Sustainability Report 2021

Warmeston

Mait Kaup

Warmeston CEO

Message from our CEO

Sustainability is a crucial component of the success story of biomass - a controllable renewable energy source. To emphasize our full commitment to sustainable biomass we are now publishing our second sustainability report to create further transparency upon the annual sustainability certification audits we have been part of for many years.

As intermittent solar and wind capacity increases, controllable, on-demand renewable energy from sustainable biomass is becoming increasingly important for phasing out coal and gas. Biomass enables a cost-effective production of heat in the cold winter days and provides a solution for on-demand renewable electricity. So we can be sure that in those dark and cold winter days when solar and wind is lacking, we can rely on clean electric power for heat pumps to keep homes warm.

Warmeston sources 100% of its biomass from Europe, thereby contributing to EU´s energy independence and energy security. At these uncertain times it has become evident that Europe needs to pay more attention to where it sources its on-demand energy. We can use biomass to limit our dependence on Russian gas, and liquid fossil fuels while also removing carbon from the atmosphere. Large-scale technical solutions for doing the latter are just about ready.

In 2018, EU adopted a recast Renewable Energy Directive 2018/2001 (REDII) which aims for a 32% share of renewable energy in Europe´s overall energy mix by 2030. Being one of the largest pellet producers in Europe, Warmeston acknowledges its role and responsibility in the region´s transition to clean energy and places great importance to following the regulative frameworks. In light of this, we have conducted our 2021 carbon footprint assessment in line with REDII requirements.

Year 2021 in numbers

Pellet Business

16
international ports receiving our pellets

79 %
of our feedstock from wood industry residues

500 000 t
maximum production capacity

474 798 t
pellets produced

87
number of suppliers

Enviromental

8,73 gCO_2e/MJ
the average GHG emissions from our pellets

2 %
reduction of our pellets´ GHG emissions per MJ from 2020

100 %
of the residual ash recycled into fertilizer

491 085
trees planted in 2021

Group Finances

230
employees in our companies

more than 60 %
higher salaries*, on average, compared to the repective country average wages

66,7 M€
our revenue

23 %
revenue growth from the last year

* Including subsidiaries and minority interest companies

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Sustainability strategy

Our strategic directions on sustainability

We are environmentally conscious and therefore pay attention to our resource efficiency, emissions and waste management.

We are resource efficient and committed to sustainable solutions starting from the use of green energy and the establishment of our own solar farm to paperless office. Conscious consumption and efficient resource use will lead to reduced emissions and carbon footprint.

We support the implementation of climate policy through production of wood-based biomass fuel

Climate policy shapes our business environment and frames our long-term purpose. The European Union aims to be climate-neutral by 2050 - a future where we will be led by biofuels and technological innovation. Pellet production will help economies to move from fossil fuels to renewable sources and towards a balanced carbon cycle and even negative emissions. A vision that is in line with the EU´s Fit for 55 package

We contribute to the competitiveness of the Estonian forest and timber industry by processing the residues of these sectors

The pellet industry adds value to the residues from the forest and wood industry and provides an output for low-value wood-based materials. The sale of their residues provides these industries additional income for growth, development and job creation in rural areas.

We work for long-term growth and development with economic sustainability in mind

In order to move towards our strategic directions, economic capacity is an essential prerequisite. Maintaining our profitability allows us to ensure long-term operations, invest in innovation and safeguard the created jobs.

We value our employees by offering meaningful work and competitive compensation

Skilled and motivated employees are a necessity for our success. Our employees have a meaningful and positively challenging job. We provide modern and secure work conditions, fair compensation, apply bonus programs, support participation in training programs and sports activities.

At **Warmeston** we value:

Our commitment to the Sustainable Development Goals of the UN

Goal	Our Contribution
	2021 marked the year of our record-high volume of produced pellets: > 474 000 t. This high demand can be translated into an increasing shift away from fossil fuels towards renewable energy. Warmeston has directed its focus towards supplying combined heat and power (CHP) plants to ensure that the pellets are used in an energy-efficient production. Warmeston is paying close attention to employee well-being. In order to improve the management of our personnel-related topics, we created a new role in Tartu and hired a suitable person who now coordinates our social matters. Additionally, we renewed our Tartu office and updated our safety guidelines to further ensure employee comfort and safety. We offer our employees a meaningful and positively challenging jobs with fair wages up to 2x higher than the respective county averages. Within the past 5 years we have decreased the energy intensity of producing 1 ton of pellets by more than 17%. To ensure the highest possible recycling rate for the ash generated in our manufacuting process, Warmeston outsourced the ash management to a local licensed operator which recycles it into a lime fertiliser. Warmeston also started to innovate its key IT-systems, including the shift to a modern enterprise resource planning (ERP) software, to further increase the planning efficiency in feedstock purchasing, pellet production and sales. Besides producing renewable fuel, we also generate and use renewable energy. Our on-site solar farm in Sõmeru went through an expansion to meet the required energy demand of the factory. With the additional solar panels that were installed, their total number now reaches to 5420, having the energy production capacity of 1260 kW. The surplus electricity is sold to the grid under the newly-established company: Ardor Energia Ltd Nature's health and wellbeing is of high importance to Warmeston. Besides having strict rules in place to refrain from sourcing our material from high conservative value areas such as Woodland Key Habitats, Natura 2000 Forest Habitats or natural sacred sites, we also give our best effort to ensure the continuation and good health of the forest ecosystems by actively participating in post-harvest regeneration. To increase our efforts even further, in 2021 we acquired two new planting machines which contributed to us having planted more than 491 000 new trees that year.

Warmeston at a glance

Warmeston's journey

The journey of Warmeston OÜ begins with its establishment in 2003 and gains momentum in 2010 when the first factory was established in Sauga. On three consecutive years from 2013, Sõmeru (Ardor), Järvere and Purila factory were opened. Warmeston acknowledges its role in global energy transition, so sustainability has played an important role in the company right from the early years. In 2016, when biomass sustainability had not yet caught everyone´s attention to the extent it has now, Warmeston was among the first 10 companies worldwide and the first in Estonia to become SBP (Sustainable Biomass Program) certified. This proved to be the right direction, as the Commission has made a positive technical assessment of the SBP certification and recognized it under the new sustainability framework as a credible way to demonstrate compliance with the revised Renewable Energy Directive (RED-II). Moving ahead to 2018, Warmeston implemented the ISO 50001 certified energy management system which ensures increasing energy efficiency through a continuous process of monitoring and improvement.

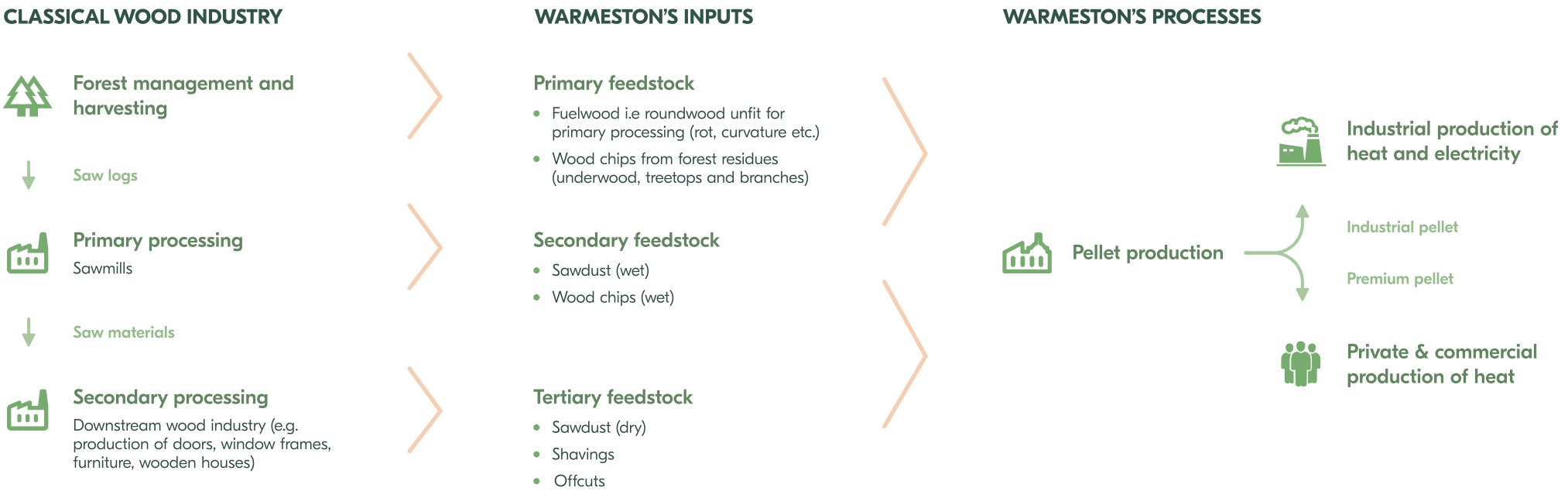
Understanding the importance of knowing one´s impacts, we carried out a carbon footprint assessment in 2020 for our industrial pellet production as the first stage of our commitment to monitor our sustainability performance and report it transparently. Building on that promise - this report is the result of an updated assessment which follows the requirements of RED-II and covers our whole pellet production, including the premium pellet. Our next efforts are aimed at increasing our energy efficiency and production capacity through further optimizations in the production process.

Warmeston's pellet production

Warmeston produces pellets by converting both forest and wood industry residues into energy efficient biofuel. The part of our feedstock that comes directly from the forest (forest residues) consist of low grade and low-value forest-based biomass which is unfit for primary processing due to reasons such as defects, diseases or curvature. The wood industry provides us their residues such as sawdust, wood chips, shavings, and offcuts. As these feedstock groups do not have any other major application in Estonian wood industry, we enable our suppliers to commercialize their residues, thereby contributing to the competitiveness of the Estonian forest and wood industry as well as to job creation in rural areas.

Two different categories of pellets are produced from the feedstock. Premium pellets have a lower ash content and a lighter color and are intended for private and commercial heat production. Industrial pellets are sent to large-scale power plants for electricity production or to combined heat and power (CHP) plants for electricity and heat co-generation.

The use of pellets displaces fossil fuels with renewable energy sources and helps combating climate change.



Warmeston´s organisational structure and process flow

Warmeston's organizational structure is composed of Warmeston OÜ and four associated companies that provide services along the supply chain. Forest management company Timberstock is Warmeston's subsidiary with Warmeston being the only shareholder. Premium pellet producer Ardor, service provider Combitrans and fuelwood dealer Iriscorp Transport are Warmeston's affiliates through a minority shareholding. For the sake of simplicity, in this report we refer to all of these companies as Warmeston's affiliates.

Pellet production

Warmeston OÜ produces industrial pellet in its three Estonian factories: Sauga, Purila and Järvere.

Pellet production

50% Ardor OÜ

Produces premium pellets in its Sõmeru factory in Estonia and provides its high-quality pellets to both, private and commercial customers.

Chipping and transportation

Transport to the ports

50% Combitrans OÜ

Combitrans is responsible for the logistics and transport of input materials from the supplier to Warmeston's factories and pellet transportation to the ports. Combitrans is also providing harvesting, chipping and forestation services.

Forest management

Sourcing of forest based materials

100% Timberstock OÜ

Timberstock's purpose is managing Warmeston's forest portfolio as well as sourcing forest-based biomass for dryer fuel and pellet production. Timberstock is also supplying wood industry with saw logs and CHP plants with wood chips produced from forest residues.

Sourcing of forest based materials

12,5% Iriscorp Transport OÜ

The company is active in transporting, buying and selling forest material while also participating in forest management. In Warmeston's operations, Iriscorp is mainly active as the supplier of fuelwood.

Sõmeru factory — the source of Warmeston´s premium pellet

Building on the last year´s sustainability report, the current one also includes a carbon footprint assessement of Warmeston´s premium pellet producer in Sõmeru — Ardor OÜ. Therefore, it is fitting to have a brief look into the factory.

Ardor OÜ was etablished exactly 10 years after Warmeston OÜ, in August 2013. The factory´s territory in Sõmeru was purchased in September of the same year and the first shipment of pellets was ready to be delivered already four months later. Since then, the factory has proved to be a great success as year after year, its output has seen a steady increase, now reaching to 18% of the Warmeston´s total pellet production.

Sõmeru factory

Produces high quality premium pellets

The pellets are characterised by high mehanical strength, low ash content, high heating value and a distinctive golden colour, making them perfect for private and commercial use and for being distributed with a blower truck.

Has an energy-efficient production process

As the factory only uses dry feedstock and only a small fraction (15%) of it needs to be chipped, the production process requires 6-7 times less energy than pellet mills using primary and secondary feedstock.

Additionally, the production process is highly reliable with the pellet presses having an availability of more than 99%.

Has a strong focus on sustainability

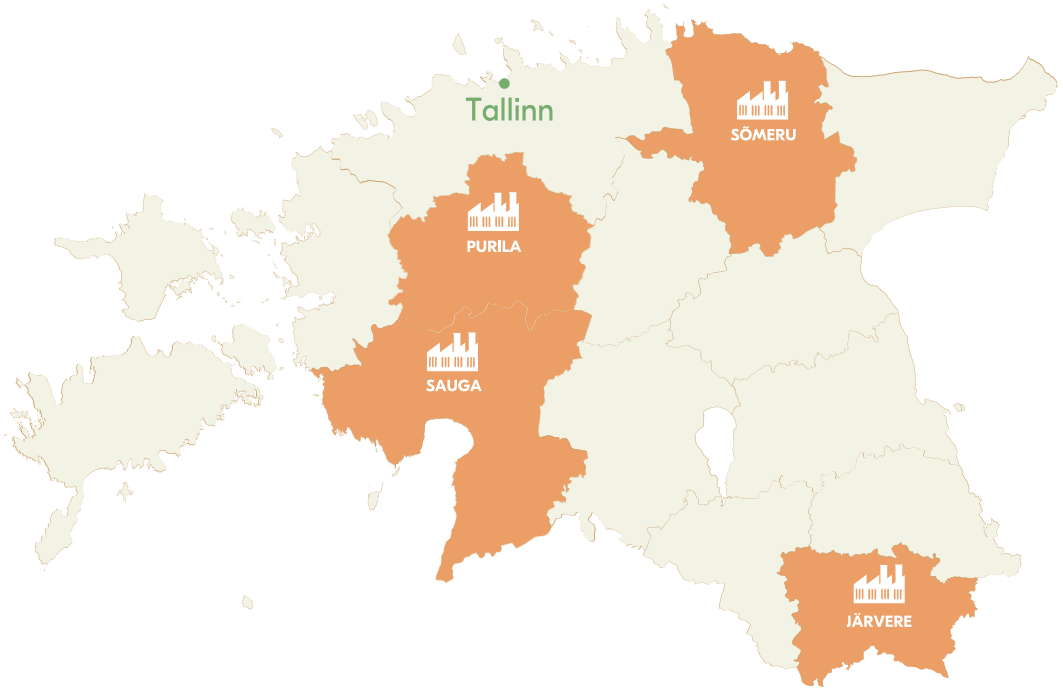
Despite its focus on private and commercial market, the produced premium pellets meet all the same strict sustainability requirements that are in place for the industrial market.

Sõmeru factory also has its own solar farm. The 5420 panels have an energy production capacity of 1260 kW, supplying approx. 12-15% of the factory´s annual energy demand.

Our pellet factories

Warmeston´s pellet production takes place in four factories located all over Estonia. Our largest factory — Sauga — with its 195 thousand metric ton annual production capacity is located in southwestern Estonia in Pärnumaa. Purila factory is located in central Estonia, in Raplamaa, while Järvere and Sõmeru factories are in southern and northern part of the country, respectively. The location advantage of Sauga and Sõmeru factories is their proximity to the port, whereas Järvere factory is close to its raw material. Purila balances both of these aspects.

Purila and Sauga factories produce industrial-class pellets while the premium pellets are manufactured in Sõmeru. Järvere factory is unique as it is the only factory equipped with a pellet bagging line as well as it has the capacity to produce both, industrial and premium pellets which provides an additional production reliability for long-term offtake contracts.



SAUGA FACTORY

Entry into operation: 2010
Maximum production capacity: 195 kT
Quality: I2, ENplus A2
Products: 6 mm industrial pellets
Employees: 28
Main input categories for production:
Primary feedstock (31%)
Secondary feedstock (56%)
Tertiary feedstock (13%)

SÕMERU FACTORY

Entry into operation: 2013
Maximum production capacity: 90 kT
Quality: ENplus A1
Products: 6 mm Premium-class pellets
Employees: 12
Main input categories for production:
Tertiary feedstock (100%)

JÄRVERE FACTORY

Entry into operation: 2014
Maximum production capacity: 115 kT
Quality: I1, I2, ENplus A1 and A2
Products: 6 mm industrial and Premium-class pellets
Employees: 21
Main input categories for production:
Primary feedstock (2%)
Secondary feedstock (76%)
Tertiary feedstock (22%)

PURILA FACTORY

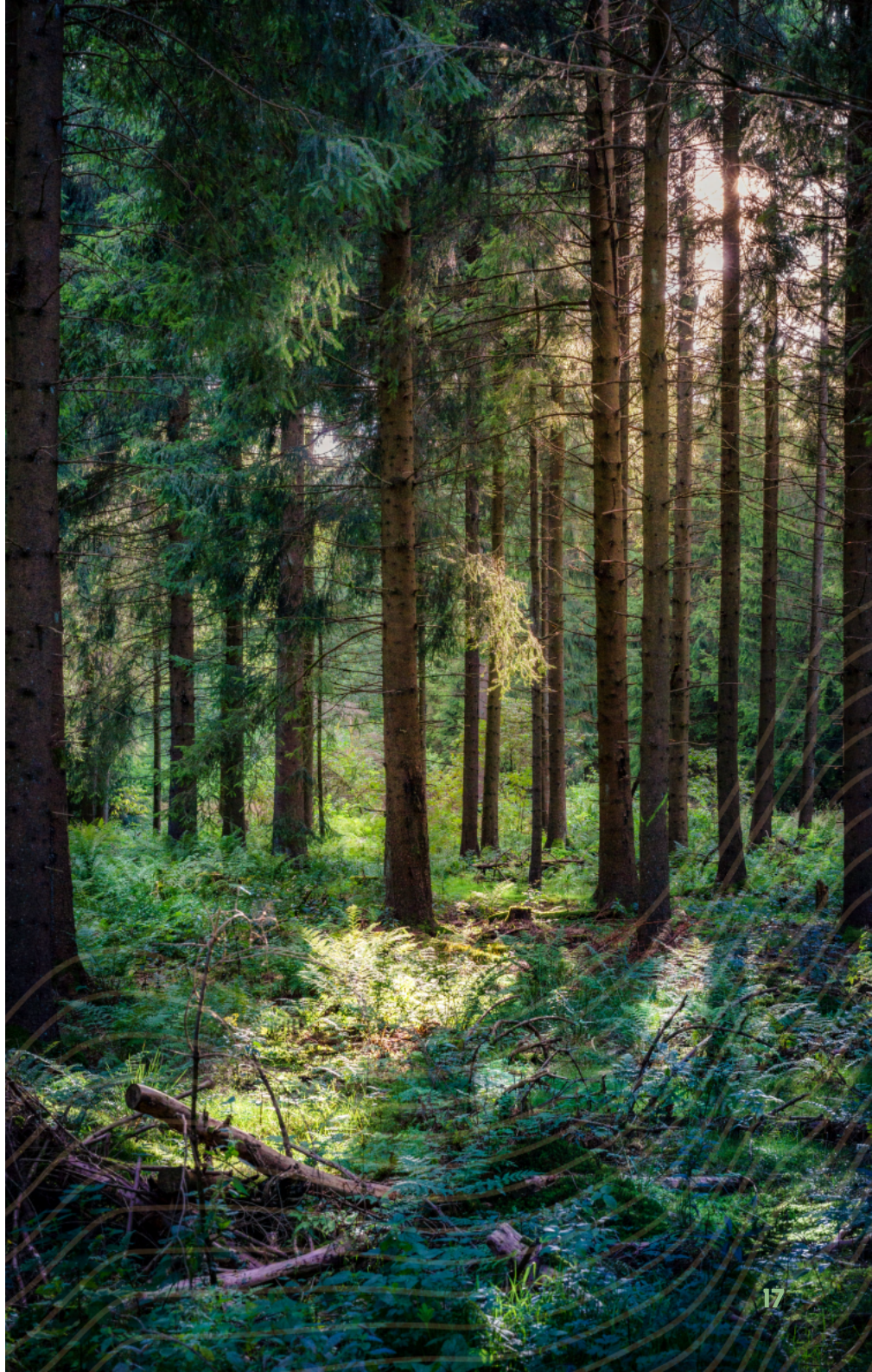
Entry into operation: 2015
Maximum production capacity: 100 kT
Quality: I2, ENplus A2
Products: 6 mm industrial pellet
Employees: 21
Main input categories for production:
Primary feedstock (39%)
Secondary feedstock (55%)
Tertiary feedstock (6%)

The value of Estonian-sourced wood

The vast majority (98,8 %) of the Warmetson´s raw material is sourced locally, from Estonia. Besides minimising the raw material´s transport demands, Estonian-sourced wood provides a significant contirbution to the overall sustainability of Warmeston´s pellets.

- About 54% of Estonia´s land is covered with forest and the forest area has been expanding steadily since the 1950s.
- Estonia´s forests are managed sustainably, meaning that the forests and forest land are used in a way which maintains their biodiversity, productivity, regeneration capacity and vitality.
- Nearly 66% of Estonian forests are under third party certification, by FSC (Forest Stewardship Council) PEFC (Programme for the Endorsement of Forest Certification) or both.
- Transparency International ranks 180 countries and territories around the world by their perceived levels of public sector corruption by assigning a Corruption Perceptions Index (CPI). The results are given on a scale of 0 (highly corrupt) to 100 (very clean) and as of 2021, Estonia is holding a remarkable 13th rank with its CPI score of 74. This gives a high confidence that doing business with Estonian suppliers means that business is done fairly and ethically.

Sources: SoEF_2020.pdf (foresteurope.org); https://www.transparency.org



Our pellets

Industrial pellets are mainly burned in large-scale power plants for electricity production or combined heat and power (CHP) plants for electricity and heat generation.

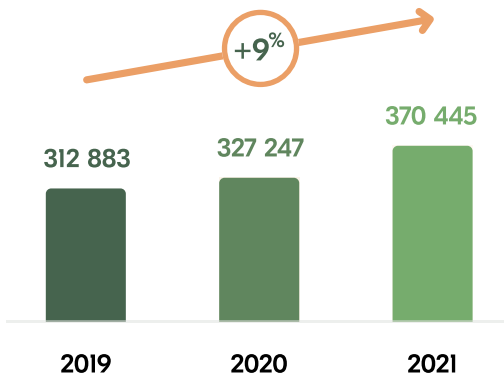
Factories: Sauga, Järvere, Purila

Clients: Power and CHP plants

Quality: I1, I2 and ENplus A2

Production volume in 2021: 370 445 tons

WARMESTON´S INDUSTRIAL PELLET OUTPUT, 2019-2021, tonnes



Premium pellets meet the highest quality requirements and are supplied with a consistently light color. They have a residential or commercial use where pellets are burned in pellet stoves or boilers for heating.

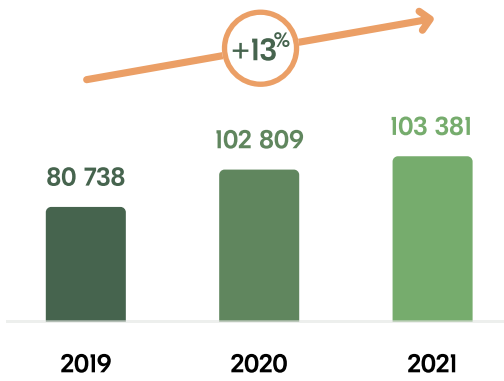
Factories: Sõmeru, Järvere

Clients: private consumers and commercial entities producing heat in pellet boilers

Quality: ENplus A1

Production volume in 2021: 104 353 tons

WARMESTON´S PREMIUM PELLET OUTPUT, 2019-2021, tonnes



Forest renewal through tree planting

Estonia´s forest renewal projects are managed by Warmeston´s affiliate Combitrans which uses three unique Risutec machines to carry out the planting. These professional machines allow for an increased agility and efficiency, demonstrating the direct results of our constant quest for more innovative solutions.

There are only three other professional tree planting machines operating in Estonia.

The main advantages of our specialized machines are:

- Higher success rate
- GPS tracking
- Flexibility
- Documentation of planted trees
- Lower cost per hectare
- Increased efficiency compared to using excavators

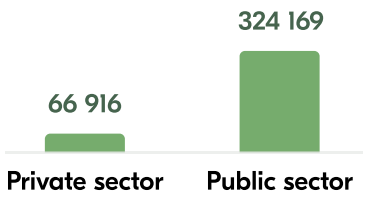
Equipment: 3 Risutec PM tree planting machines

Clients: State and private forest owners

Maximum planting capacity: 1 200 000

In 2021, Combitrans planted 391 085 trees helping to regenerate forest on approximately 220 ha of forest land.

THE NUMBER OF TREES PLANTED BY COMBITRANS IN 2021



In addition to Combitrans, Warmeston´s affiliate Iriscorp Transport planted 100 000 trees on over 52 hectares.

IRISCORP TRANSPORT

Our development in 2021

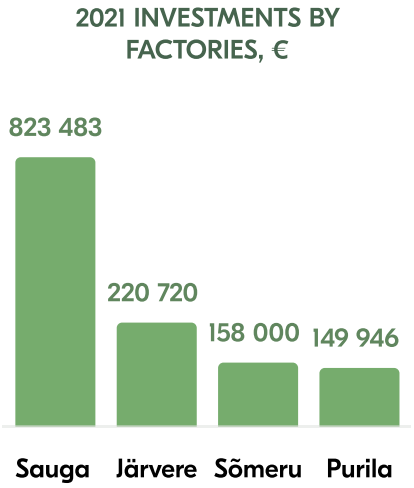
In 2021, Warmeston invested into the growth and development of the company and the group, and the efforts have improved our production capacity, operational efficiency as well as our capability to focus on sustainability-related projects.

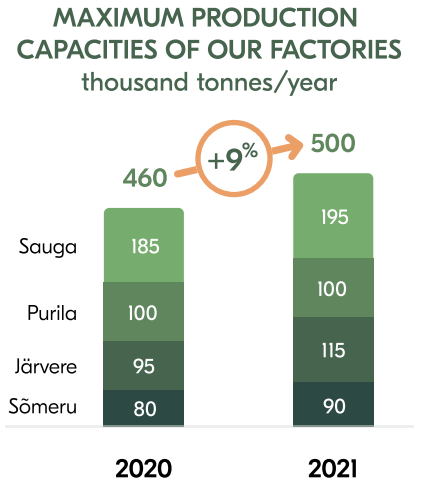
In 2021 we expanded our Sauga factory by installing a third hammer mill which allows us to process the feedstock at slightly higher moisture levels, reducing the need for prior drying — this has resulted in a considerable reduction in the factory´s heat demand. Together with the new machine we also improved our automatic spark detection and fire extinguishing systems to ensure safe working conditions and production continuity. Influenced by our Sõmeru factory, we have also initiated new renewable energy projects in other factories, starting by mapping the solar energy potential of the surroundings. In 2021 we installed remotely readable electricity meters to all major electricity consumers in Järvere factory and completed thereby the enhancement of Warmeston´s electricity consumption monitoring system. This new system has proved to be highly beneficial and has already contributed to improved decision-making for increased energy efficiency.

In 2021, we had a strong focus on IT wherein we invested approx. 49 000 € on various developments, including the establishment of an IT executive position. Our key personnel participated in a thorough digitalisation course which prepared us for the implementation of new relevant IT solutions including the introduction of a new ERP system. From our initial goal of a paperless office has grown an organization-wide digitalization and automatization project for improved data exchange, better decision-making and enhanced efficiency.

Development in Sustainability Action

Being the 2nd largest pellet manufacturer in the Baltics, we bear a great responsibility in the region´s sustainable development. 2021 marked the first year we published our sustainability report which expressed the results of our first carbon footprint assessment (for the year 2020), involving the industrial pellet production. Continuing our efforts, we also included Sõmeru´s premium pellet production into our 2021 assessment, the results of which will be covered in this report. Furthermore, following the regulative requirements of the RED-II, this year´s carbon footprint assessment was conducted following the directive´s requirements for GHG accounting to ensure Warmeston´s alignment with the EU´s climate policy.






COMBITRANS

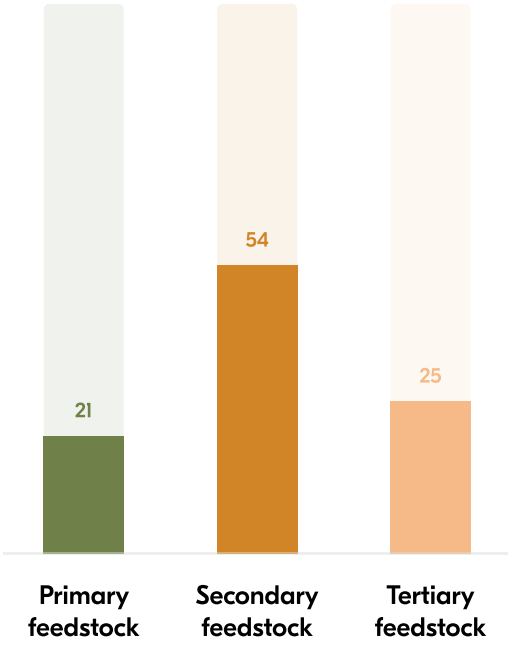
Our carbon footprint

Sourcing

Overview of raw input materials

Our raw material groups can be divided into forest industry residues (fuelwood and fuelwood chips) and residues of the wood industry. The properties of these residues are being homogenized during our pellet production and the increased energy density allows for a convenient use by the end-user in converting the pellets into bioenergy and displacing the use of fossil fuels.

FEEDSTOCK PROFILE IN 2021, %



WOOD INDUSTRY RESIDUES

Secondary and tertiary feedstock

Shavings

Scrap from the milling of wood, which contains larger and finer wood particles.

Industry wood chips

Residues from the wood industry in the form of small pieces of wood with particle size less than 50mm. Can be in both dry (moisture level approx. 10%) and wet (approx. 45%) form.

Sawdust

Residues of wood processing (sawing, drilling, grinding, etc.) with a particle size less than 20 mm. Both dry and wet sawdust are used for pellet production. The moisture level of the latter is almost six times higher, which requires proper drying

Offcuts

Dry pieces of wood from the wood industry (e.g., finger jointed wood production).

FOREST INDUSTRY RESIDUES

Primary feedstock

Fuelwood

Fuelwood is also known as low-quality roundwood. It is defective roundwood, e.g., with rot, splits or curves, that would not be used outside of energy production.

Fuelwood chips

Fuelwood can also be delivered in the form of wood chips.

Decreased volume and increased energy content of pellets

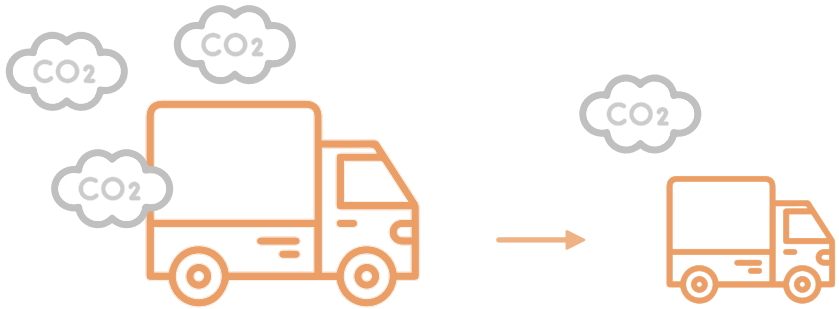
Besides the final pressing stage, pellet production also involves processes such as drying and grinding the feedstock into a small fraction size. This results in a very compact end-product with significantly higher energy content per m^3 compared to the raw material.

PELLETS´ ENERGY DENSITY IS ON AVERAGE 3-4 TIMES HIGHER THAN RAW MATERIAL´S

When converted into pellets, the volume of material needed for 1 GJ of energy is reduced by 3-4 times, on average.

Besides simplifying the use of produced biomass for the end user, the significant increase in energy density has great implications on the downstream supply chain.

The smaller volume of distributable mass allows for a more efficient transportation and as the logistics-related activities such as transport, cargo loading etc. play an important role in the product´s carbon footprint, this reduction has direct impact on the transport-related emissions.



Reliability of our supply chain

Our supply chain is robust and transparent, meeting all the legal and sustainability requirements. This is annually re-confirmed be the external auditors of the three most established international chain of custody certification systems for wood and wood-based products.

Certified since 2014

FSC® (Forest Stewardship Council®) was founded in 1993 and stands for responsible forest management around the world. The FSC Principles and Criteria provide a foundation for all global forest management standards and the FSC chain of custody certification enables a credible assurance that products which are sold with an FSC claim originate from well-managed forests, controlled sources, or reclaimed materials.

Certified since 2016

SBP (Sustainable Biomass Program) was established in 2013 and its certification system provides assurance that the woody biomass used in industrial, large-scale energy production is sourced from legal and sustainable sources, allowing companies in the biomass sector to demonstrate their compliance with regulatory requirements

Certified since 2018

PEFC (Programme for the Endorsement of Forest Certification) was founded in 1999 in response to the specific requirements of small- and family forest owners providing independent assessment, endorsement and recognition of national forest certification systems. The PEFC chain of custody certification provides an independently verified assurance that the certified forest-based material contained in a product originates from sustainably managed forests.

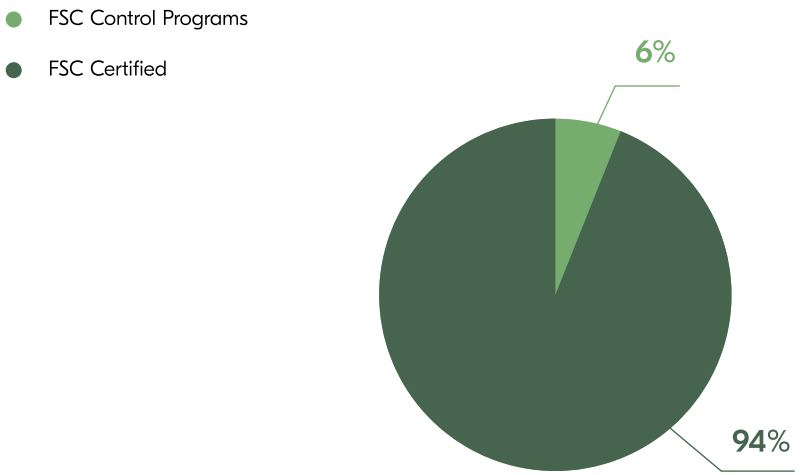
"Our values: flexibility, reliability and transparency are very well represented in the way we manage our supply chain. We conduct our data collection, verification and reporting transparently, in a way that is easy to audit. Our suppliers know that we do not compromise on our criteria for sustainability, however, we are flexible on how compliance can be demonstrated. Even though we place great importance on the certified chain of custody, it's not a prerequisite to work with us – what must fit are the values and the way of doing business. Thereby we are able to establish reliable networks that create value for the environment, our society and for all its members throughout the supply chain."

Viljo Aros, Quality and Environmental Manager

Our high expectations and through vetting process for suppliers

We have established reliable processes for selecting our suppliers and have strict requirements for them in place to minimize the possibility of raw material not complying with our criteria entering the value chain. All our suppliers understand our expectations, have signed our Supplier Code of Conduct and passed the vetting process meeting FSC's, PEFC's and SBP's requirements. Therefore, we can say with great certainty that we only use and supply biomass which is legal, sustainable and in compliance with our high standards of conducting business.

SHARE OF FSC CERTIFIED FEEDSTOCK, %



The minimum requirement for our raw material is compliance with a FSC Controlled Wood Standard. Building on that, **94% of our feedstock is delivered by FSC certified companies**, meaning that they have established third-party-verified procedures to avoid any use of wood products with controversial origin. The suppliers without a certificate are mainly small companies that have been trained by us and comply with the above-mentioned requirements, but who are yet to complete the necessary steps to get certified.

Before acceptance, all feedstock deliveries are controlled at the factory gate. The control procedure consists of 3 main stages with the purpose to verify whether:

- the supplier is in the list of approved suppliers;
- the delivery documents are consistent with the delivered material;
- the delivered material originates from a certified chain of custody or meets the required sustainability criteria to enter our supply chain.

If any of the criteria is not met, the delivery is not accepted.

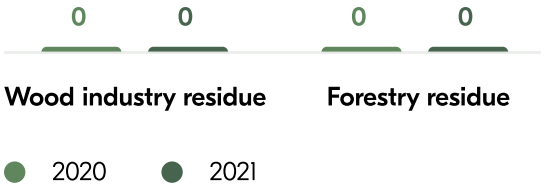
All of our suppliers have signed the Supplier Code of Conduct, confirming to operate in accordance with the values and principles important to Warmeston. The Code is based on the 10 principles of UN Global Compact and covers the topics of human and labor rights, environment and anti-corruption.

Carbon footprint of raw material

Carbon footprint analysis of the Warmeston´s pellet manufacturing starts with the feedstock. The resulting emissions have been calculated by following the RED-II which categorizes the raw material used by Warmeston into residues originating from the forestry and wood industry. According to the directive´s default emission values, there are no emissions associated with sourcing of residual wood.

Due to the fact that 100% of Warmeston´s raw material is comprised of residue, the carbon footprint of this first stage is zero.

WARMESTON´S PELLET EMISSIONS FROM RAW MATERIAL CULTIVATION, gCO_2e/MJ



SHARE OF TOTAL EMISSIONS CONTRIBUTED BY RAW MATERIAL CHAIN

"RESIDUE" means a substance that is not the end product(s) that a production process directly seeks to produce; it is not a primary aim of the production process, and the process has not been deliberately modified to produce it" *

* Directive (EU) 2018/2001: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2001

Our carbon footprint

Processing

Our production process — chipping

Our production process can be roughly divided into two stages — chipping and pellet production.

Firstly, fuelwood is chipped with a mobile chipper either in the factory or in the forest, prior the delivery. After this, all wood chips are fine chipped with a stationary chipper to give the feedstock a suitable fraction size for further processing. The used inputs are diesel fuel in the mobile chipper and/or renewable electricity in the stationary fine chipper.

Mobile chipping

Diesel fuel*

Mobile chipper processes fuelwood to wood chips with a fraction size of up to 50 mm. This is done either at the harvesting site or at the factories and is necessary to prepare the material for the next production steps.

Diesel fuel*, Renewable electricity

Fine chipper

All different input groups besides sawdust are processed in stationary fine chippers to achieve a particle size of less than 20 mm. This results in a fine homogenous biomass ready for thermal drying.

* Diesel is used to power chipping and transportation within the production area

Our pellet production process

Pellet production process creates two types of residues.

- **Ash** is a residue of burning the biomass in the dryers. In 2021, all factories combined generated 430 metric tons of ash, 100% of which was recycled into a lime fertiliser which helps to fight soil acidification and provides plants with micronutrients. The ash management has been outsourced to a licensed external company.

- **Flue gas emissions** from the dryers are proportional to the volume of biomass used in the dryers. We report our emissions quarterly according to our environmental permits and maintain our furnaces and emission control equipment on a regular basis.

Thermal drying

Biomass

All feedstock with a moisture level above 15% (forest and industry wood chips, wet sawdust) is dried in a drum dryer to achieve the moisture level of ca. 10%.

Grinding

Electricity

After drying, the feedstock enters a hammer mill for grinding which further reduces particle size.

Pressing

Electricity

Having achieved the desired particle size, the biomass is ready to be compressed into pellets.

Cooling

Electricity

As the pellets are very hot from the compression process, they need to be cooled. This is done in counter flow air coolers where the cooling medium is the outdoor air.

Carbon footprint of Warmeston´s pellet production

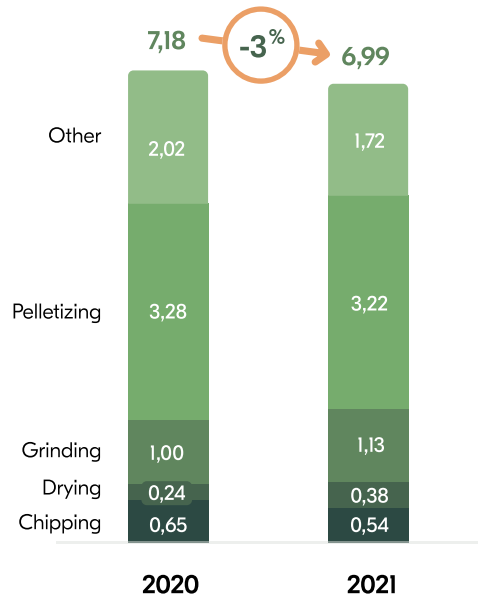
In contrast to the raw-material-associated emissions which were derived from the RED-II default values, the carbon footprint of the pellet production is a calculated result which accounts for actual production activities and used resources of Warmeston.

The carbon footprint assessment of the production phase includes chipping and pellet production which involves drying, grinding, pelletizing and few other inputs/activities (e.g., transportation within the production area, used water and starch).

The most significant contribution to this stage´s emissions come from pelletizing, which comprises almost half of the total production footprint. It should be noted that 100% of the used electricity in Sauga, Purila and Järvere is from renewable sources. But according to the RED-II requirements, the use of renewable energy which has been purchased from the grid cannot be considered in the carbon footprint calculations, making the electricity-intensive processes such as pellet pressing seem more emission-intensive than in reality. When accounting for the used renewable energy, then the 2021 emissions for this stage would be more than 4 times smaller: 1,59 gCO_2e/MJ.

Compared to 2020, the emissions from pellet production decreased roughly 3% in 2021, contributing 80% to the total emissions.

WARMESTON´S PELLET EMISSIONS FROM THE PRODUCTION STAGE, gCO_2e/MJ



SHARE OF TOTAL EMISSIONS CONTRIBUTED BY PELLET PRODUCTION


COMBITRANS
VOLVO
FH

Our carbon footprint

Transport

Raw material journey from our suppliers to our factories

Besides one small Latvian sawmill near the Estonian border and two shipments of sawdust from Sweden in 2021, we rely solely on the Estonian forest and wood industry to supply our feedstock.
Our suppliers include forest owners and management companies, sawmills, plywood factories, plaining mills, furniture producers, log-cabin manufacturers etc. They come in various shapes and sizes but share the same values in terms of sustainable forest management. The ability to sell the production residues is particularly important for smaller companies.

We pay great attention to optimizing our supplier network to keep the raw material chain as short as possible to lower the cost to the environment and increase the flexibility and efficiency of the factories´ operation.

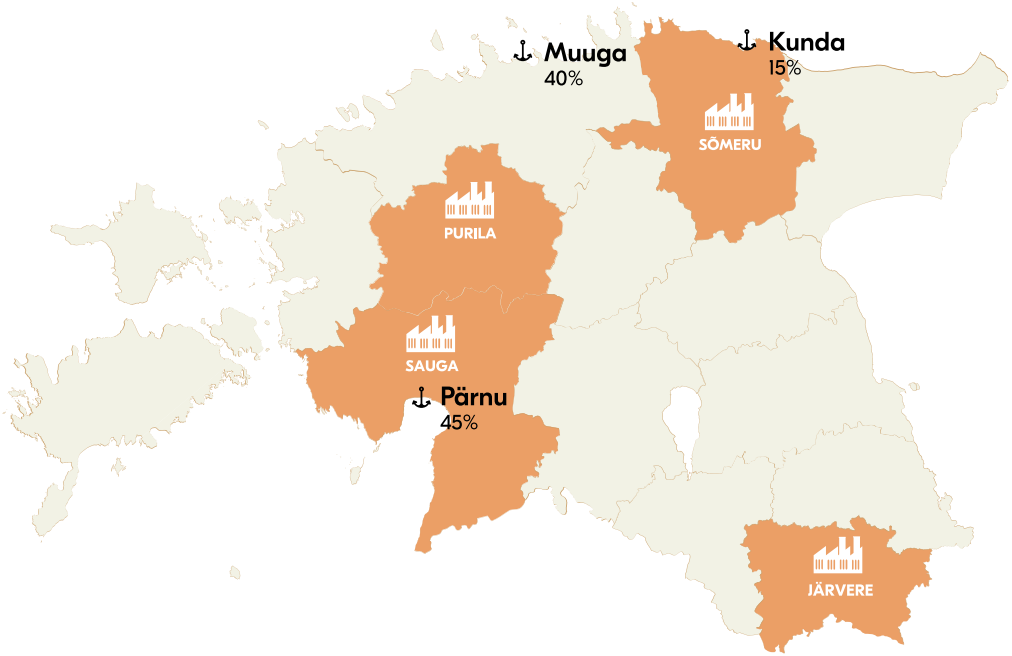
RAW MATERIAL GROUPS´ JOURNEY TO THE FACTORIES. WEIGHTED AVERAGE DISTANCE, 2021

Sauga	Sõmeru	Järvere	Purila
Primary feedstock (64 km)	Tertiary feedstock (62 km)	Primary feedstock (56 km)	Primary feedstock (63 km)
Secondary feedstock (85 km)		Secondary feedstock (54 km)	Secondary feedstock (68 km)
Tertiary feedstock (33 km)		Tertiary feedstock (33 km)	Tertiary feedstock (25 km)

Finished product´s delivery to ports

Once the pellets are ready for storage, they are transported from the factories to one of the three Estonian ports Warmeston uses: Pärnu, Muuga or Kunda. Sauga, Purila and Sõmeru ship only from the ports closest to their respective factories while Järvere pellets are stored in both, Muuga and Pärnu ports.

Pellets are transported from the factories to the ports by Warmeston's affiliate Combitrans OÜ. Our trucks run on diesel fuel but connected to our pilot project, Purila-Muuga route is serviced by an LNG-powered truck.

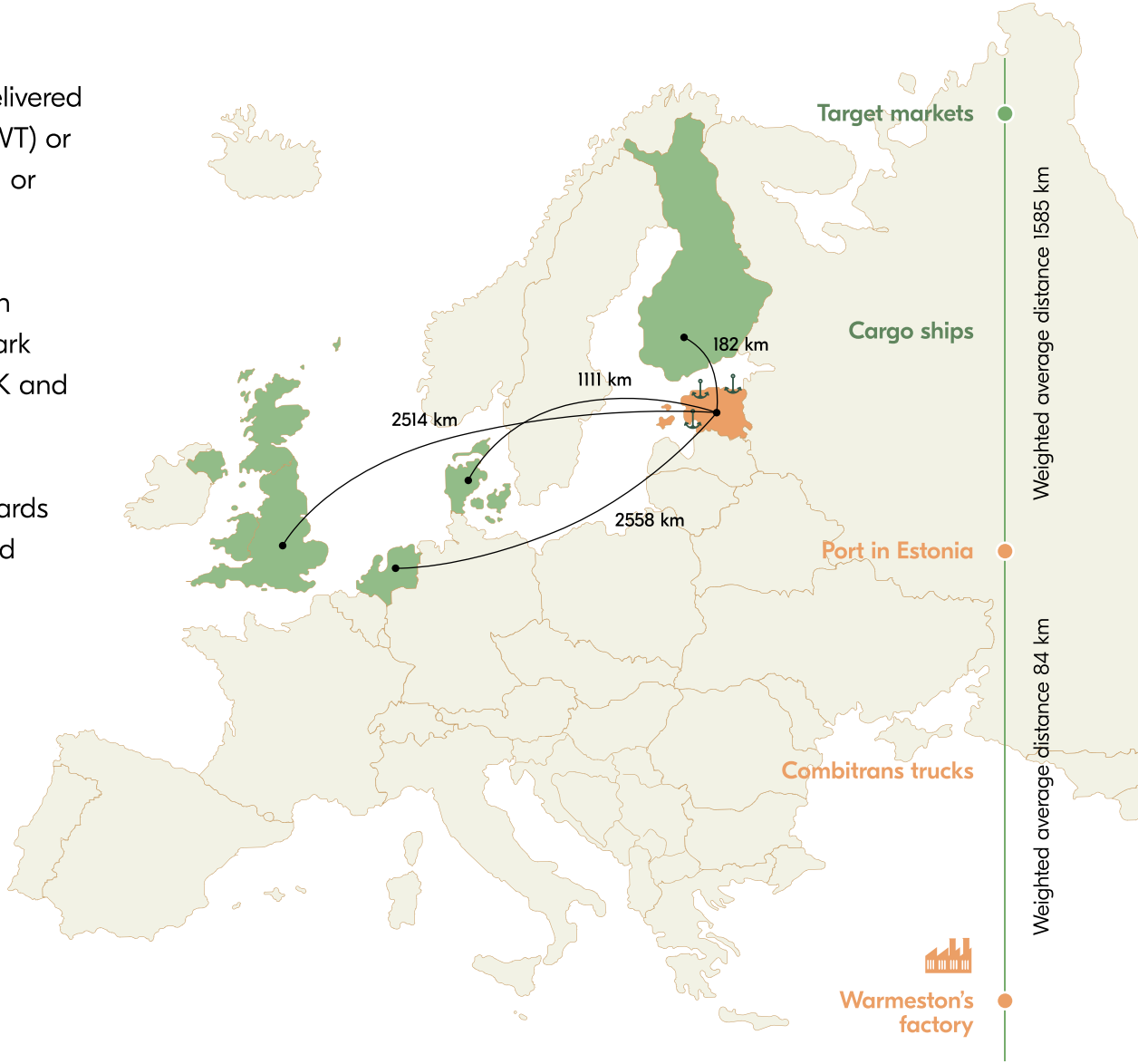


Pellets´ journey to the clients

Once the pellets have been transported to the ports, they are delivered to our customers by coasters (3-10kt DWT), handysize (15-35kt DWT) or by handymax (35-50kt DWT) vessels which are either outsourced or owned by our clients and run on marine fuel oil.

Our key clients are large-scale CHP plants that produce with high efficiency electricity and heat. The key market in 2021 was Denmark which is the second-largest European pellet importer after the UK and the largest on per-capita basis.[1]

This is due to a strong movement away from fossil fuels and towards renewable energy sources, driven by governmental regulation and subsidies incentivizing further bioenergy uptake.[2]



1 — Bioenergy Europe Statistical Report 2019
2 — Danish Energy Agency. Facts about bioenergy in Denmark

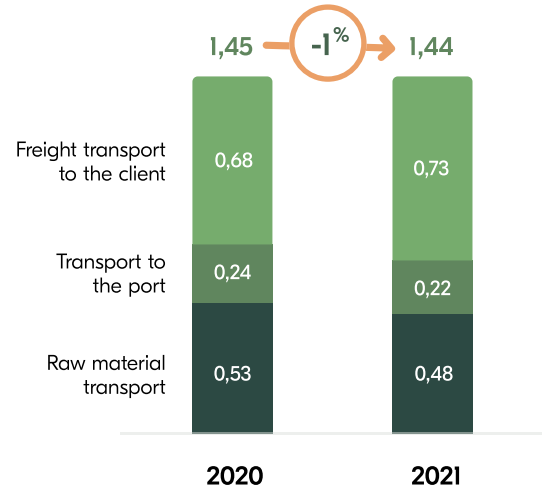
Carbon footprint of Warmeston´s transportation

As for the previous stage, the emissions related to transportation were calculated by taking Warmeston-specific activities and used resources into account. The carbon footprint of the transportation includes the transport of raw materials to the factories and the manufactured pellets from our factories to the ports and then to the end-clients.

Compared to 2020, the raw material in 2021 was sourced from a bit closer while the clients were located slightly further away, causing the 9% decrease and 7% increase, respectively. Despite the 10% increased pellet output from the previous year, transportation-related emissions managed to decrease by 1%, demonstrating the efficiency of Warmeston´s supply chain.

In 2021, carbon footprint of the raw material and pellet transport comprised 17% of the total carbon emissions of Warmeston's pellet.

WARMESTON´S PELLET EMISSIONS FROM THE TRANSPORTATION STAGE, gCO_2e/MJ



SHARE OF TOTAL EMISSIONS CONTRIBUTED BY PELLET PRODUCTION


VOLVO
SWECON
2
L120H

Our carbon footprint

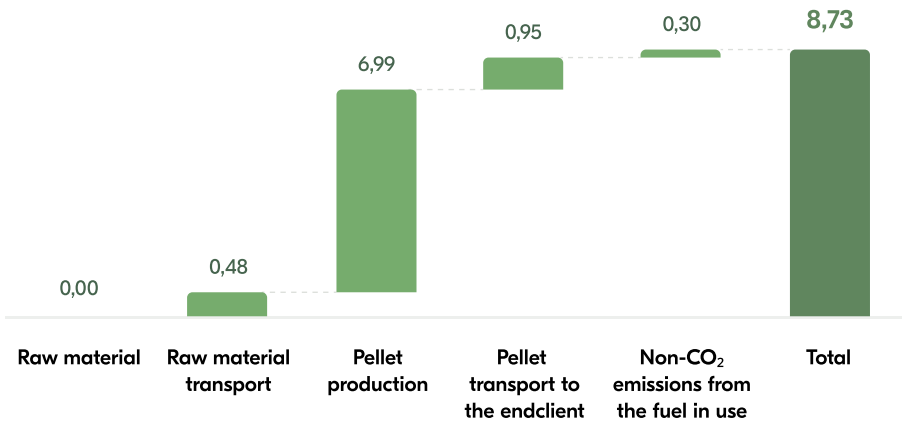
Summary

Snapshot of our pellet carbon footprint

In 2021, the carbon footprint of Warmeston´s pellets amounted to 8,73 gCO_2e/MJ which represents pellets´ carbon intensity in grams of carbon dioxide equivalent per megajoule of energy. The footprint is comprised of four general stages: raw material, production, transport and non-CO_2 emissions from the fuel in use*.

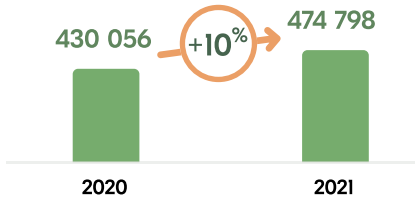
The vast majority of the emissions originate from the energy-intensive pellet production which is responsible for 80% of the total footprint. Compared to the previous year, the pellets manufacturing emissions per MJ reduced by 2%, illustrating the success of completed efficiency improvements in the production processes. Similar conclusion can be drawn from the absolute emissions which saw an increase of 6%, while the produced output increased by 10%.

WARMESTON PELLET´S CARBON FOOTPRINT OVERVIEW BY PRODUCTION STAGES, gCO_2e/MJ, 2021

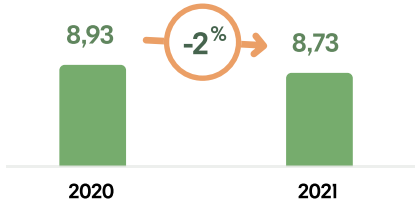


Warmeston´s pellets can, and often do substitute fossil fuels and therefore play an important role in avoiding the enormous emissions associated with their use.

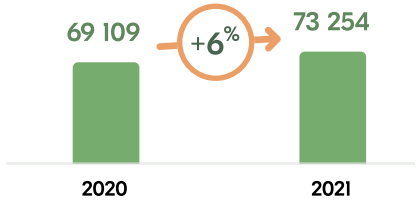
WARMESTON PELLET OUTPUT 2020-2021, t



WARMESTON PELLET´S EMISSIONS IN 2020-2021, gCO_2e/MJ



WARMESTON PELLET´S CARBON EMISSIONS IN 2020-2021, tCO_2e



By replacing coal, our 2021 pellet output had the potential to avoid:

More than 313 000 t of coal being burned

More than 933 000 t of CO_2e emissions being emitted

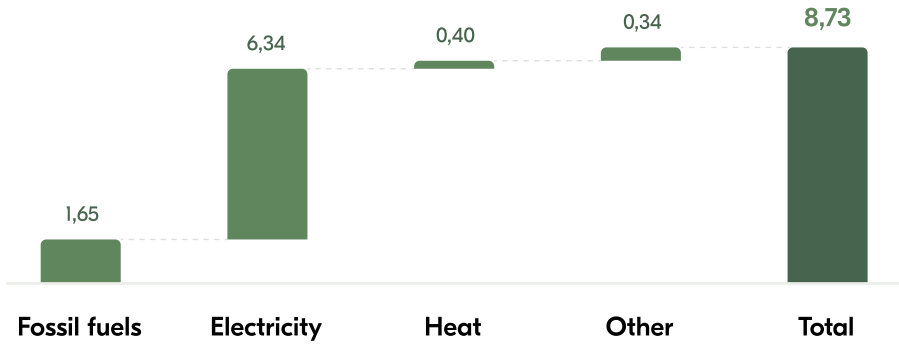
* This category represents the non-CO_2 GHG emissions (CH_4 and N_2O) which are emitted when burning the pellets

Carbon footprint sources

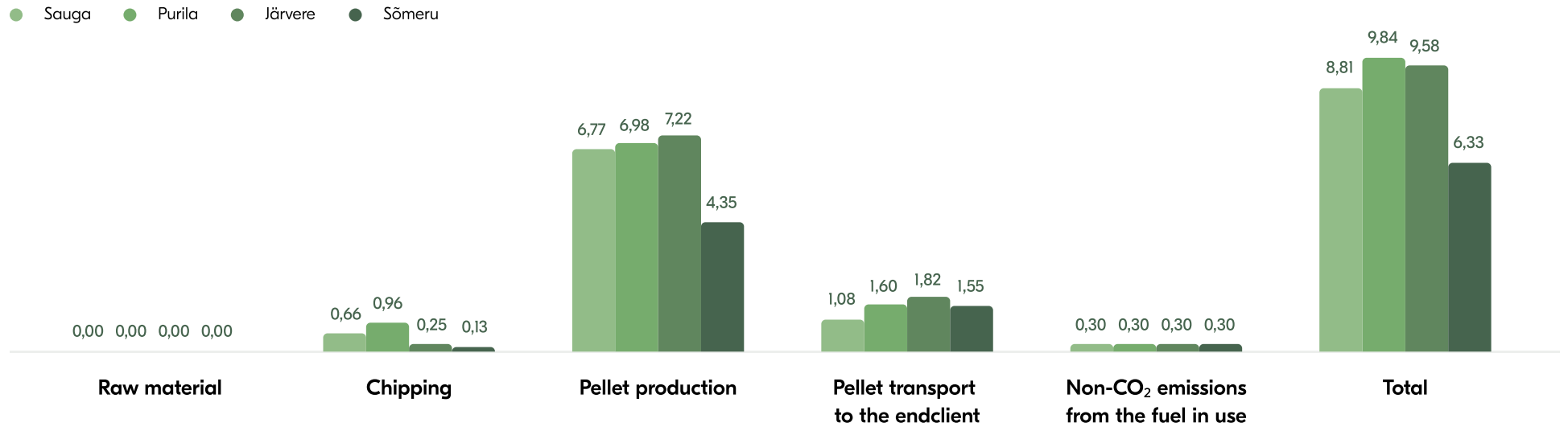
When considering the various energy sources contributing to the total carbon footprint, it is clear that electricity plays the biggest role, being responsible for more than 70% of the impact.

Looking at the factory-specific results, it is clear that the premium pellet factory in Sõmeru has the smallest emission intensity per MJ: 6,33 gCO_2e. The main cause for this can be found in the used feedstock – as the raw material is already dry and only a small fraction of it needs to be chipped, it requires less processing, i.e, less resources and results in 40% reduced production-associated emissions compared to the other factories.

WARMESTON PELLET´S CARBON FOOTPRINT OVERVIEW BY ENERGY SOURCES, gCO_2e/MJ, 2021



WARMESTON PELLET´S CARBON FOOTPRINT OVERVIEW BY FACTORIES, gCO_2e/MJ, 2021



RED-II in the context of the findings

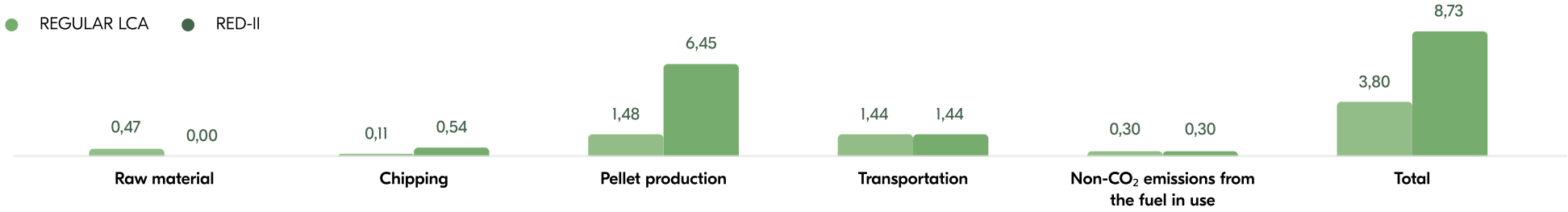
Like already mentioned earlier, the presented carbon footprint results for 2021 were calculated according to the RED-II which divides the impact categories between four groups, as shown below. In order to ensure that the calculated results are as reflective of real life as possible, the total carbon footprint of Warmeston´s pellet production is a mix between the default values provided by the directive and Warmeston-specific calculations:

Impact category	Basis for calculations
Cultivation	Based on the RED-II default values
Processing	Based on the actual input data from Warmeston
Transport	Based on the actual input data from Warmeston
Non-CO_2 emissions from the fuel use	Based on the RED-II default values

Here it is important to note that due to the RED-II requirements, the renewable electricity used in Warmeston´s operations was not allowed to be included in the analysis - instead, an emission factor for Estonia´s average electricity was used. Therefore, despite the fact that 100% of the electricity needs in Sauga, Järvere and Purila are met with renewable electricity while Sõmeru factory uses the solar energy generated on the site, used renewable electricity has not been accounted for in the GHG calculations.

For the sake of transparency, a separate carbon footprint assessment which accounts for the use of renewable energy was also carried out. In that case, the total carbon footprint of Warmeston´s pellet production in 2021 would be 56% smaller: 3,8 gCO_2e/MJ. This is an important aspect to highlight as it demonstrates the significant emission reduction that Warmeston has achieved through its conscious move towards renewable energy in all of its factories.

THE CARBON FOOTPRINT COMPARISON BETWEEN THE CALCULATIONS BASED ON RED-II AND REGULAR LCA METHODOLOGY, 2021, gCO_2e/MJ*



* In the given context, regular Life Cycle Assessment (LCA) includes the same inputs and activities as the calculation based on RED-II, but also considers the share of renewable energy used in the production processes.

Our employees, communities and society

Overview of Warmeston´s people

By the end of 2021, Warmeston, together with its affiliate companies, hired 230 people, often in the rural areas of Estonia. The biggest employer is Combitrans, with Warmeston as the close second, employing 37% and 35% of the employees, respectively. At the end of 2021, Warmeston OÜ employed 81 people, 86% of which were working in the three factories and the remaining in our office in Tartu.

In our further analysis of our people, we will focus on the employees working in the four pellet factories. This serves as a way to highlight the people in charge of handling our production processes, the core of the given report and Warmeston's business.

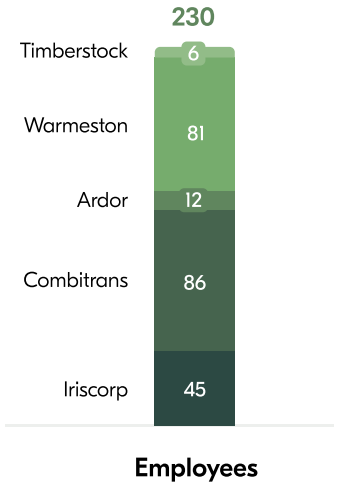
The average employee working in our factories is 40 years old and is well experienced, as the average employment length of the current employees is 5 years and several having more than 10 years of experience with our plants. There are 76 men working in the production units, as opposed to 7 women, causing the women to constitute just 7% of the factory employees. The average woman is 4 years younger than the average man, being 38 and 42 years old respectively.

40
The average age of a production-unit employee

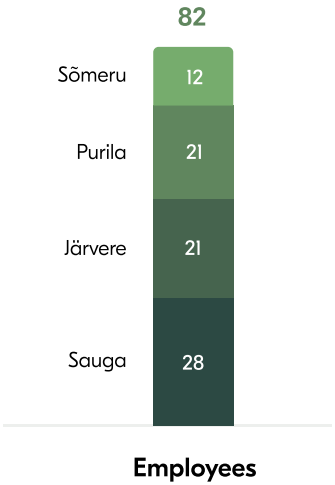
38
Average age for women

42
Average age for men

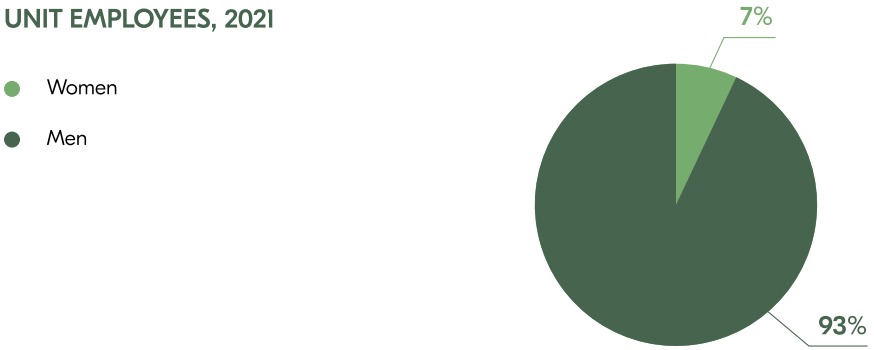
WARMESTON GROUP´S EMPLOYEES, 2021



THE PRODUCTION UNIT EMPLOYEES´ DISTRIBUTION, 2021



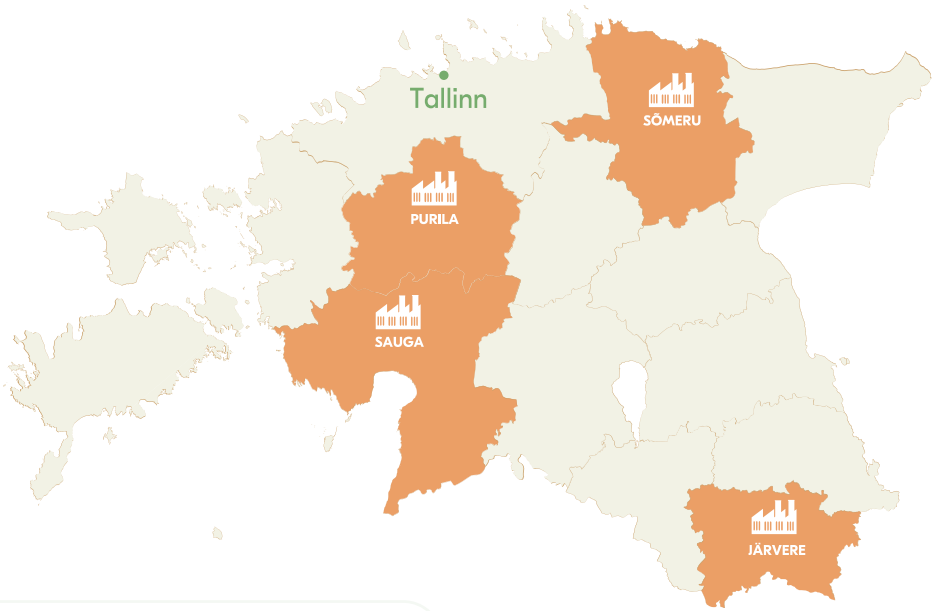
GENDER DISTRIBUTION OF THE PRODUCTION UNIT EMPLOYEES, 2021



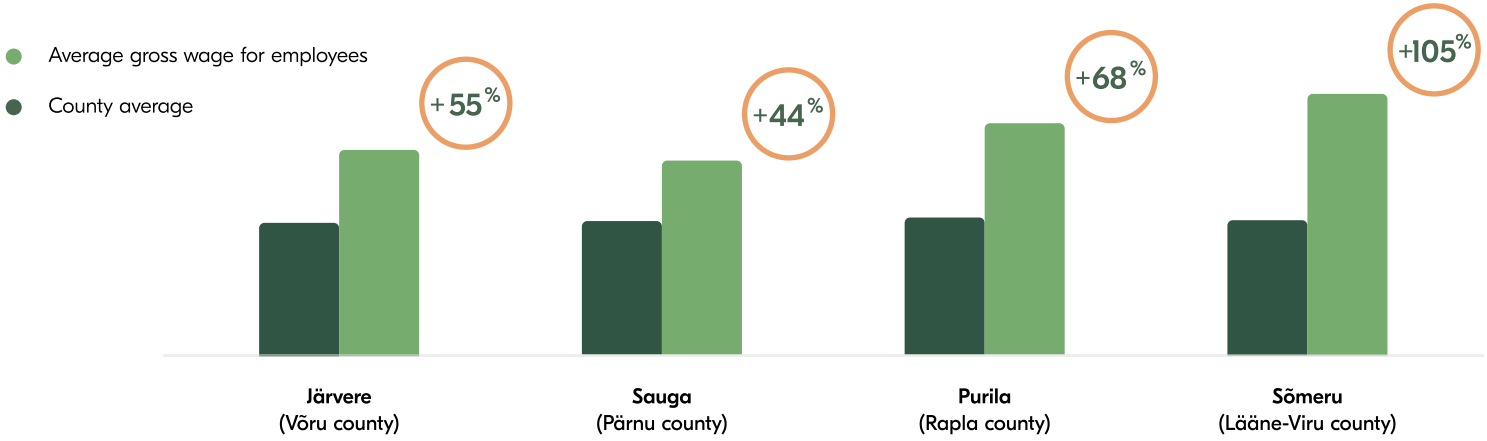
Contribution to our people and communities

We offer our employees a meaningful and positively challenging jobs with fair wages which are up to 2x higher than the respective county averages.

We pay great attention to workplace safety and are strictly in line with the Estonian workplace safety regulations. Each new onboarded employee is made aware of the contents of Warmeston's internal safety instructions that outline, among other things, the use of protective equipment and the risks to consider while working with the production machinery followed by on-site training. In 2021 we updated and improved our safety instructions in all of the factories to ensure that the employees are provided with the necessary information and work safety would remain a top-priority.



THE LEVELS OF OUR FACTORY EMPLOYEES´ GROSS WAGES (INCL. BONUSES AND THE PLANT MANAGEMENT) RELATIVE TO THEIR RESPECTIVE COUNTIES, 2021



Contribution to society

Warmeston and its affiliates place a great importance on giving back to the local communities and the society as a whole.

Our charitable activities are the reflection of what our team cares about - we value physical health and believe in the importance of the examples professional athletes set. Therefore, the biggest support from Warmeston is directed towards Estonian sport — we have been a long-time supporter of teams and individuals practicing sports like basketball, football, volleyball, hurdling and horse riding all over the country. Additionally, we support the Youth to Olympics Foundation (Noored Olümpiale SA) which guides young athletes in their development. We also helped with the establishment of a skiing and sledding hill in Sõmeru so that outdoor physical activity would be more accessible to all!

Understanding the importance of not-for-profit organizations (NPOs) in shaping and helping the local communities, we support the Pärnu-Jaagupi volunteering firemen association and the local animal shelter Paikass NPO by providing them with pellets for heating and litter, respectively. Warmeston also offered its contribution to the Pai Campaign, aimed at appreciating the medicine workers for their efforts in the time of COVID-19.

Our continuous support into education involves supporting Sõmeru´s robotics class, Estonian Forest Students Association and the annual engineering-themed competition CADrina by Kadrina Middleschool.

Annex
Carbon footprint assessment methodology

The main purpose of Warmeston's carbon footprint assessment is to assess the company's carbon footprint from its pellet production in terms of global warming potential per 100 years (GWP 100).

Methodology and standards

- Warmeston's carbon footprint analysis was conducted by following the principles of Life Cycle Assessment (LCA), adhering to two generally accepted international ISO standards - ISO 14040: 2006 and ISO 14044: 2006.
- Emissions per unit of input were calculated in SimaPro program, using IPCC 2021 methodology and the emission factors from BioGrace-II and EcoInvent Database v3.8.
- The analysis is in accordance with the directive (EU) 2018/2001 (recast) on the promotion of the use of energy from renewable sources.

Impact category

Global warming potential (GWP 100, kg CO_2 equivalent).

System boundaries

Raw materials to client (cradle-to-gate) approach.

Structure of the analysis

The analysis is based on an MS Excel dynamic model specially developed for Warmeston.

Functional unit

Production of 1 metric ton of pellets; 1 MJ of energy.

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