

# Environmental Product Declaration

Reed and sedge pellets “Hygge pellet”



“Nine Voices”  
2020, Summer

# Environmental Product Declaration

## General information

Owner of environmental product declaration	Nine Voices, Kuršių str. 7, Dreverna, Lithuania  Owned by Baltic Environmental Forum Lithuania Kalvarijų str. 8-17 LT-09309 Vilnius Lithuania <a href="http://www.bef.lt">www.bef.lt</a>
Product	Hygge pellet
Manufacturer	Nine Voices
Manufacturing sites	Dreverna, Lithuania
Product application	Horse (animal) bedding from biomass (grass)
Declared unit	1 kg of product
Date declaration was issued	June, 2020

As the product is unique and does not have product category rules (PCR) the EDP is prepared according ISO 14040:2006 and ISO 14044:2006 standards. The declaration is not externally verified according ISO 14025:2010.

Environmental product declaration data is based on production data for 2020, May.

Prepared by dr. Sigita Židonienė

## Product

Reed and sedge pellets “Hygge pellet” are mainly used for horse or another animal bedding. The pellets create a thick and soft bedding layer on concrete – comfortable for a horse. They do not create dust and are hyper absorbent, so, there are no ammonia odors in the stables, just a fresh, comfortable and dry environment. The pellets are made from reeds, sedges and other wetland plant grasses, which horses do not eat, and are high temperature treated, so they do not cause allergies or diseases. It is a natural product from protected areas without any impurities or fertilizers. The production of these pellets is a nature conservation activity. During the production late-cut grass that is no longer suitable for fodder is recycled. In this way we are protecting the home of the rarest Europe’s songbird – the Aquatic Warbler – and other bird species.

This environmental declaration covers pellets made by “Nine Voices” in Dreverna, Lithuania.

## Product Materials

Pellets are made from biomass which is harvested in natural wetlands that are situated in Lithuania’s protected areas near the Baltic Sea. These territories are a part of the Natura2000 network. Here, natural wetland vegetation grows and there is no agro-industrial activity, which means a fertilizer and chemical-free environment.

The product consists only from biomass, no additional substances are added.

## Production

“Nine voices” recycles the late-cut grass that is not suitable for fodder anymore from home of Aquatic warbler and turns it to a new product – “Hygge pellets”. The late cutting (from the mid of August) is needed to ensure the safety of 2 aquatic warbler broods. Only in August the chicks of the second brood are capable to run away from the machinery and the mowing is allowed. The grass cut so late is not suitable for fodder anymore, therefore there is a problem, where to put huge amount of biomass left in fields. “Nine voices” solves this problem by collecting this grass, avoiding waste and encouraging Aquatic warbler-friendly farming.

The grass in wetlands are mowed from the mid of August. Special modern equipment designed to work in wet conditions, is used. It prevents the soil from harsh damage and consumes less fuel. Then grass is baled into rolls, covered with polypropylene net and transported directly to biomass processing facility (5 km), where it is stored until it needs to be processed into pellets. The biomass is shredded, treated with heat and pressed into pellets. No additional substances are added. Then hot pellets go to the huge open bags to get cool (in order not to get mould). Pellets are packed mostly in white polypropylene woven big bags – 500 kg per unit. In very rare occasions, the smaller (15 kg per unit) low density polyethylene (LDPE) bags are chosen. Further the packages are prepared for transportation –wrapped into packing film stretch and put on wooden pallets.

## Recycling and Waste Processing

The product does not contain any synthetic additives, thus is 100 % biodegradable and therefore suitable for fertilizing fields after use in the stable box. No hazardous waste originates from pellets. Packaging materials waste are handled in accordance with current legal requirements: sorted and delivered for recycling.

## Environmental profile

The functional unit of this EPD refers to the manufacture of 1 kg pellets, it covers the life cycle of the product from cradle to the factory gate. The life cycle assessment (LCA) does not include information of the use and end of life stages.

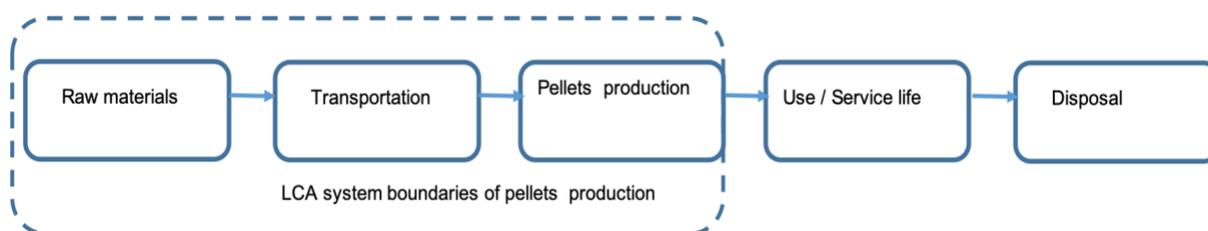


Figure 1. System boundaries of life-cycle assessment. The diagram describes the life-cycle stages of pellets production. LCA excludes the use and end of life life-cycle stages.

SimaPro – the software for comprehensive analysis developed by Pre-Sustainability was used for modelling the life cycle of the product under review. The data required for the upstream chain for which no specific details are available, is taken from the SimaPro database. As product is unique from its origin, for the raw material - the biomass – “grass, organic (RoW) grass production, permanent grassland, organic, extensive” data was used. As for electricity - Electricity, high voltage {LT}| electricity production, wind, 1-3MW turbine, onshore included. The primary data collected at the manufacture’s is based on monthly volumes and/or extrapolated.

ReCiPe is a method used for the life cycle impact assessment. Inventory results expressed in 18 midpoint indicators scores.

While conducting LCA, commonly is applied 5 % cut-off rule, that means that the Life Cycle Inventory (LCI) data for a minimum of 95% of total inflows (mass and energy) to the upstream and core module shall be included. However, in this study, wherever data was available, it was included in the study, even if aggregate mass flows for a specific input or output fell below the 5% materiality threshold. The only inflow not included in the LCI model was oil for equipment maintenance.

Table 1. Results of LCA – Environmental impact

<b>RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1kg of pellets</b>		
Parameter	Unit	Value
Climate change	kg CO2 eq	0,25215882

Ozone depletion	kg CFC-11 eq	2,6032E-08
Terrestrial acidification	kg SO2 eq	0,00126296
Freshwater eutrophication	kg P eq	7,0593E-05
Marine eutrophication	kg N eq	0,00260811
Photochemical oxidant formation	kg NMVOC	0,00171465
Particulate matter formation	kg PM10 eq	0,00084913
Terrestrial ecotoxicity	kg 1,4-DB eq	-0,0001169
Freshwater ecotoxicity	kg 1,4-DB eq	0,00010659
Marine ecotoxicity	kg 1,4-DB eq	0,00016959
Ionising radiation	kBq U235 eq	0,0071852

Table 2. Results of LCA – Resource use

<b>RESULTS OF THE LCA – RESOURCE USE: 1kg of pellets</b>		
Parameter	Unit	Value
Agricultural land occupation	m2a	3,39718364
Urban land occupation	m2a	0,00677136
Natural land transformation	m2	5,8255E-05
Water depletion	m3	0,0030694
Metal depletion	kg Fe eq	0,04615461
Fossil depletion	kg oil eq	0,07915749

Table 3. Results of LCA – Human health

<b>RESULTS OF THE LCA – HUMAN HEALTH: 1kg of pellets</b>		
Parameter	Unit	Value
Human toxicity	kg 1,4-DB eq	-0,0093071

1 kg of pellets have impact to climate change respectively 0,25 kg CO2 eq. A significant part of all the environmental indicators, such as the climate change, ozone depletion, photochemical oxidant formation and freshwater ecotoxicity can be attributed to the diesel, burned in agricultural machinery used for harvesting grass and transportation it to production site. Negative terrestrial ecotoxicity refers to raw material - grass, that is grown naturally without any toxic substances released to environment and thus contributing to better biodiversity condition. On the other hand, grass has highest impact on agricultural land occupation, but as this unique product is as an outcome of natural land reservation and natural habitats restoration for birds (Aquatic Warbler) the higher score should be considered as positive impact.

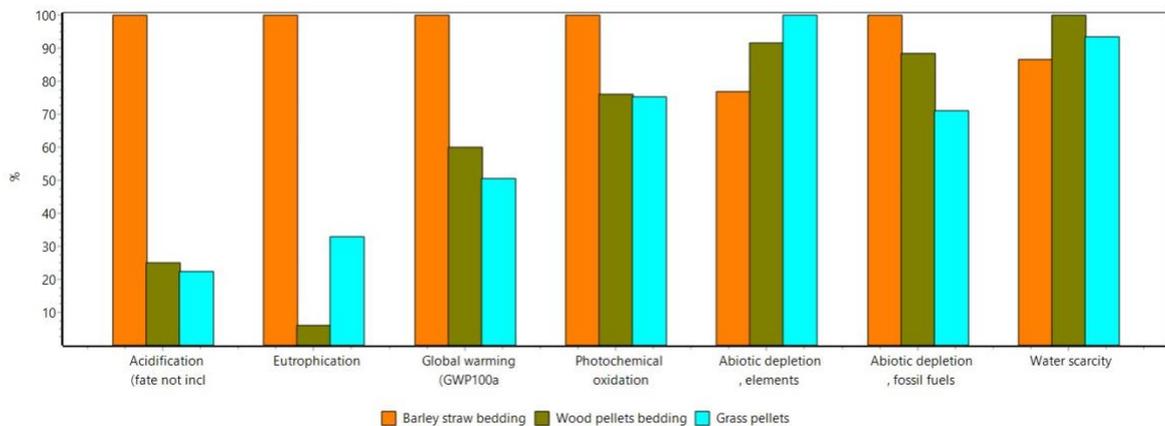
## Discussion

EDP serves as a tool to compare environmental performance of the same products group. As we could not find EDP for similar products, we made modelled comparison with the most common horse beddings – barley straw and hardwood chips pellets. Our assumptions were that in LCA calculations the only one parameter is changing – raw material – grass, straw or wood chips. All other inputs as transportation, production processes and packaging are the same. For

comparison was used EPD (2018) method. This method created by Swedish Environmental Management Council is dedicated for creation of EDP. It has 7 main categories (acidification, eutrophication, global warming, photochemical oxidation, abiotic depletion (elements), abiotic depletion (fossil fuels) and water scarcity. Table 2 shows comparison results of three different bedding types.

Table 2. Comparison of different bedding types

Impact category	Unit	Barley straw bedding	Wood pellets bedding	Grass pellets
Acidification (fate not incl.)	kg SO2 eq	0.006137308	0.001530858	0.001378697
Eutrophication	kg PO4 <sup>---</sup> eq	0.00462853	0.000280831	0.001521294
Global warming (GWP100a)	kg CO2 eq	0.508382235	0.304617825	0.256385288
Photochemical oxidation	kg NMVOC	0.002310635	0.001759336	0.00174117
Abiotic depletion, elements	kg Sb eq	8.67677E-07	1.03274E-06	1.12863E-06
Abiotic depletion, fossil fuels	MJ	4.667928963	4.126258877	3.318027367
Water scarcity	m3 eq	0.093782751	0.108467488	0.101292438



shows change in impacts across different life cycle impact categories in percentage.

Fig.1 Percentage change in impacts across different life cycle impact categories

Fig.3. Single score results of the assessment

1kg of pellets		Downstream		Core	Total
		Raw materials	Transportation	Production	
Carbon footprint	0,059	0,171	0,02	<b>0,25</b> kg CO2/kg	
Ecological footprint					
Water footprint <sup>1</sup>	13	31,3	3.2	47,5 l/kg	

## References

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations – principles and procedures.

ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines

ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework