data): emissions conversion factor was taken from International Energy Agency (IEA), 2021, and European Residual Mixes, 2020. IEA EF for 2021 is therefore based on the data from 2019 statistics.

Table 7. **Emissions from electricity consumption**

Category	Unit	Activity data	t, CO_2 eq
Electricity (location-based)	MWh	1,031,640	67,057
Electricity (market-based)	MWh	1,031,640	350,758

District heating

District heating means actual and estimated district heating consumption in the Group offices, premises and customer service buildings. Activity data (primary data): data of heating consumed by the Group during the reporting year was collected by internal administration. Emissions factors (secondary data): CO_2 eq conversion factor was taken from local legislation.

Table 8. **Emissions from district heating**

Category	Unit	Activity data	t, CO_2 eq
District heating	MWh	8,731	873
Total			**873**

Energy related activities

Emissions related to the extraction, production, and transportation of fuels and energy purchased or acquired by the reporting company in the reporting year, not already accounted for in the direct emissions category:

- Upstream emissions from the extraction, production and transportation of fuel (e.g., natural gas) combusted to generate the electricity that the Group purchased from third parties. Note that emissions from the combustion of fuels at our facilities are accounted for as our direct (Scope 1) emissions; similarly, emissions from the generation of purchased electricity consumed by the Group are accounted for as our indirect GHG emissions from imported energy (Scope 2) emissions.
- Well-to-tank (WTT) conversion factors are used to account for the upstream emissions associated with extraction, refinement and transportation of raw fuel sources to an organisation's site (or asset) prior to the combustion or generation of the heat and electricity from sources that the organisation had purchased (e.g., diesel, petrol).

Activity data (primary data): actual and estimated district heating consumption quantities of fuel and energy (electricity and heat) purchased during the reporting year were obtained from internal accounting systems. The cradle-to-gate emissions factors were obtained from the DEFRA database.

Table 9. **Well-to-tank emissions from fuel and energy related activities**

Category	Unit	Activity data	t, CO_2 eq
Natural gas (WTT)	MWh	1,711,122	53,644
Heat & steam (upstream)	MWh	8,731	290
Electricity Lithuania (upstream)	MWh	1,031,640	67,981
Diesel (WTT)	Litres	1,887,239	1,151
Petrol (WTT)	Litres	250,400	154
Total			**123,219**

[3] The location-based method is based on statistical emissions information and electricity output aggregated and averaged within a defined geographic boundary and during a defined period. Within this boundary, the different energy producers utilize a mix of energy resources, where the use of fossil fuels (coal, oil, and gas) result in direct GHG-emissions. These emissions are reflected in the location-based emissions factor.
[4] The choice of emissions factor using this method is determined by whether the business acquires guarantee of origin/ renewable energy certificates (GoOs/RECs) or not. When selling GoOs or RECs, the supplier certifies that the electricity is produced exclusively by renewable sources, which has an emission factor of 0 grams CO_2 eq per kWh. However, for electricity without the GoO or REC, the emission factor is based on the remaining electricity production after all GoOs and RECs for renewable energy are sold. This is called a residual mix, which is normally substantially higher than the location-based factor.

Indirect GHG emissions from transportation

Upstream transportation

This category includes the reporting of emissions due to the transportation (by contractors) of used fuels (biomass and waste) for the operation of Elektrėnai biomass boiler, Kaunas and Vilnius CHPs. For calculation, basic assumptions were made regarding the length of the trip, the emissions of the mode of transport used and its frequency. The transportation distance was estimated by the logistics experts:

- Truck transportation and an average transportation distance of 120 km were assumed for Elektrėnai plant for biomass (both ways). There were around 1,415 total trips and an average truck consumption of 35l/100km was presumed.
- For Kaunas CHP, truck transportation and routes were calculated based on bills of loading for 1 month multiplied by 12. The total transportation distance amounted to 308,016 km and an average truck consumption of 35l/100km was presumed.
- For Vilnius CHP, truck transportation and routes were calculated based on bills of loading for 1 month multiplied by 12. The total transportation distance amounted to 226,104 km and an average truck consumption of 35l/100km was presumed.

Emission factors (secondary data) for diesel fuel were obtained from DEFRA database.

Table 10. **Emissions from upstream transportation**

Category	Unit	Activity data	t, CO_2 eq
Transportation diesel	Litres	246,372	619
Total			**619**

Downstream transportation

This category includes the reporting of emissions from transportation (by contractors) of waste from operation of the plants. For calculation, basic assumptions were made regarding the length of the trip, the emissions of the mode of transport and its frequency. The transportation distance is estimated by the logistics experts:

- Truck transportation and an average transportation distance of 120 km were assumed for Elektrėnai Complex (both ways). There were around 178 total trips and an average truck consumption of 35l/100km was presumed.
- For Kaunas CHP, truck transportation and routes were calculated based on bills of loading for 1 month multiplied by 12. The total transportation distance amounted to 127,836 km and an average truck consumption of 35l/100km was presumed.
- For Vilnius CHP, truck transportation and routes were calculated based on bills of loading for 1 month multiplied by 12. The total transportation distance amounted to 256,884 km and an average truck consumption of 35l/100km was presumed.
- Emissions factors (secondary data) for diesel fuel were obtained from DEFRA database.

Table 11. **Emissions from downstream transportation**

Category	Unit	Activity data	t, CO_2 eq
Transportation diesel	Litres	134,652	357
Total			**357**

Business travel

This category covers emissions from all domestic and international flights taken by employees for business travel purposes. GHG emissions from business travel by air: actual distance travelled (in kilometres) between airports was converted to CO_2 equivalents using conversion factors for an average passenger in short-haul and long-haul flights. Activity data (primary data): travelled kilometres by means of transport of Group employees in the reporting year were collected by internal administration. Emissions factors (secondary data): CO_2 eq conversion factors for short-haul and long-haul flights were taken from DEFRA database.

Table 12. **Emissions from business trips**

Category	Unit	Activity data	t, CO_2 eq
Continental/Nordic, (<3700 km)	Km	99,468	15
Total			**15**

Employee commuting

This category includes emissions from the transportation of employees between their homes and worksites. Emissions are estimated by collecting data on the quantity of fuel used by employees to commute from their home to the office during the reporting period and multiplying by the relevant emissions factor. Conversion is used if the data is not in litres (e.g., when collecting data on the total distance travelled by employees). Activity data (primary data): travelled kilometres or consumption of fuel by means of transport of Group employees in the reporting year were collected by internal administration. Emissions factors (secondary data): CO_2 eq conversion factors were taken from DEFRA database.

Table 13. **Emissions from employee commuting**

Category	Unit	Activity data	t, CO_2 eq
By diesel transport	Litres	741,187	1,862
By petrol transport	Litres	232,231	509
Total			**2,372**

Indirect GHG emissions from products used by the organisation

Purchased goods and services

This category includes all upstream (i.e., cradle-to-gate) emissions generated from the manufacturing of products purchased or acquired (non-durable) by the Group in 2021: packaging material, office paper and water. Activity data (primary data): quantity and volume of the goods and services purchased during the reporting period were obtained from internal companies and from the main supplier of office paper. There are three main types of water use in our operations: surface, ground water from boreholes and from the supply network. Water is used mainly in our generation facilities for technological processes. Emissions factors (secondary data) for raw materials and packaging (cradle-to-gate) were obtained from DEFRA database.

Table 14. **Emissions from upstream transportation**

Category	Unit	Activity data	t, CO_2 eq
Cardboard virgin	tonnes	41	34
Paper, virgin	tonnes	7	6
Pallet wooden EUR, virgin	tonnes	72	0
Plastics	tonnes	2	6
Water, network supply	m^3	192,846	29
Water supply (surface)	m^3	516,067	323
Water supply, groundwater	m^3	23,079	13
Total			**411**

Waste generated in operation

The waste figures are based on actual and estimated amount of waste. This section describes the emissions associated with material waste disposal which is used for end-of-life disposal of different materials using a variety of disposal methods. Wastewater is treated in local treatment facilities or returned into the sewerage system through the drains. The quantities of solid waste and waste water generated during production at the Group production sites were obtained from the Unified Product, Packaging and Waste Record Keeping Information System of Lithuania (www.gpais.eu) and from the internal accounting system. Each category is divided into different sub-categories. Emission factors are then applied for the volumes of each sub-category. Emission factors (secondary data) were obtained from the DEFRA, 2021 and Ecoinvent, 2019 databases.

Table 15. **Emissions from waste**

Category	Unit	Activity data	t, CO_2 eq
Metal waste, recycled	tonnes	2,577	55
Hazardous waste, incinerated	tonnes	886	2,142
Waste mix, landfill	tonnes	5,058	2,362
Waste (ashes)	tonnes	98,776	820
Wastewater treatment (network)	m^3	318,814	87
Total			**5,466**

Indirect GHG emissions associated with the use of products from the organisation

Use of sold products is calculated based on actual sales of gas and electricity to end-users. Emissions related to combustion of the goods, which are those corresponding to the combustion of natural gas sold by the Group to the customer, excluding the gas consumed within the organisation (which is already included in Direct category). It was assumed that 100% of the gas is combusted for heating or chemical purposes. When selling electricity with GoOs or RECs, the supplier certifies that the electricity is produced exclusively by renewable sources, which has an emission factor of 0 grams CO_2 eq per kWh. So, "green" electricity emissions are equal to 0.

Grid losses are emissions associated with grid losses during the transportation of energy from third parties. This category includes indirect emissions deriving from dissipated energy emissions from technical losses of the Group grid distribution network. The quantities of grid losses were obtained from the internal accounting system.

Activity data (primary data): quantities of products sold during the reporting period were obtained from the Group internal business data management systems. The newest emissions factors were used (secondary data): CO_2 eq conversion factor was taken from IEA, 2020, European Residual Mixes, 2019 and Lithuania's national inventory report, 2021. IEA EF for 2019 is therefore based on the data from 2018 statistics.

Table 16. **Emissions from use of sold products**

Category	Unit	Activity data	t, CO_2 eq
Sold electricity in retail market (location-based)	MWh	6,506,548	525,336
Sold electricity in retail market (market-based)	MWh	4,341,828	1,529,241
Use of sold natural gas in retail market	MWh	8,953,878	1,616,643
Electricity from leased assets (location-based)	MWh	1,703	111
Electricity from leased assets (market-based)	MWh	1,703	579
Electricity grid losses (location-based)	MWh	521,153	33,875
Electricity grid losses (market-based)	MWh	521,153	177,192
Total (location-based)			**2,175,965**
Total (market-based)			**3,323,655**

Excluded GHG emissions sources

This report was based on a materiality criterion. Emissions that do not figure highly (< 5%) in relation to total emissions were not included.

This report was based on materiality criterion, with the following exceptions:

- Bus, taxi, car sharing travels. Reason for exclusion – minimal impact;
- Emissions from production of purchased capital goods (e.g., construction) by the Group. Reason for exclusion – there is no reliable data;
- Emissions from the use of leased assets – activity data, such as water and municipality waste, is included in other categories: 'Indirect emissions from energy' and 'Indirect GHG emissions from products used by the organisation';
- Processing of sold intermediate products (related to GHG protocol) by third parties. Reason for exclusion – products are mainly used ('Indirect GHG emissions associated with the use of products from the organisation') and are not processed;
- Emissions from waste disposal and treatment of products sold by the reporting companies at the end of their life. Reason for exclusion – not relevant;
- Transmission and distribution of sold electricity abroad – there is no reliable data;
- Emissions from operation of assets that are owned by the reporting companies and leased to other entities. Activity data, such as water and municipality waste, is included in other categories;
- Emission from operation of franchises (a business operating under a license to sell/distribute another company's goods/ services). Reason for exclusion – the Group doesn't have such type of operations;
- Investments – the parent company's subsidiary UAB "Ignitis renewables" has acquired 5 percent of shareholding interest in the development project of the Moray West wind farm on the east coast of Great Britain and will be the minority partner in the project.

Verification statement

The GHG inventory statements for 2021 were audited by Bureau Veritas, with a reasonable level of certainty. The audit was conducted according to standard LST EN ISO 14064-3:2019.
The English version of this statement is the only valid version.

Verification statement related to Ignitis Group greenhouse gas inventory report (year 2021)

Terms of Engagement
Bureau Veritas Lit., UAB (Bureau Veritas) was commissioned by AB Ignitis Group to verify its greenhouse gas inventory report (year 2021).

Standards and criteria used
We delivered our work in accordance with Bureau Veritas's assurance methodology which is based on the specific and relevant requirements of international assurance and audit standards ISAE 3000 and ISO 14064-3:2019.
We planned and performed our work to obtain all the information and explanations that we believe were necessary to provide a basis for our verification conclusions as to whether the reported information and data was appropriately reported, i.e. that nothing has come to our attention through the course of our work that the data are materially misreported.

Our work
To form our conclusions, the verification engagement was undertaken as a sampling exercise and we have:
• Reviewed the processes to collect, consolidate and report activity data that are used.
• Reviewed the scope, activity data and emission factors included in the carbon footprint to determine conformance with standard LST EN ISO 14064-1:2019.
• Assessed report and calculation tool.

Respective responsibilities and Bureau Veritas's independence
AB Ignitis Group is responsible for preparing the report and for the information in it.
AB Ignitis Group management is responsible for maintaining effective internal controls over the data and information disclosed.
Bureau Veritas's responsibility is to carry out a verification engagement on the report in accordance with our contract with AB Ignitis group.

Bureau Veritas or verifier has not been involved in the preparation of any material included within the report in the internal management and reporting systems that yielded the data contained therein.

Level of Assurance & Materiality
The opinion expressed in this verification report has been formed based on a reasonable level of assurance.

Our assurance conclusions
Based on our work undertaken as described above, we conclude that, in all material respects, AB Ignitis Group has appropriately reported its greenhouse inventory report.

Verified year 2021 (2021.01.01-2021.12.31) emissions:

Local based approach
Anthropogenic emissions
Category 1: 731 731 t CO_2eq
Category 2: 67 930 t CO_2eq
Category 3: 3 363 t CO_2eq
Category 4: 129 095 t CO_2eq
Category 5: 2 175 965 t CO_2eq
Biogenic anthropogenic emissions
Category 1: 217 093 t CO_2

Total anthropogenic emissions: 3 108 083 t CO_2eq
Total biogenic anthropogenic emissions: 217 093 t CO_2

Marked based approach
Anthropogenic emissions
Category 1: 731 731 t CO_2eq
Category 2: 351 631 t CO_2eq
Category 3: 3 363 t CO_2eq
Category 4: 129 095 t CO_2eq
Category 5: 3 323 655 t CO_2eq
Biogenic anthropogenic emissions
Category 1: 217 093 t CO_2

Total anthropogenic emissions: 4 539 474 t CO_2eq
Total biogenic anthropogenic emissions: 217 093 t CO_2

Signed

Verifier Tomas Paulaitis

On behalf of Bureau Veritas Lit., UAB
Ukmergės g. 369A,
LT-12142 Vilnius
Lithuania
2022.04.06

This document is subject to the provision below:
Because of the inherent limitations in any internal control, it is possible that fraud, error, or non-compliance with regulations may occur and not be detected. Further, the verification was not designed to detect all weakness or errors in internal controls so far as they relate to the requirements set out above as the verification has not been performed continuously throughout the period and the verification carried out on the relevant internal controls were on a test basis. Any projection of the evaluation of control to future periods is subject to the risk that the processes may become inadequate because of changes in conditions, or that the degree of compliance with them may deteriorate. The English version of this statement is the only valid version. The Bureau Veritas assumes no responsibility for versions translated into other languages.

Glossary

CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
DEFRA	Department for Environment, Food & Rural Affairs
EF	emission factor
EV	electric vehicles
ESO	AB "Energijos skirstymo operatorius"
GHG	greenhouse gas
GoO	guarantee of origin
Group or Ignitis Group	AB "Ignitis grupė" and its controlled companies
GW	gigawatt
GWP	global warming potential
IPCC	Intergovernmental panel on climate change
Kaunas CHP	UAB Kauno kogeneracinė jėgainė
LNIR	Lithuania's national inventory report
MW	megawatt
MWh	megawatt hour
N2O	nitrous oxide
OECD	Organisation for Economic Co-operation and Development
RECs	renewable energy certificates
SBTi	Science Based Targets initiative
TW	terawatt
Vilnius CHP	UAB Vilniaus kogeneracinė jėgainė
WBCSD	World business council for sustainable development

Appendix I: Total GHG emissions (based on LST EN ISO 14064-1:2019)

Total GHG emissions by categories (location-based)

	Emissions	Total (t, CO_2 eq)	t, CO_2 eq (from CO_2)	t, CO_2 eq (from CH_4)	t, CO_2 eq (from N_2O)	t, CO_2 eq (from Hydrofluorocarbons)
1.	**Cat. 1: Direct emissions and removals (t CO_2 eq)**	**731,731**	**531,976**	**194,409**	**5,262**	**83**
1.1	Direct emissions from stationary combustion	535,259	526,760	3,309	5,191	-
1.2	Direct emissions from mobile combustion	5,291	5,217	2	71	-
1.3	Direct fugitive emissions	191,181	-	191,099		83
	Direct emissions in tonnes of CO_2 from biomass	56,681	56,681			
	Direct emissions in tonnes of CO_2 from biogenic waste	160,412	160,412			
2.	**Cat. 2: Indirect emissions from energy**	**67,930**				
2.1	Emissions from imported electricity (location-based)	67,057				
2.2	Emissions from imported heating	873				
3.	**Cat. 3: Indirect GHG emissions from transportation**	**3,363**				
3.1	Upstream transportation	619				
3.2	Downstream transportation	357				
3.3	Business travel	15				
3.4	Employee commuting	2,372				
4.	**Cat. 4: Indirect GHG emissions from products used by the organisation**	**129,095**				
4.1	Emissions from purchased goods and services	411				
4.2	Emission from fuel and energy related activities	123,219				
4.3	Emission from disposal of solid and liquid waste	5,466				
5.	**Cat. 5: Indirect GHG emissions associated with the use of products from the organisation**	**2,175,965**				
5.1	Emissions from the use stage of the product (location-based)	2,141,979				
5.2	Emission from downstream leased assets (location-based)	111				
5.3	Emission from grid losses	33,875				
	Total anthropogenic emissions (location-based):	**3,108,084**				
	Total anthropogenic biogenic emissions:	**217,093**				

Total GHG emissions by categories (market-based)

	Emissions	Total (t, CO_2 eq)	t, CO_2 eq (from CO_2)	t, CO_2 eq (from CH_4)	t, CO_2 eq (from N_2O)	t, CO_2 eq (from Hydrofluorocarbons)
1.	**Cat. 1: Direct emissions and removals**	**731,731**	**531,976**	**194,409**	**5,262**	**83**
1.1	Direct emissions from stationary combustion	535,259	526,760	3,309	5,191	-
1.2	Direct emissions from mobile combustion	5,291	5,217	2	71	-
1.3	Direct fugitive emissions	191,181	-	191,099		83
	Direct emissions in tonnes of CO_2 from biomass	56,681	56,681			
	Direct emissions in tonnes of CO_2 from Biogenic waste	160,412	160,412			
2.	**Cat. 2: Indirect emissions from energ**	**351,631**				
2.1	Emissions from imported electricity (market-based)	350,758				
2.2	Emissions from imported heating	873				
3.	**Cat. 3: Indirect GHG emissions from transportation**	**3,363**				
3.1	Upstream transportation	619				
3.2	Downstream transportation	357				
3.3	Business travel	15				
3.4	Employee commuting	2,372				
4.	**Cat. 4: Indirect GHG emissions from products used by the organisation**	**129,095**				
4.1	Emissions from purchased goods and services	411				
4.2	Emission from fuel and energy related activities	123,219				
4.3	Emission from disposal of solid and liquid waste	5,466				
5.	**Cat. 5: Indirect GHG emissions associated with the use of products from the organisation**	**3,323,655**				
5.1	Emissions from the use stage of the product (market-based)	3,145,884				
5.2	Emission from downstream leased assets (market-based)	579				
5.3	Emission from grid losses	177,192				
	Total anthropogenic emissions (market-based):	**4,539,475**				
	Total anthropogenic biogenic emissions:	**217,093**				

Appendix II: Total GHG emissions (based on GHG protocol)

Total GHG emissions by scopes (location-based)

Emissions	Total (t, CO_2 eq)	t, CO_2 eq (from CO_2)	t, CO_2 eq (from CH_4)	t, CO_2 eq (from N_2O)	t, CO_2 eq (from Hydro-fluorocarbons)
Scope 1: Direct GHG emissions	731,731	531,976	194,409	5,262	*83*
Scope 2: Indirect GHG emissions	101,805				
Scope 3: Other indirect GHG emissions	2,274,548				
Total anthropogenic emissions (location-based):	3,108,084				
Total anthropogenic biogenic emissions:	217,093				

Total GHG emissions by scopes (market-based)

Emissions	Total (t, CO_2 eq)	t, CO_2 eq (from CO_2)	t, CO_2 eq (from CH_4)	t, CO_2 eq (from N_2O)	t, CO_2 eq (from Hydro-fluorocarbons)
Scope 1: Direct GHG emissions	731,731	531,976	194,409	5,262	*83*
Scope 2: Indirect GHG emissions	528,823				
Scope 3: Other indirect GHG emissions	3,278,921				
Total anthropogenic emissions (market-based):	4,539,475				
Total anthropogenic biogenic emissions:	217,093				

AB “Ignitis grupė”

Laisvės av. 10, LT-04215 Vilnius, Lithuania
Company code 301844044
Tel. +370 5 278 2998
E-mail grupe@ignitis.lt
www.ignitisgrupe.lt/en/

Sustainability
Valentas Neviera
Tel. +370 670 25997
E-mail sustainability@ignitis.lt

ignitis group