About Nordic Ecolabelled

Solid fuels



Version 3.0

Background to ecolabelling
26/09/2016
Consultation proposal

Nordic Ecolabelling

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Note: The original document, of which this is a translation, was written in a combination of several Scandinavian languages. The reason for this is that the Nordic countries work in close collaboration to develop the Nordic Ecolabelling criteria. Nordic Ecolabelling is of the opinion that this variation in the original document (provided there is coherence) can be seen as confirmation of this strong Nordic partnership, which enables and drives the development of the Nordic Ecolabel's criteria.

Addresses

In 1989, the Nordic Council of Ministers decided to introduce a voluntary official ecolabel, the Swan. These organisations/companies are responsible for the official Nordic Ecolabel on behalf of their own country's government. For more information, see the websites:

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1 Summary

The overall aim of this revision is to ensure that the Nordic Ecolabel's criteria continue to secure a positive environmental benefit via ecolabelling and also that the criteria are viable and clear for the industry. The revision has considered the areas that were apparent on the evaluation of the criteria. This revision has also focused on expanding the product group with the possibility of also bringing briquettes, wood chips, firewood, barbecue charcoal/briquettes and firelighting products under the Nordic Ecolabel.

Product group message

Nordic Ecolabelled solid fuels – pellets, briquettes, wood chips, firewood, barbecue charcoal/briquettes and firelighting products - consist of renewable material from sustainably produced, controlled sources. The energy consumption during the production is limited in order to ensure energy efficiency and reduce climate impact. The energy requirement thus includes stringent requirements concerning the use of fossil fuels, as these are highly significant for emissions of greenhouse gases in a life cycle perspective for solid fuels. Stringent requirements for quality properties ensure good combustion properties.

MECO and RPS analyses

To obtain an overview of the key environmental impacts in the products' life cycles, an environmental assessment of the product group was performed as a qualitative MECO analysis for each of the four product areas. MECO stands for the assessment of Materials, Energy, Chemicals and Other characteristics and describes the principal environmental impacts during the product group's life cycle phases. This was followed by an overall RPS analysis for the product group as a whole. RPS was found for the following:

- Raw materials contained in solid fuels
- Energy consumption and impact on the climate
- The quality of the solid fuels

Market description

A brief description of the Nordic market shows that distribution and sales of solid fuels partly take place via manufacturers, but also to a great extent via wholesalers, builder's merchants, retail chains and online-based businesses (many product types). Consumers consider price first and foremost and then quality and function/environment when purchasing solid fuels. The description of the market also shows that environmental statements used in marketing by builder's merchants and retailers focus on the use of sustainable and carbon-neutral raw materials.

Changes in the revised version

Based on the assessment, the MECO and RPS analyses and the market description, the main changes in the revision focus on:

- expanding the criteria to include briquettes, wood chips, firewood, charcoal/briquettes and firelighting products.
- tightening and updating the criteria for sustainable raw materials
- amending requirements concerning energy consumption and setting more stringent requirements for the use of fossil raw materials in the production phase
- tightening the requirements for quality aspects

All changes and amendments to the requirements are listed in Chapter 8. Further details about the changes to requirements and new requirements can be found in Chapter 7.

2 Basic facts about the criteria

2.1 Products that may be Nordic Ecolabelled

The product group comprises the following solid fuels for domestic and industrial use: pellets, briquettes, wood chips, firewood, charcoal/briquettes and firelighting products. The material in the products is made from renewable raw materials. The product group also includes composite products that combine functions of the above-mentioned product types (e.g. products that serve both as a solid fuel and firelighting product). However, these products must demonstrate that they comply with all of the Nordic Ecolabel's requirements within the different product types that the product has combined.

Liquid fuels for transport, heating and industrial production may not be Nordic Ecolabelled according to these criteria, but may be Nordic Ecolabelled according to the criteria for biofuels. Nor does the product group include liquid and gel firelighting products defined by the EN 1860:3:2003 standard, matches, smoking wood chips and disposable barbecue grills.

Product group message

Nordic Ecolabelled solid fuels – pellets, briquettes, wood chips, firewood, barbecue charcoal/briquettes and firelighting products - consist of renewable material from sustainably produced, controlled sources. The energy consumption during the production is limited in order to ensure energy efficiency and reduce climate impact. The energy requirement thus includes stringent requirements concerning the use of fossil fuels, as these are highly significant for emissions of greenhouse gases in a life cycle perspective for solid fuels. Stringent requirements for quality properties ensure good combustion properties.

Nordic Ecolabelled solid fuels:

- consist of renewable materials – e.g. wood, herbaceous crops and fruit biomass
- consist of sustainably produced raw materials – to conserve the earth's resources
- meet stringent requirements for energy consumption – to reduce climate impact

- meet stringent quality requirements – to ensure good combustion properties

2.2 The version and validity of the criteria

The criteria for the Nordic Ecolabelling of pellets were first agreed by the Nordic Ecolabelling Board in June 2005 and remained effective until 10 June 2007 as version 1.0.

At the secretariat management meeting of 16 November 2005, it was agreed to amend the energy requirement. The change led to version 1.1 of the criteria.

At the secretariat management meeting of 3 May 2006, it was decided to extend the validity of the criteria until 31 December 2007. The new version was called 1.2.

At the secretariat management meeting of 8 December 2006, it was decided to extend the validity of the criteria until 31 December 2008. The new version was called 1.3.

At the secretariat management meeting of 13 December 2007, the revised version 2.0 of the criteria was approved as effective until 31 December 2012.

At the secretariat management meeting of 1 November 2011, it was decided to extend the validity of the criteria until 31 December 2014. The new version was called 2.1.

At the Nordic Criteria Team meeting of 3 September 2014, it was decided to extend the validity of the criteria until 31 December 2017. The new version was called 2.2.

At the Nordic Criteria Team meeting of 8 February 2016, it was decided to extend the validity of the criteria until 31 March 2018. The new version was called 2.3.

2.3 Nordic Ecolabel licences

There are no licences in this product group.

3 The Nordic market

This chapter briefly describes the Nordic market for the individual types of solid fuels, and outlines the solid fuel industry in each of the Nordic countries (data from 2013-2015).

3.1 The Nordic market for solid fuels

Pellets

There are currently three main types of purchasers/end-users of pellets:

- Private homeowners
- Small-size businesses and public institutions (schools, etc.)

- Major manufacturers of electricity and Combined Heat and Power (CHP)

The main factors influencing the market for pellets are quality, price and service. The market is characterised by a large number of pellet providers: Producers of pellets, builder's merchants, petrol stations and many small-size businesses that primarily sell their products online and deliver to the customer's doorstep. Nowadays, large quantities of pellets are being imported to the Scandinavian market for use in industries, CHP production and by private homeowners. The price of the imported pellets is low and it is very difficult for producers in Scandinavia to compete with these prices. However, the pellets produced in Scandinavia can compete on quality and reliability of supply. Pellets are marketed partly with the FSC/PEFC label and are also certified as complying with the quality provisions of the EN14961 standard, ENplus or DINplus (applies in particular in Denmark). Pellets that are to be exported to Germany must have DINplus certification. Experience says that customers do not demand FSC/PEFC labelled pellets. Pellets are a very uniform type of fuel that, in comparison with other solid biofuels, are associated with a green image. The wide range means there is considerable pressure in the market, particularly on prices, but there is also variation in quality, which is the potential for the Nordic Ecolabel.

Briquettes

Sales of briquettes are generally increasing in all the Nordic countries, where they are used as an alternative to firewood. Briquettes are sold widely via builder's merchants, retail chains and lots of small companies, which primarily sell their products online and deliver to the customer's doorstep, either in bags, sacks or on pallets. Briquettes are typically made from wood residual products (sawdust). There are also some types that are made entirely or partly from bark, peat and brown coal (lignite). According to the findings of a Danish study,[1] there are good quality and poor quality briquettes on the market and this is often reflected in the price. Only a small percentage of the briquettes that are sold to private customers in the Nordic market are certified in compliance with quality or raw material standards.

Firewood

Availability (access to wood) and price are the main determinants of demand in the market for firewood. Because of the problem of emissions from wood-burning stoves, there is greater awareness among buyers that the wood must be dry (moisture content below 18%) before use. Firewood is now therefore increasingly being marketed as “kiln-dried”. Dialogues with industry stakeholders[2] reveal, however, that a significant part of the firewood being sold as dry/kiln-dried is not dry enough, which means there is still a problem with poor combustion and emissions. The EN ISO 17225:2014 standard for biofuels includes requirements for firewood. There are no legislative provisions or Nordic labelling schemes to provide guidance to consumers with regard to firewood.

[1] Denmark's supply of wood chips in the energy market of the future; The Danish Forest Association, 2013

[2] Interview with Tommy Bruus-Jensen, former Chairman of the Danish Biofuel Association, 22 January 2015

Barbecue charcoal and briquettes

The market for barbecue charcoal/briquettes is characterised by a wide range of different types of products and brands. A large percentage of barbecue charcoal/briquettes in the Swedish, Norwegian and Finnish markets is FSC labelled, while only a small percentage of those on the Danish market is FSC labelled. Furthermore, the Swedish market has barbecue charcoal marked with the "Bra Miljöval" (Good Environmental Choice) ecolabel. Tests[3],[4],[5] of barbecue charcoal/briquettes show that consumers are looking for barbecue charcoal that is easy to light and is of good quality with regard to durability and temperature. There are no legislative provisions or labelling schemes (other than the "Bra Miljöval" (Good Environmental Choice) ecolabel) to provide consumers with guidance in this area.

Firelighting products

The Nordic market for firelighting products and, in particular, alternatives to the traditional fossil fuel products (solid and liquid), has grown dramatically in the past five years[6]. Firelighting products are covered by quality standards to a limited extent only. This means that there are a lot of products in the market of widely varying quality. A significant amount of the products are manufactured in Asia. Test[7],[8] of firelighting products show that consumers are looking for firelighting products that is easy to light, burns with a powerful flame and does not smell. There are no labelling schemes (other than the "Bra Miljöval" (Good Environmental Choice) ecolabel) to provide consumers with guidance with regard to firelighting products.

3.2 Sweden

In 2013, 53.5 TWh of unprocessed forest fuels (wood chips, bark, sawdust and firewood) were produced in Sweden[9]. That represents a good 40% of the Swedish biofuel consumption or just under 15% of the whole of Sweden's energy consumption. Alongside the pulp and sawmill industries, forestry is a major producer of solid biofuels. Large quantities of the fuels are by-products from the sawmill industry and the pulp industry in the form of lye.

Pellets: In 2015, 1.7 million tonnes (8 TWh) of pellets were used in Sweden. Approximately 32% of this was for the housing market, the rest was for larger companies and municipal buildings. In 2015, Swedish production of pellets was approximately 1.6 million tonnes from 80 Swedish pellet producers[10].

[3] http://www.kokosbriketten.dk/public/Image/Kokosbriketten/bestitest.pdf, 6 June 2015
[4] http://www.icakuriren.se/Test-Rad/Tester/Test-av-grillkol/, 6 June 2015
[5] http://www.testfakta.se/tester/hem-och-hush%C3%A5ll/ingen-brikett-%C3%A4r-bra-p%C3%A5-allt, 6 June 2015
[6] Interview with Bjane Malmkjær, Fritz Schur, January 2015
[7] http://www.grillguru.dk/forum/viewtopic.php?t=9276, besøgt oktober 2015
[8] http://www.hyttemag.no/vi-tester/i-fyr-og-flamme, besøgt september 2015
[9] The Swedish Energy Agency. Production of unprocessed wood fuels 2013. ES 2014:09.
[10] http://pelletsforbundet.se/statistik/ (2 August 2016)

Briquettes: There are 6-8 producers of briquettes in Sweden. A significant amount of the production is aimed at large companies and public bodies, such as heating plants, schools, hospitals and industries[11].

Wood chips: According to the Swedish Wood Fuel Association, there are about 20 major suppliers of wood chips in the country. Wood chips are delivered either in skips or by trailer. The raw material comprises harvesting residues, wood from thinning operations, recycled wood, sawdust and bark[12].

Barbecue charcoal/briquettes: Sweden has a small-scale production of barbecue charcoal/briquettes. Approximately 24,000 tonnes/year[13], which is about 10 million bags of barbecue charcoal/briquettes, are used.

Firelighting products: There are several solid firelighting products made of renewable raw materials in the Swedish market; brown blocks, white sachets, firelighting paper, fibrous material, firelighter blocks with paper and firelighting gel. All products are sold in the manufacturer's name and under private labels, particularly at builder's merchants, retail chains and petrol stations.

The Swedish Bioenergy Association (Svebio) has about 300 members comprising enterprises and manufacturers and a couple of hundred private members. Svebio is active in the whole production chain from raw material production, production of energy raw materials to purchasers of energy raw materials in the form of heating plants and industries[14]. The Swedish Association of Pellet Producers comprises 14 producers of pellets and a number of production equipment manufacturers and fitters[15]. The Swedish Wood Fuel Association is for Swedish producers of firewood, wood chips, forestry and wood industry by-products such as pellets, briquettes, wood chips, sawdust, wood powder, bark and recycled wood. The members produce and supply about 80% of the wood fuel that is sold to central and district heating plants, CHP plants and other biofuel facilities in the Swedish commercial market[16].

3.3 Denmark

Pellets: 9 Danish manufacturers produced 99,930 tonnes of pellets in 2012: this is approximately a 25% decrease from the more or less constant level of about 135,000 tonnes. The import of pellets to Denmark has increased significantly from approximately 200,000 tonnes in 2001 to more than 1.8 million tonnes in 2012. The dramatic increase is primarily due to demand from CHP plants where fossil fuels (mainly coal) have been replaced by sustainable energy sources[17] as part of Denmark's energy and climate policy. In 2012, private homeowners accounted for approximately 500,000 tonnes compared with about 200,000 tonnes in 2001. As previously mentioned, there has been a dramatic increase in the import of pellets.

[11] http://www.tradbransle.se/fakta-om-tradbransle/fakta-om-briketter/ (2 August 2016)
[12] http://www.tradbransle.se/fakta-om-tradbransle/fakta-om-grot/ (182016-08-02)
[13] Interview with Gryfskand, February 2015, Stockholm
[14] https://www.svebio.se/om-oss-0
[15] http://pelletsforbundet.se/
[16] http://www.tradbransle.se/
[17] http://www.ens.dk/politik/dansk-klima-energipolitik

For the part of production that is based on dry raw materials, the current level is restricted by the producers' access to raw materials (sawdust and shavings from the wood industry).

Briquettes: In Denmark, there are a couple of small-scale briquette producers that primarily sell their products locally. Several types of wood briquettes for stoves have appeared in the Danish market in recent years and the use of this type of fuel has increased greatly. Years ago, wood briquettes were few and not very visible in the Danish market. Based on data from Statistics Denmark and a firewood reseller survey, it is estimated that consumption was around 100,000 tonnes in 2012[18].

Wood chips: Danish consumption of wood chips in 2012 amounted to about 1.75 million tonnes (2.2 million m^3) or approximately 17.5 PJ, broken down as follows[19]:

- Approximately 100 decentralised heating and CHP plants: 55% of total consumption.
- 4 centralised power plants (DONG, Østkraft & Verdo): 30%.
- 4 industrial companies: 10%.
- An unknown number of farm furnaces, institutions, nurseries, retail, etc.: approximately 5%.
- 80% of the wood chips are produced in Danish forests. The rest is imported.

Firewood: The total consumption of firewood in Denmark in 2013 is estimated at 22 PJ, representing just over 50% of the biomass fuel used in Danish CHP plants[20]. It is estimated that 15% (3,308 TJ) of firewood was imported in 2013. This figure is a qualified estimate, based on three elements. Firstly, it is estimated that just over 8% of the firewood market is made up of firewood crates, which are imported. Secondly, it is estimated that firewood processed from whole, imported logs makes up just over 2% of the firewood market. And thirdly, based on consumer data, it is estimated that briquettes account for almost 5% of the consumption.

Barbecue charcoal/briquettes: It is mainly barbecue briquettes (and not barbecue charcoal) that are sold in the Danish market, and consumption has remained stable in recent years at about 25,000 tonnes/year[21]. Denmark does not produce any barbecue charcoal/briquettes.

Firelighting products: There are two producers of firelighting products (white and brown blocks) in Denmark: HVK (Fritz Schur) and Burner. The products are sold mainly in Scandinavia. Solid firelighting products made of renewable raw materials are widespread in the Danish market, where they are mainly sold at builder's merchants, retail chains, grocery stores and petrol stations. They are mainly sold as brown blocks, white sachets and fibrous material.

[18] Environmental impact of sawdust briquettes use, Report No. 4 from the Danish Environmental Protection Agency, 2013
[19] Denmark's supply of wood chips in the energy market of the future; The Danish Forest Association, 2013
[20] Hansen T.: Firewood consumption in Denmark 2013, the Danish Energy Agency, 2015
[21] Interview with Bjaren Malmkjær, Fritz Schur, 3 March 2015

The Danish Biofuel Association[22] represents 62 members, who import and sell solid biofuels (pellets, wood briquettes, wood chips, firewood, barbecue charcoal and barbecue briquettes and firelighting products). Many of the members import the fuels from abroad and market them on their websites. Danish forestry also sells and markets firewood and wood chips.

3.4 Norway

In 2012, bio-energy accounted for 16% of the total energy consumption of households[23]. Firewood, wood chips, pellets and briquettes are the main solid biofuels in the Norwegian market. The market for firewood is commercialised only to a slight extent and is fragmented. This means that information about prices and volumes is limited and unreliable. The use of firewood in Norway is a result of both private harvesting and purchase of wood. According to Statistics Norway (SSB),[24] the purchase of firewood accounts for approximately 40% of consumption. The market for processed fuels, such as pellets, briquettes and wood chips, is better documented, but the market is vulnerable in terms of high overheads, low prices for substitutes, such as electricity and oil, demand and public funding. The turnover for solid biofuel producers in Norway is generally low and a number of producers operate in a secondary market, mainly targeted at technology and production equipment or bio-energy production.

Pellets: The Norwegian Bioenergy Association (NoBio)[25] has compiled information about the production and sales of pellets in 2013. In total, it has registered and collected data from six producers of pellets in Norway. The production of pellets is down significantly on 2012. While production amounted to 124,170 tonnes in 2012, total production in 2013 was 48,921 tonnes. The main reason for this is that Biowood's pellets production plant at Averøya was closed down in 2012. Total consumption of pellets in Norway has increased from 66,188 in 2012 to 93,879 tonnes in 2013. This increase can be attributed to growing demand from the central and district heating industry in general.

Briquettes: The Norwegian Bioenergy Association (NoBio) has collected data from nine producers and four importers of briquettes. Production of briquettes in Norway has increased from 31,659 tonnes in 2011 to 34,236 tonnes in 2012. According to Nobio, consumption is on the same level as in 2011, but is still higher than national production. Demand is met by importing briquettes, although imports were down significantly in 2012 compared with 2011. Most of the briquettes imported are supplied in 10 to 20 kilo sacks, which are sold to households as a substitute for firewood.

Wood chips: In Norway, wood chips are mainly used in district heating plants and industrial facilities. Norwegian district heating plants consumed approximately 1.3 GWh of wood chips in 2012.

[22] http://www.biobraendselsforeningen.dk/
[23] Statistics Norway (SSB) «Statistics: Energy balance. Production and consumption, by energy product» 2013.
[24] «Statistics: The Balance of Energy. Production and consumption, by energy product» 2013.
[25] http://nobio.no/dokumenter/4-statistikk/

Norwegian district heating plants use a total of 100 MW of installed power, based on wood chips and pure recycled wood (The Norwegian Water Resources and Energy Directorate (NVE)'s district heating database, June 2011).

Barbecue charcoal/briquettes: Norway imports large quantities of barbecue briquettes. In 2012, it imported 1955 tonnes (turnover of EUR 186,489). The figure in 2013 was 1883 tonnes (turnover of EUR 181,240)[26]. It has not been possible to find data for the production of barbecue charcoal/briquettes in Norway.

Firelighting products: Solid firelighting products made of renewable raw materials are widespread in the Norwegian market, where they are mainly sold at builder's merchants, retail chains, grocery stores and petrol stations. In 2014, a consumer test was conducted on the following products: brown blocks, white sachets, firelighting paper, fibre firelighter rolls and fire-starter logs.

The Norwegian Bioenergy Association (NoBio)[27] is the industry association that represents the bio-energy market in Norway.

3.5 Finland

Wood is the main source of bio-energy in Finland and accounted for 24% of total energy consumption in 2013. Most of the wood-based energy (64%) comes from residual products from forestry operations and forest industries[28].

Pellets: Finland's consumption of pellets in 2014[29] was 240,000 tonnes/year, of which 181,000 tonnes were used in heating/electricity generation plants and other major industries. 46,000 tonnes of pellets were imported and 56,000 tonnes were exported. In 2013, there were 27 pellet manufacturers and approximately 20 other producers of pellets in Finland. More than 26,000 private households and 1,000 large-scale industrial facilities used pellets for heating.

Pellets/wood chips/firewood: The table below[30] shows the use of solid biofuels in Finland in 2012. Firewood is used in private households, but wood chips are primarily used in industrial facilities and CHP plants.

Table 1: Use of solid fuels (pellets, wood chips and firewood) in Finland in 2012

Type of fuel	Use in 2012 (PJ)	%
Pellets	3.3	0.7
Wood chips	59.4	14.2
Firewood	60.4	14.4

[26] Interview with Gryfskand, 3 February 2015, Stockholm
[27] http://nobio.no/
[28] IEA Bioenergy Task 40 - Country report of Finland 2014
[29] http://www.bioenergytrade.org/downloads/iea-task-40-country-report-2014-finland.pdf
[30] European Pellet Report, PellCert Project, 2012

Barbecue charcoal/briquettes: Finland has a small-scale production of barbecue charcoal/briquettes. The largest manufacturer (RPK Hiili) produces approximately 250 tonnes of barbecue charcoal a year[31]. In 2005, Finland imported 1783 tonnes of barbecue charcoal/briquettes, and 2700 tonnes in 2013[32].

Firelighting products: There are several solid firelighting products made of renewable raw materials in the Finnish market; brown blocks, white sachets, firelighting paper, fibrous material, firelighter blocks with paper and firelighting gel. All products are sold both in the manufacturer's name and under private label especially in builder's merchants, retail chains, grocery stores and petrol stations.

Bioenergia,[33] the Bioenergy Association of Finland, represents the interests of the bioenergy sector in Finland. The Association has more than 300 members who represent all aspects of the bioenergy chain, from producers of raw materials, energy and energy raw materials, to research and so on.

4 Other labelling schemes and controls

This chapter summarises the main labelling schemes for solid biofuels; pellets, briquettes, wood chips, firewood, barbecue charcoal/briquettes and firelighting products. A summary of relevant EU directives, legislation and regulations can be found in Appendix 3. A summary of relevant standards can be found in Appendix 4.

ENplus

ENplus[34] is a quality certification scheme for pellets, developed by the European Biomass Association (AEBIOM). The objective of the ENplus scheme for pellets is to guarantee the supply of pellets for heating and CHP up to 1 MW output power in residential, commercial and public buildings with a constant and clearly defined quality. The production, logistics and delivery procedures are controlled to ensure that supplied pellets maintain a constant high level of quality. The product certification is therefore combined with a system certification. With the classes ENplus-A1 and ENplus-A2, and class EN-B, three grades are defined, based on the specifications of the European standard EN ISO 17225-2:2014.

ENplus requirements differ from EN ISO 17225-2:2014 in the following:

- Mandatory requirements on ash melting temperature (voluntary under EN 14961-2).
- ENplus A1 requires an ash deformation temperature of ≥ 1200°C.
- ENplus A2 and EN-B require an ash deformation temperature of 1100°C.
- The ash used for analyses is produced at 815°C.
- For EN-B, chemically treated wood is not permitted as a raw material.

[31] Rautiainen M. et al. (2012): Biocoal production, properties and use, University of Helsinki, Department of Forest Sciences
[32] http://www.factfish.com/statistic-country/finland/wood+charcoal,+import+weight
[33] http://www.bioenergia.fi/English
[34] http://www.enplus-pellets.eu/, accessed 8 July 2016

DINplus

DINplus[35] is a quality certification scheme for pellets, developed by DinCertco in Germany and is widely used for pellets produced in Germany and pellets that are sold/marketed in the German market. Specifications are based on the specifications of the EN ISO 17225-2:2014 European standard and assure the same quality level as ENplus.

Blaue Engel

Under the Blaue Angel ecolabel, criteria for labelling of pellets and wood chips are called "Technically dried wood chips/wood pellets (RAL-UZ 153)"[36]. There are currently two producers who hold licences and have labelled a number of pellets products. The criteria are linked to DIN EN17225 with regard to specifications of wood raw materials and quality. There are also requirements for sustainable wood raw materials and energy consumption in the drying process of wood chips/pellets.

Bra Miljöval

The "Bra Miljöval" (Good Environmental Choice) ecolabel provides a set of criteria for biofuels (2013:2[37]) which include many types of renewable solid, liquid and gaseous fuels. Pellets, briquettes, firewood, wood chips, biogas, barbecue charcoal and briquettes and firelighting products are examples of product types. There are currently five licences: one for biogas, one for barbecue charcoal/briquettes, one for pellets and two for firelighting products.

The criteria stipulate that non-renewable energy, which is part of the product's life cycle, must account for a maximum of 10% of the product's energy content. Moreover, there are requirements for sustainable renewable raw materials and chemical products and constituent substances classified as CMR.

Green Gold Label

The Green Gold Label[38] was established by the Dutch energy company Essent and Control Union Certifications. GGL employs the track and trace system in the certification programme. It covers standards for specific activities in the supply chain of solid biomass, as well as for the supply chain as a whole. This includes production, processing, transport and final energy transformation. GGL requires the tracking custody of the biomass. Currently, there are 8 Green Gold Label standards and 2 Clean Raw Material (CRM) certificates. Different standards are specified for either the producer of raw materials, the user of biomass for power generation or power plant.

GGL Standard 8 is prepared for compliance with greenhouse gas reduction targets, while CRM is the specific clean wood certificate for pretreated biomass.

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[35] http://www.dincertco.de/en/dincertco/produkte_leistungen/zertifizierung_produkte/brennstoffe/holzpellets_heizkessel/holzpellets_heizkessel.html, accessed 8 July 2016

[36] https://www.blauer-engel.de/en/products/energy-heating/technically-dried-wood-chips-wood-pellets/wood-pellets

[37] http://www.naturskyddsforeningen.se/bra-miljoval/biobransle, 21 April 2015

[38] http://www.greengoldlabel.org/site/pagina.php?id=51 (7 May 2015)

GGL also provides additional guidelines for pellets manufacturing and transportation on existing certification systems for forest management (FSC, PEFC, etc.) and agricultural certification systems (Organic and EUREGAP) which have been approved by GGL. In July 2016, there were 14 certified businesses from all over the world.

Sustainable Biomass Partnership (SBP)

SBP[39] is a certification system for sustainable biomass, developed by seven major European energy producers[40] that account for the purchase of more than 70% of industrial pellets in Europe. In addition to the collection and communication of climate data, SBP builds on standards and requirements for responsible forest management. In certain areas, this is most easily documented using the FSC or PEFC schemes for certification.

Raw materials labelling and traceability systems

Sustainability labels for wood are very relevant within the solid biofuels product group (pellets, briquettes, wood chips, firewood, barbecue charcoal and briquettes). FSC and PEFC are the two most dominant sustainability certifications for wood and wood-based products. Although there are some differences between the schemes, Nordic Ecolabelling considers them both to be at the leading edge of the legislation, and thus driving change towards more sustainable forestry. Today, FSC and PEFC labels are widespread in the labelling of solid biofuels, particularly barbecue charcoal and briquettes.

5 Aims of the revision

Evaluation of the current version 2 of the criteria for the Nordic Ecolabelling of pellets (2015) resulted in a proposal to revise the criteria, primarily by tightening the current requirement level for quality, updating the raw material requirements, energy consumption, and expanding the product group to include briquettes, wood chips, firewood, barbecue charcoal and briquettes and firelighting products.

Based on the recommendations in the evaluation report, the objectives of the revision have been to:

- Establish the product group definition to cover the new types of products: briquettes, wood chips, firewood, barbecue charcoal and briquettes and firelighting products.
- Establish new criteria for materials, energy requirements and production-specific quality requirements that apply to the new product types. The starting point should be the same requirements that already apply to pellets, but the requirement levels need to be reviewed. New product-specific requirements for the new products must be developed for the parameters where a high RPS is found and which are not already covered by requirements for pellets.

[39] http://www.sustainablebiomasspartnership.org/ (2 March 2015)
[40] DONG Energy, Drax, E-ON, ENGIE, RWE, Vattenfall and HOFOR.

- Update raw material requirements: the requirements should be updated to comply with the EN ISO 17225:2014 standard for Solid Biofuels. In addition, requirements for wood raw materials must be updated in line with the Nordic Ecolabel's new forest requirements including requirements for traceability.
- Update raw material quality requirements (e.g. residual and waste wood) to comply with the EN ISO 17225:2014 standard.
- Amend the energy consumption requirement so that it is also possible to produce pellets from virgin wood raw materials, i.e. that in future there will be two differentiated energy requirements for pellets; one for pellets produced from residual products and one for pellets produced from virgin raw materials.
- Review the requirement for the impact on the climate of the used energy raw materials. It is considered that the requirement level can be increased, possibly with a prohibition on the use of fossil fuels for drying raw materials.
- Update the quality requirement. The requirement for testing methods and quality parameters must be updated to comply with the EN ISO 17225:2014 standard. A particular focus on the quality parameters for water content, dust, ash content and ash melting point.
- Generally update current requirements to ensure their continuing relevance.

About this revision of criteria

The revision was conducted by Product Group Manager Thomas Christensen (DK) as the project manager, and Eva-Lotta Lindholm (S) as the project adviser. Stinus Kappel Andersen (DK), Kristian Kruse (N), Eva-Lotta Lindholm (S) and Harri Hotulainen (Fin) are the national contacts.

The revision was conducted as an internal Nordic Ecolabelling project with an ongoing dialogue with international and national stakeholders. A consultation is scheduled for mid September - November 2016 with a consultation meeting to be held in Sweden at the end of the consultation period for the whole of the Nordic and international industry.

6 Environmental impact of "the product group"

The solid fuels product group (including firelighting products) comprises uniform types of materials and an overall uniform function, which is to produce energy in the form of heat by burning fuels.

A so-called MECO analysis was performed in conjunction with Nordic Ecolabelling's evaluation of the criteria in 2015[41]. MECO stands for the assessment of Materials, Energy, Chemicals and Other characteristics and describes the principal environmental impacts during the products' life cycle phases. The MECO analyses are based on LCA studies, datasets from generic databases and scientific reports.

[41] The separate MECO analysis for solid fuels is written in Danish and is available upon request from Nordic Ecolabelling: tc@ecolabel.dk

Based on the MECO analysis, an RPS analysis was conducted which identifies the relevance, steerability and potential of the various environmental aspects of the solid fuels: pellets, briquettes, wood chips, firewood, barbecue charcoal and briquettes and firelighting products.

Nordic Ecolabelling uses the RPS analysis to pinpoint the environmental issues that are most relevant (R) in the life cycle of the products and assess what potential (P) exists for reducing adverse effects on the environment in these areas. At the same time, it is important to examine how the manufacturers in particular can make changes to the products (steerability = S) that will trigger the potential for environmental improvements. This section describes the key findings of the RPS analysis. The complete analysis is in Danish, but can be demanded at Nordic Ecolabel.

The RPS analysis for solid fuels: pellets, briquettes, wood chips, firewood, barbecue charcoal and briquettes and firelighting products, shows that RPS has been found in a life cycle for the following areas:

- Raw materials contained in solid fuels
- Energy consumption and impact on the climate
- The quality of the solid fuels

Raw materials contained in solid fuels

Raw materials for the solid fuels (pellets, briquettes, wood chips, firewood, barbecue charcoal and briquettes and firelighting products) are mainly wood raw materials (virgin or waste) or other vegetable raw materials and are thus renewable raw materials. Requirements concerning sustainable production of renewable raw materials are therefore highly relevant (R) and can be ensured by setting requirements for the use of sustainability standards (P). Requirements for the use of certified raw materials and traceability standards will also strengthen the traceability (S) of renewable raw materials that are used in the Nordic Ecolabelled solid fuels.

The quality of the solid fuels is largely determined by the “purity” of the raw materials that make up the fuels.

Requirements concerning additives, binders, fillers or fossil raw materials are therefore extremely relevant (R) and can be ensured by setting requirements for the use of quality standards (P). Requirements for fuels to be tested for additives, for example, by an independent, qualified third party increase steerability (S) of unwanted substances in the Nordic Ecolabelled solid fuels.

Energy consumption and impact on the climate

There is high relevance associated with energy consumption in raw materials production and, in particular, in the actual solid fuels production process. The potential (P) and steerability (S) for energy requirements in the raw material phase are, however, assessed to be low, since transportation in the forest and from the forest to the production facilities is now already optimised by the industry.

The greatest energy relevance for some types of solid fuels, such as pellets, wood briquettes and barbecue charcoal/briquettes, is in the actual raw material drying process (and for barbecue charcoal/briquettes plus the distillation process) for the finished product. Since there is a big difference in production technologies and their energy efficiencies, there is potential (P) for stringent energy requirements. The steerability (S) is also considered to be good, since energy consumption is already a focus area for the industry. Furthermore, the RPS analysis shows that there is limited potential (P) for the energy requirement to include all the processes that use electricity to power the machinery, since the pellet and briquette factories use the same electricity-powered technologies (debarking, chipping, grinding, pressing, cooling and sifting) to a great extent.

The use of fossil fuels in the production of solid fuels is of utmost relevance (R) from a climate and life cycle perspective, as they emit high levels of greenhouse gases during combustion. Both renewable raw materials and fossil fuels release CO_2 during burning, and thus contribute to the greenhouse effect. The benefit of burning renewables is that they do not contribute additional CO_2 to the atmosphere, as is the case with fossil fuels, provided that the biomass, for example, comes from sustainable sources. Moreover, CO_2 in new biomass is absorbed much more quickly than fossil sources. Biomass therefore has a relatively short impact on the climate compared with fossil CO_2, where the effect lasts for thousands of years[42]. The use of fossil fuels to dry pellets, wood briquettes, wood chips, firewood and barbecue charcoal/briquettes is common in Europe, unlike Scandinavia. This means there is considerable potential (P) and good steerability (S) for restricting the use of fossil fuels in the drying processes.

The quality of the solid fuels

Material composition and production methods vary greatly for the individual product types of solid fuels (pellets, wood briquettes, wood chips, firewood, barbecue charcoal/briquettes and firelighting products). This has a major impact on the quality of the products.

It is therefore highly relevant (R) to ensure that the quality of the solid fuels is good. This can be ensured through requirements to apply quality standards (P). Steerability (S) of the solid fuel quality is increased by requiring relevant quality parameters to be tested by independent, qualified third parties.

Imposing stringent requirements for the quality of the solid fuels ensures not only good combustion properties, but also an indirect restriction on emissions of harmful substances, such as particulate matter, OGC, CO, VOC and NOx, in the use phase.

[42] Cheeubini F. et al: "CO2 emissions from biomass combustion for bioenergy: atmospheric decay and contribution to global warming", March 2011

7 Reasons for requirements

7.1 Product group definition

The product group comprises the following solid fuels for domestic and industrial use: Pellets, briquettes, wood chips, firewood, charcoal/briquettes and firelighting products. The material in the products is made from renewable raw materials. The product group also includes composite products that combine functions of the above-mentioned product types (e.g. products that serve both as a solid fuel and firelighting product). However, these products must demonstrate that they comply with all of the Nordic Ecolabel's requirements within the different product types that the product has combined.

Liquid fuels for transport, heating and industrial production may not be Nordic Ecolabelled according to these criteria, but may be Nordic Ecolabelled according to the criteria for biofuels. Nor does the product group include liquid and gel firelighting products defined by the EN 1860:3:2003 standard, matches, smoking wood chips and disposable barbecue grills.

Background

Pellets, briquettes, wood chips and firewood: The definition of pellets, briquettes, wood chips and firewood is consistent with EN ISO 17225:2014 (solid biofuels), previously EN 14961:2011. This standard determines the fuel quality classes and specifications for solid biofuels for general use. The classification principle of the solid biofuels is based on origin and source, major traded forms (briquettes, pellets, wood chips, sawdust, firewood, straw, miscanthus (elephant grass), reed canary bales, grains, olive residues, etc.) and properties of solid biofuels. The classification system is flexible. A hierarchical classification system includes four sub-groups: woody biomass, herbaceous biomass, fruit biomass and biomass blends and mixtures. The standard involves special requirements for chemically treated biomass (other than heat, air or water). EN ISO 17225:2014 consists of the following parts: Part 1: General requirements, Part 2: Graded wood pellets, Part 3: Graded wood briquettes, Part 4: Graded wood chips, Part 5: Graded firewood, Part 6: Graded non-woody pellets, Part 7: Graded non-woody briquettes.

Barbecue charcoal and briquettes: The requirement for the definition of barbecue charcoal and briquettes is consistent with the general definition in EN 1860-2:2005.

Firelighting products: The requirement for firelighting products is consistent with the general definition of solid and thickened liquid firelighting products in compliance with the definition in EN 1860-3:2003.

There are also solid fuel types on the market that combine the features of the above product types (e.g. products that serve as both a solid fuel and a firelighting product). Typical for these product types is that they consist of a combustible solid material to which a lighter fluid/material has been added or that they are packaged inside paper or plastic for use as firelighting material. As there is no specific quality standard for this product type, these products must demonstrate that they comply with all of the Nordic Ecolabel's requirements within the different product types that the product has combined.

A considerable amount of the material in solid fuels is renewable, but they can also contain inorganic and organic fossil materials as fillers or additives. Nordic Ecolabelling works to achieve a greater use of renewable raw materials for those product areas where this makes sense. Nordic Ecolabelling of products based on renewable raw materials will thus be able to help consumers and businesses to choose solid fuels with minimal impact on the environment. Additives, fillers or chemicals from non-renewable sources or recycled material may be necessary, however, and a requirement for all products to consist of 100% renewable materials is therefore not possible.

Both biomass (vegetable raw materials) and fossil fuels release CO_2 during burning, and thus contribute to the greenhouse effect. The benefit of burning biomass is that it does not contribute additional CO_2 to the atmosphere, as is the case with fossil fuels, provided that the biomass comes from sustainable sources. The creation and transport of biomass leave a marginal CO_2 footprint, which is lower than the CO_2 footprint created, for example, by fossil oil. This is the conclusion of an IPCC report[43], which examines the total emission from all energy sources.

To achieve a clear definition of the product group, only solid fuels are included in the product definition. Liquid fuels for transport, heating and industrial production therefore may not be Nordic Ecolabelled according to these criteria, but may be Nordic Ecolabelled according to the criteria for biofuels. Liquid and gel firelighting products, defined by the EN 1860-3:2003 standard, are not included in the product group as they are not considered to be solid fuels. Nor does the product group include matches, as the purpose of matches is to emit thermal energy for a very short period of time in order to ignite the actual firelighting products. Smoking wood chips may not be Nordic Ecolabelled according to these criteria. The purpose of smoking wood chips is to generate smoke and thus transfer flavour to the food. Smoke carries emissions that are harmful to health, such as particulate matter, OGC, CO, VOC and NOx in the use phase.

Barbecue charcoal and briquettes may be impregnated with lighter fluid (which is usually fossil) for easy lighting. This is typical, for example, for the charcoal in disposable barbecue grills.

In the view of Nordic Ecolabelling, barbecue products should be 100% free from impurities and additives, which can bring unwanted smoke and flavours to the food on the barbecue. A new report[44] by The Danish Veterinary and Food Administration (DVFA) concludes that there is a risk that the shorter the distance between the food and the source of heat, the greater the amount of carcinogenic PAH compounds. The rack on a disposable barbecue grill is very close to the charcoal. The product also contains several materials (metal rack and tray) that are not solid fuels. For this reason, disposable barbecue grills may not be Nordic Ecolabelled according to these criteria.

[43] http://www.danskenergi.dk/~/media/Biomasse/SummaryForPolicymakers.ashx, 31 March 2015
[44] The Danish Veterinary and Food Administration (DVFA): Final report on PAH in smoked meat and fish and grilled meat, November 2015

7.2 Production and product description

O1 Description of the product

The applicant must submit the following information about the product(s):

- Brand/trading name(s).
- Description of the product(s) (volume/weight/number per package) in the application. Primary packaging and any use of individual packaging must also be included in the description.
- Raw materials used in the solid fuel must be described (tree species, name/species for other raw materials, oil, wax, stearin, adhesives, binders/fillers or other raw materials), type of raw material (virgin or recycled material), origin of the raw materials and the percentage contained in the product.
- Description of manufacturing process of the product.
- Subcontractors must be described with company name, production location, contact person and the production processes used.

Individual packaging: refers to packaging around each individual solid fuel, e.g. plastic cover around each separate firelighting product. The individual packaging and the solid fuel constitute a unit.

Primary packaging: refers to the purchase packaging for the consumer, e.g. the packaging that holds 15 kg of pellets or 5 kg barbecue charcoal, and what the consumer encounters in sales.

✉ Description of the points above. Appendix 1 may be used. A flow chart is recommended to explain the production process.

Background to requirement O1

The intention of the requirement is to provide an adequate picture of the life cycle of the product and any packaging: what raw materials and production processes are used, what binders or additives are used, and so on. The requirement will thus give an insight into the product(s) in the application, in order to ensure the application is processed correctly.

7.3 Resources

O2 Material composition

Pellets, briquettes, wood chips and firewood must comply with the definition in accordance with the EN ISO 17225:2014 standard.

Barbecue charcoal and briquettes must comply with the definition in accordance with the EN 1860-2:2005 standard.

Firelighting products must comply with the definition in accordance with the EN 1860-3:2003 standard.

100% by weight of the material composition of solid fuels must be produced from renewable raw materials. The requirement covers all use of binding agents/fillers and oils, wax and stearin in barbecue charcoal/-briquettes and firelighting products.

Small quantities of any non-renewable impurities/additives are permitted, however, as stipulated in EN ISO 17225:2014, EN 1860-2:2005 and EN1860-3:2003. The requirement does not cover individual, primary and transport packaging.

Palm oil, palm kernel oil and their derivatives may be used with a maximum quantity of 50% by weight in the firelighting products.

Renewable raw materials in pellets, briquettes, wood chips, firewood, barbecue charcoal/briquettes and firelighting products must comply with the requirements for class and type of raw material stipulated in Table 2 below.

Renewable raw materials are defined as biological materials that are constantly replenished by natural processes. This includes the degradable part of products, waste and residues from agriculture (both vegetable and animal), sustainable forestry operations and similar industries and the biodegradable fraction of industrial waste and municipal waste. Peat is defined as a non-renewable material.

Table 2 Requirements for class and types of raw materials

	Pellets and briquettes	Wood chips and firewood	Barbecue charcoal/briquettes	Firelighting products
Class	A1*	Wood chips: A1/A2** Firewood: A1/A2***	-	-
Type of renewable raw material according to EN ISO 17225:2014	1.1.3 Stemwood 1.2.1 Chemically untreated wood residues****	1.1.1 Whole trees without roots 1.1.3 Stemwood 1.1.4 Logging residues 1.2.1 Chemically untreated wood residues****	1.1.1 Whole trees without roots 1.1.3 Stemwood 1.2.1 Chemically untreated wood residues**** 3.1.2 Stone/kernel fruits 3.2.1 Chemically untreated fruit residues	1.1.1 Whole trees without roots 1.1.3 Stemwood 1.2.1 Chemically untreated wood by-products and residues**** 2.1 Herbaceous biomass from agriculture and horticulture 2.2.1 Chemically untreated herbaceous residues 3.1 Orchard and horticulture fruit 3.2.1 Chemically untreated fruit residues
Type of renewable raw material in bio-oil				Renewable raw material (compare with the definition above)

**According to EN ISO 17225, Solid biofuels, Part 2 Graded wood pellets and Part 3 Graded wood briquettes.*

***According to EN ISO 17225, Part 4 Graded wood chips*

****According to EN ISO 17225, Part 5 Graded firewood*

*****Negligible levels of glue, grease and other additives used in sawmills during production of timber and similar products from virgin wood are permitted in the raw material provided that the quantities of impurities/additives meet the limit values stipulated in requirements O12, O13, O14 and O15.*

☒ Description of the renewable materials and declaration from the manufacturer of pellets, briquettes, wood chips, firewood, barbecue charcoal/briquettes and firelighting products, specifying the amount of raw material, as a percentage, contained in the product. Appendix 1 may be used.

☒ Declaration from the manufacturer of pellets, briquettes, wood chips, firewood, barbecue charcoal/briquettes and firelighting products that the requirement for definition, class and type of raw materials has been met. Appendix 2 may be used.

Background to requirement O2

The requirement that pellets contain 100% by weight of renewable materials remains unchanged in version 3 of the criteria. In version 3, the product definition has been extended to include briquettes, wood chips, firewood, barbecue charcoal/briquettes and firelighting products.

The raw material in these product types must also be 100% by weight renewable materials. The background to the requirements for a high percentage of renewable raw materials is presented above in Section 7 Product definition.

The cultivation of oil palm is associated with a number of environmental and social issues that are described in detail under the requirements O5. A characteristic of the head part of all types of solid firelighting products on the market is that the added combustible liquid/wax is methyl ester or vegetable wax derived from palmoil. There are firelighting products using triglycerides (esters) extracted from oilseed rape, but these are still very limited compared to palm oil. A review on firelighting products available on the market shows, that the amount of palm oil vary considerably (from 30 wt% to 85 wt%), see table below. Nordic Ecolabelling proposes to limit the use of palm oil/-kernel oil and and their derivatives with a maximum quantity of 50 w% in each firelighting product. The reason for this is (from Nordic Ecolabel view), that the cultivation of oil palm is problematic in spite of sustainability certification by (Roundtable on Sustainable Palm Oil, RSPO). A requirement of 50% by weight results in white sachets, based on the methyl ester of palm oil, can not meet the requirement.

Table 3: Content of palm oil/-kernel oil and their devivatives in different firelighting products

Type of firelighter	Content of palm oil/-kernel oil and their derivatives
Brown blocks	50% til 65%
White sachets	75% til 85%
Lighting paper	50% til 70%
Various fibermaterials	30% til 60%

The requirement for product definition, classification and types of raw materials in pellets, briquettes, firewood, wood chips and barbecue charcoal/briquettes is consistent with EN ISO 17225:2014[45].

[45] EN ISO 17225-1 Solid biofuels – Fuel specifications and classes, Part 1: General requirements, Part 2: Graded wood pellets, Part 3: Graded wood briquettes, Part 4: Graded wood chips, Part 5: Graded firewood.

Barbecue charcoal/briquettes are covered by the requirements of the standard for types of raw materials but do not have requirements for the classification system. As a product type, firelighting products are not covered by the standard, but the raw materials are. The requirement is for the wood raw materials in pellets, briquettes and firewood to be class A1 (class A2 is also allowed for wood chips and firewood) which ensures that only pure raw materials from stemwood with or without bark and chemically untreated residual products from forestry industries are used in the products. The reason for requiring class A1/A2 rawmaterials is to ensure a high quality of pellets, briquettes and wood chips and firewood, which is required particularly in small and medium-sized boilers to ensure a clean and efficient combustion.

Both EN ISO 17225:2014, Parts 2 and 3, and the ENplus standard[46] operate with 3 quality classes (A1, A2 and B), with class A1 permitting use of the "purest" raw materials. The ENplus standard largely corresponds to EN ISO 17225-2 and 3 for pellets and briquettes, except that ENplus does not allow the use of demolition wood and chemically treated wood[47].

Raw materials for barbecue charcoal/briquettes must derive from stem wood, residual products from forest industries or stone/kernel fruits similarly to ensure that only pure raw materials are used in the products. Requirements for types of raw materials are consistent with EN ISO 17225:2014-1. Barbecue charcoal/briquettes are primarily made of wood. However, there are also barbecue briquettes on the market whose raw material is coir fibre (by-product of the coconut milk industry). The Nordic Ecolabel wishes to make it possible for barbecue charcoal/briquettes produced using fibrous materials from stone/kernel fruits to be Nordic Ecolabelled.

There is wide variation in the use of raw materials for firelighting products, which is why the Nordic Ecolabel also permits, in addition to pure virgin wood, the use of fibre and fruit materials from agriculture and horticulture. Requirements for types of raw materials are consistent with EN ISO 17225:2014-1.

Liquid oil is not covered by EN ISO 17225:2014. Renewable raw materials in oils used in firelighting products therefore have their own definition which, for example, permits raw materials with vegetable and animal origins.

Type of raw material: 1.2.1 According to EN ISO 17225:2014, chemically untreated wood residues may contain negligible amounts of glue, grease and other additives used in sawmills during production of timber and timber products from virgin wood. The Nordic Ecolabel wishes to set requirements for the use of pure raw materials to ensure clean combustion. The requirement limits for impurities/additives for the individual product types are stipulated in O12-O15 requirement specifications.

[46] The European pellet industry's own quality standard for pellets/briquettes - http://www.enplus-pellets.eu

[47] ENplus accepts wood that has been treated with wood preservatives against insect attack, which does not classify as chemically-treated wood.

7.3.1 Wood

The requirement for wood applies to all types of solid fuels that contain wood, including wood boards in firelighting products. Wood in paper, cardboard and pulp has to comply with requirement O7.

O3 Tree species that may not be used in Nordic Ecolabelled solid fuels

Species of trees on the Nordic Ecolabel list of protected tree species* may not be used in Nordic Ecolabelled solid fuels.

*The complete list of protected tree species is available for viewing at: www.nordic-ecolabel.org/wood/

✉ Declaration from applicant/manufacturer that the requirement to tree species not permitted to be used in Nordic Ecolabelled solid fuels are met. Appendix 3 may be used.

Background to O3, tree species that may not be used in Nordic Ecolabelled solid fuels

Nordic Ecolabelling requires that a number of tree species are not permitted for use in Nordic Ecolabelled solid fuels. The requirement only applies to virgin forest tree species and not tree species defined as recycled materials (for the definition of recycled materials, see glossary/requirements for wood raw materials below).

The list of protected species is based on tree species that are relevant to the Nordic Ecolabel's criteria, i.e. tree species that have the potential to be included in Nordic Ecolabelled products. The scientific name and the most common trade names are given for the listed tree species. The list of scientific and trade names is not always adequate, as there may be more than one scientific name or trade name for the listed tree species than the list indicates. The list includes closely-related or similar tree species as a precautionary measure.

Criteria for species on the list are wood originating from:

- IUCN Red List, categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and relevant species as Near Threatened (NT)
- Tree species listed by CITES, Appendices I, II and III.
- Unsustainable forestry practices, such as felling of trees in HCVF, IFL areas in countries/regions with high levels of corruption.

The IUCN Red List[48] of threatened species is the world's most comprehensive inventory of the global conservation status of biological species, including trees. The IUCN Red List provides consistent criteria to assess the risk of extinction for thousands of species and subspecies. These criteria cover all countries and all species in the world. Nordic Ecolabelling wishes to prohibit the use of tree species listed as endangered (categories CR, EN and VU) and individual tree species with the status NT, in cases where the IUCN Red List specifies the scientific family name and "spp", which indicates that there are several tree species.

[48] http://www.iucnredlist.org/

A large number of the tree species (apart from 6 tree species) listed on the IUCN Red List, categorised as CR, EN and VU, are also listed by CITES[49]. CITES is an international convention that regulates international trade in wild fauna and flora. CITES includes around 5,600 animal species and around 28,000 plant species, some of which are relevant timber tree species (mainly tropical species). Depending on how endangered they are, the species are included in Appendix I, II or III. Species listed in Appendix I are highly endangered and trade in these species is totally banned. Special import and export permits are required for the other tree species (Appendices II and III). CITES is regulated by EU legislation (Council Regulation (EC) No 338/97) and trees with valid CITES permits are considered to be legally harvested under EUTR. The Nordic Ecolabelling ban on the use of tree species listed by CITES (Appendix I, II or III) thus goes beyond the EU legislation.

There may be other tree species that are not currently listed on the IUCN national Red Lists or by CITES. Nevertheless, Nordic Ecolabelling believes it may be relevant to prohibit the use of such species in Nordic Ecolabelled products, due to the risk of unsustainable forest management even though they have been certified. This is the case, for example, with the Siberian Larch, which is a popular tree species because it provides high-quality timber for building purposes. This species is widespread in the boreal zone. In Russia, there are vast tracts of forest that are largely untouched by human activity, known as Intact Forest Landscapes (IFL)[50]. These pristine forest areas are threatened by clearing, logging, infrastructure development, etc.[51] Corruption is also a serious problem in Russia. This is evidenced by Transparency International's Corruption Perceptions Index (CPI)[52]. Siberian Larch, and in particular the species Larix sibirica, Larix gmelinii, Larix cajanderi and Larix sukaczewii, is widespread in these so-called IFL areas in Russia.

There has been a growing focus in recent years on the legality and sustainability of European imports of wood, especially from tropical countries and countries where corruption is rife. Environmental organisations have thrown the spotlight onto problems related to the trade and use of endangered wood types and timber from sensitive forest ecosystems. Organisations and consumers have been concerned that their use of wood products is contributing to the extinction of wood types or the destruction of forests and other unique forest environments. According to the findings of a recent survey[53], illegal logging accounts for 50-90% of all felling activities in key tropical producer countries and 15-30% globally. As a consequence of this survey and other findings, the European Union adopted the Timber Regulation EU 995/2010[54], which prohibits the marketing and sale of illegally harvested timber in the European Union market. The Regulation covers imported wood and timber harvested in the EU. The EU Timber Regulation (EUTR) came into force on 3 March 2013. It contains obligations for all players operating in the European market for timber or timber products.

[49] https://www.cites.org/sites/default/files/eng/com/pc/19/e19-11-05.pdf, accessed 20 October 2015
[50] Aksenov et al. 2002. Atlas of Russia's Intact Forest Landscapes. Global Forest Watch Russia.
[51] http://www.worldwildlife.org/ecoregions/pa0601> (accessed 14 September 2015)
[52] http://www.transparency.org/cpi2014 (accessed 14 September 2015)
[53] Nellemann, C., INTERPOL Environmental Crime Programme (eds). 2012. Green Carbon, Black Trade: Illegal Logging, Tax Fraud and Laundering in the World's Tropical Forests. A Rapid Response Assessment. United Nations Environment Programme
[54] http://ec.europa.eu/environment/forests/timber_regulation.htm

The objective of the regulation is to tackle the problem of illegal harvesting of timber and prevent the trade of illegally felled wood. Illegal logging contributes in several places in the world to unsustainable forestry practices e.g. deforestation, forest degradation and major secondary effects such as loss of biodiversity.

Nordic Ecolabel is positive towards EUTR's focus on combating illegal logging, but is also aware of the challenges involved in protecting endangered tree species and wood from sensitive forest areas, so-called High Conservation Value Forestry (HCVF) such as hotspots of high biodiversity (e.g. rainforests) or Intact Forest Landscapes (IFL). Preservation of rainforests is also a central theme in the UN climate negotiations when it comes to regulating the earth's climate.

Several reports show, for example, that the Amazon plays a key role in precipitation patterns and temperatures elsewhere in the world[55],[56],[57]. Deforestation in the Amazon can for example lead to drought in the United States and floods in Norway.

The list of protected tree species is available for viewing at www.nordic-ecolabeliing.org/wood/. The applicant shall provide a declaration of compliance with the requirement that protected tree species are not used in Nordic Ecolabelled products. Appendix 3 may be used. Nordic Ecolabelling may demand more documentation for a specific tree species.

O4 Wood raw material

The applicant must state the name (species name) of the wood raw material used in the Nordic Ecolabelled solid fuel.

Chain of Custody certification

Pellets, briquettes, wood chips, firewood and firelighting products:

Suppliers of wood raw materials must have Chain of Custody certification under the FSC/PEFC schemes.

Barbecue charcoal/briquettes:

Manufacturers of barbecue charcoal and manufacturers of barbecue briquettes must have Chain of Custody certification under the FSC/PEFC schemes.

Certified wood raw material

On an annual basis;

Pellets and briquettes

A minimum of 95% of the wood raw material used in Nordic Ecolabelled pellets or briquettes must be recycled material. The definition of recycled material, see glossary/below∗.

Wood chips, firewood and firelighting products:

A minimum of 70% of wood raw materials used in the Nordic Ecolabelled solid fuel (virgin and/or recycled material) must be certified as sustainably forested under the FSC or PEFC schemes or be recycled material∗.

[55] Nobre, A.D, 2014. The Future Climate of Amazonia, Scientific Assessment Report. Sponsored by CCST-INPE, INPA and ARA. São José dosCampos, Brazil, 42p.
[56] http://news.mongabay.com/2014/12/tropical-deforestation-could-disrupt-rainfall-globally/
[57] Medvigy et al., 2013, Simulated Changes in Northwest U.S. Climate in Response to Amazon Deforestation, J. Climate, 26, 9115–9136.

The remaining percentage of wood raw materials must be covered by the FSC/PEFC compliance schemes or be recycled material.

Barbecue charcoal/briquettes:

100% of wood raw materials that are used in Nordic Ecolabelled barbecue charcoal/briquettes must be certified as sustainably forested under the FSC or PEFC schemes.

Certified wood raw materials (FSC and PEFC) must be accounted/recorded from the manufacturer's Chain of Custody account to the Nordic Ecolabelled product/production line.

∗ *Recycled material defined according to ISO 14021 in the following two categories:*

"Pre-consumer" is defined as material that is reclaimed from the waste stream during a manufacturing process. Re-use of materials, that are processed or crushed, or waste, that has been produced in a process and can be reclaimed in the same manufacturing process that generated it, is not considered to be pre-consumer reclaimed material.

"Post-consumer" is defined as material generated by households or commercial, industrial or institutional facilities in their role as end-users of a product, which can no longer be used for its intended purpose. This includes materials from the distribution chain.

Nordic Ecolabelling includes by-products from primary wood processing industries (sawdust, wood chips, shavings, bark etc.) or residues from forestry operations (bark, branches, roots, etc.) in its definition of recycled material.

✉ Name (species name) of the wood raw materials that are used in Nordic Ecolabelled solid fuel.

✉ Suppliers of wood raw materials are required to present a valid FSC/PEFC Chain of Custody certificate that covers all wood raw materials used in Nordic Ecolabelled pellets, briquettes, wood chips, firewood or firelighting products.

✉ Manufacturers of barbecue charcoal and manufacturers of barbecue briquettes are required to present a valid FSC/PEFC Chain of Custody certificate that covers all wood raw materials used in Nordic Ecolabelled barbecue charcoal/briquettes.

✉ Applicants/manufacturers of pellets, briquettes, wood chips, firewood and firelighting products: Declaration of compliance with the requirement for the percentage of certified material or recycled material.

✉ Manufacturers of barbecue charcoal and manufacturers of barbecue briquettes: Enclose documentation e.g. a third party controlled balance sheet from CoC bookkeeping system or rolling average of the certification percentage on a production line showing that the quantity of certified wood raw material and recycled material in barbecue charcoal and barbecue briquettes is met.

Background to requirement O4, Wood raw materials

Name of the wood raw material. Nordic Ecolabelling requires information to be provided about which tree species are used in Nordic Ecolabelled products. The requirement makes it possible to check the Chain of Custody certificates in the supply chain (check whether the stated tree species is covered by the Chain of Custody certificates in question) and also provide information for future forestry-related requirements.

If recycled material is used in the Nordic Ecolabelled solid fuel, particularly in the form of fibre raw materials, it is not always possible to specify the species name of all wood raw materials used. In this case, the requirement for documentation of recycled material must be complied with.

FSC, PEFC and EUTR. The Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification schemes (PEFC) together cover 98% of the world's certified sustainably-managed forest areas[58], and together are predominant in the global market for certified sustainable wood.

Both these schemes cover Forest Management certification of forests and subsequent Chain of Custody (CoC) certification, which documents the traceability of timber and timber products from certified forests. The systems are commonly regarded by forest owners, forest industries, manufacturers and distributors of wood products, and public authorities as reliable systems for sustainable forestry practices.

FSC's updated traceability standard from 2015[59] and PEFC's traceability standard from 2013[60] comply in all respects with the requirements of the EU Timber Regulation (995/2010/EC)[61] which prohibits the marketing and sale of illegally harvested timber in the EU. The Regulation covers imported wood and timber harvested in the EU. Nordic Ecolabelling recognises both FSC and PEFC as schemes that provide sufficient guarantees for legal and sustainable forestry practices. Barbecue charcoal and briquettes are not currently covered by EUTR and Nordic Ecolabelling therefore requires 100% of the wood raw material used in Nordic Ecolabelled barbecue charcoal/briquettes to be certified as sustainably forested under the FSC or PEFC schemes. This provides, as mentioned above, sufficient guarantee for legal and sustainable forestry practices.

Traceability certification.

Pellets, briquettes, wood chips, firewood and firelighting products: Nordic Ecolabelling requires that suppliers of wood raw materials have Chain of Custody certification under the FSC/PEFC schemes. The requirement for Chain of Custody certification contributes to traceability in the supply chain under FSC's and PEFC's guidelines and regulatory frameworks for traceability. The company's Chain of Custody certification proves how certified wood is kept separate from other wood during production, administration and warehousing and is inspected annually by independent certification bodies. Chain of Custody certification can vary according to the minimum content of certified wood and the way in which this is calculated. Both schemes allow, under specific circumstances and rules, wood from certified forests to be mixed with recycled material or legal wood from non-certified forests. There is thus no guarantee that a batch of FSC or PEFC certified wood necessarily comes from a certified forest.

[58] UN: Forest Products – Annual market review 2011-2012, ch. 10
[59] https://ic.fsc.org/en/our-impact/timber-legality/ensuring-compliance, accessed 21 December 2015
[60] http://www.pefc.org/certification-services/eu-timber-regulation, accessed 21 December 2015
[61] http://ec.europa.eu/environment/forests/timber_regulation.htm

In all cases, the remaining share of the wood shall comply with a number of minimum requirements for it to be considered “legal timber”. Several traceability verification methods are allowed by the FSC and PEFC schemes. They are the physical separation method, percentage-based method and volume-credit method. Nordic Ecolabelling accepts all of FSC's and PEFC's methods for traceability verification and the percentage of certified and controlled wood raw materials. The applicant/manufacturer must submit a valid FSC/PEFC Chain of Custody certificate that covers all wood raw materials used in the Nordic Ecolabelled solid fuel as documentation.

Reclaimed material. Pre-consumer and post-consumer reclaimed materials are defined by the ISO 14021 standard.

"Pre-consumer" is defined as material that is reclaimed from the waste stream during a manufacturing process. Re-use of materials, that are processed or crushed, or waste, that has been produced in a process and can be reclaimed in the same manufacturing process that generated it, is not considered to be pre-consumer reclaimed material.

"Post-consumer" is defined as material generated by households or commercial, industrial or institutional facilities in their role as end-users of a product, which can no longer be used for its intended purpose. This includes materials from the distribution chain.

Nordic Ecolabelling includes by-products from primary wood processing industries (sawdust, wood chips, shavings, bark etc.) or residues from forestry operations (bark, branches, roots, etc.) in its definition of recycled material. Virgin material purchased by industries primarily to make wood chips, for example, is not counted as recycled material. Industries that process raw wood are counted as primary wood-using industries.

It should be noted that the EU Timber Regulation, unlike Nordic Ecolabelling, does not define by-products from primary wood-using industries as residual products. Sawdust, wood chips, shavings, bark, etc. or residues from forestry operations, such as bark, branches, roots, etc. are covered by the EU Timber Regulation, i.e. legal and traceability requirements.

A record must be kept to show that the wood in question has the status of recycled material according to the definitions above.

Barbecue charcoal/briquettes:

Nordic Ecolabelling requires the manufacturer of barbecue charcoal to have Chain of Custody certification under the FSC/PEFC schemes. When applying for Nordic Ecolabelling of barbecue briquettes, Nordic Ecolabelling requires both manufacturers of barbecue charcoal and manufacturers of barbecue briquettes to have Chain of Custody certification under the FSC/PEFC schemes.

Trade in charcoal from illegally harvested forests is taking place on a large scale, mainly in regions of the African continent and also in South America. In a report published in 2015, FERN[62] states that 90% of the barbecue charcoal that is sold in the UK comes from Africa and South America. In a report published in 2014, the WWF estimates[63] that an area the size of a football pitch is lost every second as a result of illegal logging.

Moreover, the illegal trade in charcoal is helping finance terrorist groups[64], such as al-Shabaab in Nigeria, Somalia, etc. The United Nations and the USA have therefore together banned the import of charcoal from several African countries[65]. Barbecue charcoal and briquettes from illegally harvested timber is also sold in the Scandinavian market. There are a lot of "traders" in Europe that repackage barbecue charcoal and briquettes and then sell them as European-produced products (greenwashing)[66]. A similar problem may occur among European manufacturers of barbecue briquettes who buy barbecue charcoal on the market, pulverise it and then compress it into barbecue briquettes that are sold as "produced in Europe". For this reason, Nordic Ecolabelling requires both manufacturers of barbecue charcoal and manufacturers of barbecue briquettes to have Chain of Custody certification under the FSC/PEFC schemes. Requirements for traceability using FSC's transfer method/PEFC's physical separation method (full traceability) ensure that the wood raw material can be traced back to the forest.

Certified wood raw materials.

Pellets and briquettes: Applicants/manufacturers must have documentation to show that a minimum of 95% of the wood raw materials used in the Nordic Ecolabelled product, or product line on an annual basis, is recycled material. The requirement that suppliers of wood raw materials have Chain of Custody certification under the FSC/PEFC schemes ensures that the remaining percentage of wood raw materials (5%) complies with FSC's and PEFC's guidelines and regulatory frameworks for traceability.

Residual products from sawmills are the primary type of raw material used in the production of pellets and briquettes in the Nordic countries. Round wood/solid wood is used only in limited quantities during periods when availability of residual products is restricted[67]. From a life-cycle assessment perspective, from the sawmill to the production of pellets/briquettes, solid wood has a greater impact on the climate than residual products[68]. Nordic Ecolabelling therefore requires that a maximum of 5% round wood/solid wood be used annually in the production of Nordic Ecolabelled pellets/briquettes.

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[62] FERN Report "Playing with fire", August 2015, http://www.fern.org/charcoal
[63] WWF Report "Illegal timber trade 6 August 2014",*http://www.wwf.eu/?226851/EU-countries-failing-to-halt-illegal-timber-trade*
[64] Dagens Industri newspaper 11 October 2014*http://www.di.se/artiklar/2014/10/11/terrorgrupp-tjanar-miljarder/*
[65] UN Resolution 2036; p.22;
http://www.un.org/ga/search/view_doc.asp?symbol=S/RES/2036(2012))
[66] Interview with Alexander Brömer, Gruvskand, Stockholm. 31 October 2014
[67] Nordic Ecolabelling. 2015. Evaluation of Nordic Ecolabelled wood pellets. Version 2. NMN 5 November 2015.
[68] Concito (Denmark's green think tank): Does the use of biomass reduce CO2 in the atmosphere? November 2011

Wood chips, firewood and firelighting products: Applicants/manufacturers must have documentation to show that a minimum of 70% of wood raw materials (virgin and/or recycled) used in the Nordic Ecolabelled product or product line, is certified as sustainably forested under FSC/PEFC or is recycled material. The remaining percentage of wood raw materials must be FSC Controlled Wood, wood from PEFC Controlled Sources or recycled material.

The requirement limit that a minimum of 70% of wood raw materials (virgin and/or recycled) must be certified as sustainably forested under the FSC or PEFC schemes, corresponds to FSC's and PEFC's requirement limits for the use of the respective logos on products, for example, “FSC mix” and “PEFC certified”. Together, FSC and PEFC have five official logos. Further details about the use of logos can be found on the FSC[69] and PEFC[70] websites. The requirement can make it easier for manufacturers of Nordic Ecolabelled products to document the requirement, as they can demand labelled FSC/PEFC products. Recycled material is explicitly emphasised in the requirement, as both FSC's and PEFC's schemes include certified recycled material.

Nordic Ecolabelling equates recycled material with virgin material procured from sustainable forests. Recycled material that is not covered by FSC's or PEFC's Chain of Custody certification may also be used in Nordic Ecolabelled products. The recycled material must satisfy the requirement for the percentage of wood raw materials with FSC or PEFC sustainably forested certification.

A record must be kept to prove compliance with the requirement for a percentage of certified timber or recycled material. The percentage of certified material must be documented on an invoice or delivery note (paper or e-invoice) with certification codes for the certified company/companies from which the wood raw material was purchased. It must be clearly stated on the invoice or delivery note which parts of the delivery are certified (there must be a claim/material category, e.g. FSC MIX 70% and FSC 100% relating to the product in question on the invoice or delivery note, when it comes to FSC certified goods). A valid label with the relevant scheme's logo on the actual product or on an unbroken package, in which the wood product (or a batch of wood products) are sold, may also be used to demonstrate compliance with the requirement. On this may be listed a certification number or licence code, that provides information about the authorised trader who sold the product in question as being certified. The certification schemes have different rules regarding labelling and logo use. Should there be any doubt, it is advisable to consult the websites of the schemes for detailed information on the rules.

Barbecue charcoal/briquettes: Applicants/manufacturers must have documentation to show that 100% of wood raw materials used in Nordic Ecolabelled barbecue charcoal/briquettes, must be certified as sustainably forested under the FSC or PEFC schemes. Unlike the other types of products in the product group, only FSC/PEFC certified wood may be used for barbecue charcoal/briquettes.

[69] http://welcome.fsc.org/understanding-the-fsc-labels.27.htm
[70] http://www.pefc.co.uk/chain-of-custody-logo-use/pefc-label

Recycled material that is not covered by FSC/PEFC may therefore not be used. Documentation: Certified wood raw materials (FSC and PEFC) must be accounted/recorded from the manufacturer's Chain of Custody account to the Nordic Ecolabelled product/production line.

Certification and accreditation. The certification (check and approve compliance with the standard, and that the Chain of Custody and any use of label are in order) must be conducted by an independent, competent and accredited third party and must follow relevant international guidelines for certification: ISO/IEC 17065:2012: Conformity assessment - Requirements for bodies certifying products, processes and services, EN ISO/IEC 17021:2011 Conformity assessment - Requirements for bodies providing audit and certification of management systems).

The accreditation (check and approve that the certification firm is working correctly) must be performed by a national or international body, whose systems and procedures are consistent with the relevant international guidelines for accreditation bodies ("EN ISO/IEC 17011:2004 Conformity assessment - General requirements for accreditation bodies accrediting conformity assessment bodies" or equivalent).

7.3.2 Solid and liquid renewable raw materials other than wood in barbecue charcoal/briquettes and firelighting products

The requirements apply to solid and liquid renewable raw materials other than wood in barbecue charcoal/briquettes and firelighting products, for example, palm oil, bio oil, coir and paper.

O5 Renewable raw materials from palm oil, palm kernel oil and and their derivatives

Certified traceability

Suppliers of palm oil, palm kernel oil and their derivatives must have Chain of Custody certification under the RSPO scheme.

Certified raw materials from palm oil

100% of raw materials from palm oil, palm kernel oil and their derivatives used in the Nordic Ecolabelled firelighting products must be RSPO certified as sustainable palm oil, using the physical separation method, i.e. full traceability.

✉ Suppliers of palm oil are required to present a valid RSPO Chain of Custody certificate that covers all raw materials from palm oil used in the Nordic Ecolabelled firelighting product.

✉ Declaration of compliance with the requirement for the percentage of certified material and traceability. Invoices or delivery notes may be used as documentation.

Background to requirement O5

Palm oil is the primary vegetable raw material used in the production of fatty acid, methyl ester, stearin or oil for firelighting products as an alternative to paraffin.

However, oil palm cultivation is associated with many environmental and social issues[71]. The greatest environmental problem linked to the production of palm oil is the conversion of natural areas into palm oil plantations, as the erosion of natural habitats poses a critical threat to many endangered species.

In addition, there may be environmental problems associated with the use of toxins in production, air pollution from burning forests, soil erosion and heavy sedimentation to rivers and streams, as well as discharge of waste water from palm oil mills. The social problems include the violation of labour rights, where the use of chemicals and pesticides constitutes a risk to the health of the plantation workers[72]. High unemployment in Indonesia and illegal work in Malaysia increase the risks of workers being paid below the minimum wage, poor response to requests to engage in trade unions and unsafe working conditions. The expansion of palm oil plantations is also associated with the displacement of local communities. As a result of many disagreements about ownership of the land, the plantation business is the most conflict-prone land-based sector in Indonesia and Malaysia today.

Nordic Ecolabelling requires that 100% of raw materials from palm oil used in the Nordic Ecolabelled firelighting products must be certified as sustainable palm oil in compliance with the criteria of the Roundtable on Sustainable Palm Oil (RSPO) using the physical separation method, i.e. full traceability. The requirement applies both to raw materials from palm oil produced from virgin sources and residual/waste products.

Suppliers of palm oil must have Chain of Custody certification under the RSPO scheme. The requirement for certified traceability contributes to traceability in the supply chain under RSPO's guidelines and regulatory frameworks for traceability. The company's Chain of Custody certification proves how certified wood is kept separate from other wood during production, administration and warehousing and is inspected annually by independent certification bodies. Several traceability verification methods are permitted by the RSPO scheme: Physical separation method, mass balance and certificate trading (book and claim). Nordic Ecolabelling requires the strictest method, the physical separation method, for the verification of traceability and the percentage of certified raw materials. The applicant/manufacturer must submit a valid RSPO Chain of Custody certificate that covers all raw materials from palm oil used in the Nordic Ecolabelled firelighting product. A record must be kept to show the percentage of certified material. This should be an invoice or delivery note (paper or e-invoice) specifying certification codes for the certified company/companies from which the palm oil has been purchased. It must be clearly stated on the invoice or delivery note which parts of the delivery are certified.

The Round Table on Sustainable Palm Oil (RSPO) is a global standard for sustainable production of palm oil.

[71] UNEP. 2009. Towards sustainable production and use of resources: Assessing biofuels. http://www.unep.org/pdf/biofuels/Assessing_Biofuels_Full_Report.pdf
[72] OLSEN LJ, FENGER NA & GRAVERSEN J 2011a. Palm oil - Denmark's role in the global production of palm oil. WWF World Wide Fund for Nature, Denmark.

Stakeholders throughout the production chain from palm oil producers, consumers and dealers to NGOs, including environmental organisations, founded RSPO in 2004[73]. RSPO brings together stakeholder organisations from different sectors of the palm oil industry with the objective of developing and implementing global standards for sustainable palm oil.

Transparency, worker rights, use of the best available cultivation methods, protection of nature and the environment, and long-term economic planning are the key principles behind the certification. The supply of RSPO certified palm oil has increased from 1.2 million tonnes in 2009 to 12.9 million tonnes in June 2016[74]. Sales of palm oil with full traceability rose 162% from January 2015 to January 2016. In January 2016, sales of palm oil with full traceability accounted for 57% (segregated), 30% (identity preserved) and mass balance 13%[75].

By setting requirements for sustainability certified palm oil, Nordic Ecolabelling wishes to steer developments towards more sustainable palm oil production.

O6 Traceability and verification of renewable raw materials in barbecue charcoal/briquettes and firelighting products

Renewable raw materials other than palm oil and wood raw materials must meet the following requirements:

1. State name (Latin and a Nordic language) and geographical origin (country/state and region/province/municipality) and suppliers of the vegetable raw material used. Appendix 4 may be used.
2. There must also be a written procedure in place for the purchase of solid vegetable raw materials to also ensure that all vegetable raw materials come from legal sources. The raw materials must not be sourced from:

- protected areas or areas under preparation as protected areas
- areas where ownership or usage rights are unclear
- illegally harvested crops

Nordic Ecolabelling may require further documentation in the event of uncertainty about the raw material's origin.

If the vegetable raw material comprises of waste or residual products, there must be traceability to the production/process from which the waste or residue derived.

See "Terms and definitions" at the end of the criteria for a definition of waste and residual products.

☒ Name (Latin and a Nordic language) and geographical origin (country/state and region/province/municipality) of the vegetable raw materials used. Appendix 4 can be used for documentation purposes.

☒ Description of the system for traceability of vegetable raw materials

[73] http://www.rspo.org/ (18 May 2015)
[74] http://www.rspo.org/about, accessed 1 June 2016
[75] http://www.rspo.org/news-and-events/news/rspos-physical-certified-sustainable-palm-oil-hits-record-sales-for-january-2016, accessed 1 June 2016

☒ A written procedure from the producer/supplier of the vegetable raw material or the manufacturer of the charcoal/briquettes and firelighting products, describing how the requirement is fulfilled. A requirement for a certificate of traceability from subcontractors may be used as part of the procedure.

Background to requirement O6

Since use of land is also a relevant environmental parameter in this product group, requirements should be set concerning the areas from which the vegetable raw materials originate.

The aim is to ensure that areas of high biological or social value are not used for cultivation. For Nordic Ecolabelled charcoal/briquettes or firelighting products made from renewable raw materials, it is therefore important to set requirements concerning the areas from which the raw materials are sourced. Most criteria documents do this by ensuring the origin of the raw material.

A need for traceability is the basis for all vegetable raw material requirements. Traceability tells us where the raw material comes from and who produced it. For many years, Nordic Ecolabelling has made traceability a requirement in criteria that include wood raw materials.

These criteria also set requirements for the traceability of vegetable raw materials, in the same way as the criteria for the Nordic Ecolabelling of liquid fuels. There must be a written policy in place for the purchase of raw materials to also ensure that all raw materials come from legal sources. The criteria therefore contain requirements that renewable raw materials must not be sourced from:

- protected areas or areas under preparation as protected areas
- areas where ownership or usage rights are unclear
- illegally harvested crops

If the vegetable raw material can be defined as a waste or residue, there must be traceability to the process from which the waste or residue derived by means of invoices.

Vegetable raw materials for barbecue charcoal/briquettes or firelighting products may, for example, be herbaceous biomass from agriculture and horticulture or fibrous material from coconuts.

O7 Paper, cardboard and pulp in firelighting products

The requirement covers paper, cardboard or pulp used in firelighting product. The requirement also covers individual packaging, but not primary packaging.

Paper, cardboard and pulp, which are covered by the Basic Module for “Nordic Ecolabelling of Paper Products" Version 2, must comply with the following requirements of the Basic Module:

- Chapter 1 Information on production, R3
- Chapter 4 Fibre raw materials, R7
- Chapter 5 Chemicals, R8 which refers to requirements R1-R14 of the Chemical Module, Version 2.

The requirements may be documented by means of a list of all the chemicals used, giving their trade names and classification and a declaration that the requirements contained in R2-R14 have been fulfilled. Forms 1d and 1e may be used for documentation purposes. Nordic Ecolabelling reserves the right to demand further documentation for the chemicals to verify that they comply with the requirements.

- Chapter 6 Energy and CO2, R9-R10
- Chapter 7 Emissions to water and air, R12-R16

If the paper or cardboard is already Nordic- or EU Ecolabelled in accordance with the criteria for Copy and Printing Paper, the requirement will be considered to have been fulfilled and can be documented by means of a licence certificate.

✉ Documentation as described in the Basic Module for the Nordic Ecolabelling of Paper Products or a valit licence certificate from Nordic- or EU Ecolabelling. If documentation for the paper pulp has already been sent to Nordic Ecolabelling, state which office administered the documentation.

Background to requirement O7

The requirement is new in this version of the criteria and is aimed at firelighting products consisting of or containing paper, cardboard or paper pulp. For example, there are several forms of so-called ignition paper, which is paper coated with oil or stearin. Composite products, that are a combined solid fuel and firelighting product, may also contain ignition paper.

Production of paper pulp or paper has a considerable impact on the environment in terms of extraction and processing of raw materials, energy consumption and emissions to air and water. Nordic Ecolabelling has extensive experience of requirements relating to paper pulp and paper products. Requirements for these products are contained in the Nordic Ecolabel's Basic Module for paper products, Version 2. Since paper, cardboard and paper pulp in firelighting products (for example, ignition paper) generally look like the other paper and pulp types contained in Nordic Ecolabelled products, firelighting products made of paper, pulp or cardboard must also comply with these requirements in the Basic Module for paper products. The requirement also covers individual packaging, i.e. when a firelighting product and individual packaging constitute a single unit.

7.4 Chemicals

Requirements for chemicals are new and did not exist in the previous version of the criteria, which only included pellets. Since the product group has now been extended to include a number of new solid fuel types, for example firelighting products, it is relevant to ensure that chemical products do not pose any risks to the environment or health.

The chemical requirements cover all constituent substances, chemicals and chemical products that are added to the solid fuels or used in the production of solid fuels. Here, manufacture is defined as all manufacturing/processing activities conducted by the manufacturer of solid fuels or by its subcontractors.

The requirements relate to oil, grease, wax, stearin, adhesives, binders, dyes, etc.

The requirements do not cover:

- Auxiliary chemicals used during manufacture, such as lubricants, cleaning chemicals and so on.
- Refining processes, i.e. refining of vegetable oils.
- Production of paper and paper products.
- Individual, product and transport packaging.

The requirements apply to all constituent substances in the chemical product, but not impurities (compare with the definition below) unless otherwise stated in specific requirements.

Constituent substances are taken to be any substances in the chemical product, including additives in the ingredients (e.g. preservatives and stabilisers), but not impurities. Substances known to be degradation products from the constituent substances (such as formaldehyde and arylamine) are also considered to be constituent substances.

Impurities are defined as residual products from the production, including the raw material production, that can be found in the final chemical product in concentrations below 100 ppm (0.01% by weight, 100 mg/kg). Impurities in the raw material at concentrations of more than 1% are always regarded as constituent substances.

Examples of impurities are residual reagents, residual monomers, catalysts, bi-products and residual cleaning products from the production equipment and carry-overs from other production lines.

O8 Chemical products

Chemical products that are used in the production of solid fuels may not be classified in accordance with Table 4 below.

Exception:

- Fatty acids (methyl ester) are exempted from the requirement for classifications H400 and H411

Table 4: List of non-permitted classifications of chemical products used in the manufacture of solid fuels, in accordance with the CLP Regulation No. 1272/2008, or later.

CLP Regulation 1272/2008			
Hazard classification	**Code for hazard classification and category**	**Hazard statement**	**Signal word**
Harmful to aquatic organisms: Acute hazard and may cause long-lasting harmful effects	Aquatic Acute 1 Aquatic Chronic 1 Aquatic Chronic 2 Aquatic Chronic 3 Aquatic Chronic 4	H400 H410 H411 H412 H413	Warning Warning - - -
Hazardous to the ozone layer	Ozone	H420	Warning
Carcinogenic	Carc. 1A or 1B Carc. 2	H350* H351*	Hazard Warning
Germ cell mutagenicity	Muta. 1A or 1B Muta. 2	H340* H341*	Hazard Warning
Reproductive toxicity	Repr. 1A or 1B Repr. 2 Lact.	H360** H361** H362	Hazard Warning -

Acute toxicity	Acute tox. 1 or 2	H300	Hazard
	Acute tox. 1 or 2	H310	Hazard
	Acute tox. 1 or 2	H330	Hazard
	Acute tox. 3	H301	Hazard
	Acute tox. 3	H311	Hazard
	Acute tox. 3	H331	Hazard
	Acute tox. 4	H302	Warning
	Acute tox. 4	H312	Warning
	Acute tox. 4	H332	Warning

* Including all combinations of specified exposure route.

** Including all combinations of stated specific effect.

✉ Declaration from the manufacturer/supplier of the chemical product that the requirement has been fulfilled. Appendix 5 may be used.

Background to requirement O8

The requirements for chemical products are particularly relevant to solid fuels that have been impregnated with a flammable product such as oil, stearin, grease, wax, etc. or to which binding agents have been added. Nordic Ecolabelling works to ensure that any environmental and health impacts of chemical products are as small as possible. The requirement therefore includes chemicals that are toxic, harmful to the environment and harmful to the ozone layer, and chemicals that are carcinogenic, mutagenic or reprotoxic (abbreviated as CMR).

Fatty acid (methyl esters), classified as harmful to the environment with hazard statements H400 (very toxic to aquatic life) and H411 (toxic to aquatic life with long-lasting effects) are exempted. At present, methyl esters produced from palm oil/palm kernel oil are more or less the only alternative available as a substitute for petroleum-based oil (paraffin), which is dominant in the firelighting products market today. This oil is not only produced from fossil oil, it is classified as H304 (May be fatal if swallowed and enters airways) and is therefore subject to special regulations for the labelling of oils[76]. Methyl esters produced from palm oil are not classified under this hazard category. Methyl esters from palm oil have several particularly good combustion properties, unlike methyl esters produced from oil-seed rape, for example. Palm-oil firelighting products are thus able to comply with EN1860-3:2003 (requirements for safety and fire).

Stearin based on fatty acids produced from animal by-products is an alternative to methyl ester produced from palm oil. However, because stearin has a relatively low melting point (60°C), it is not always preferable for use in firelighting products.

Nordic Ecolabelling allows so-called thickened liquid firelighting products, where adhesives and soap are added to fatty acids which solidify when cooled. The type of adhesive most commonly used are formaldehyde-based adhesives, which make up 1-10% of the firelighting products and are thus classified as H341 and H350. Formaldehyde is a toxic and sensitising agent that has a carcinogenic effect and its use must therefore be restricted as much as possible. Formaldehyde-based adhesives often contain methanol as a stabiliser.

[76]http://mst.dk/virksomhed-myndighed/kemikalier/regulering-og-regler/faktaark-om-kemikaliereglerne/lampeolier/

Formaldehyde is unstable in an aqueous solution, and the solution therefore contains a stabiliser that reduces the tendency to polymerise. The solution can be stabilised by adding methanol, which is classified as H351, H301, H331 and H370.

Nordic Ecolabelling does not want to make an exception for formaldehyde-based adhesives, making it difficult for thickened liquid firelighting products to be awarded an ecolabel.

O9 CMR classification of constituent substances

Chemical products used in the manufacture of solid fuels must not contain substances that are classified with any of the following hazard codes and hazard designations or combinations thereof, as set out in Table 5 below.

Table 5: List of non-permitted classifications for the constituent substances in the chemical products used in the manufacture of solid fuels, in accordance with CLP Regulation (EC) No 1272/2008, or later.

CLP Regulation 1272/2008		
Hazard class	Code for hazard class and category	Hazard designation
Carcinogenic*	Danger, Carc. 1A or 1B Warning, Carc. 2	H350 H351
Mutagenic*	Danger, Muta. 1A or 1B Warning, Muta. 2	H340 H341
Reprotoxic*	Danger, Repr. 1A or 1B Warning, Repr. 2 -, Lact	H360 H361 H362

* Including all combinations of specified exposure route.

☒ Declaration from the chemical manufacturer/supplier that the requirement has been fulfilled. Appendix 6 may be used.

Background to requirement O9

Substances that may cause cancer, change genetic material or interfere with reproduction (known as CMR substances in categories 1A and 1B) are prioritised substances within the EU's chemical legislation due to their inherently dangerous properties. It is therefore important to reduce and eventually totally prohibit the use of CMR substances.

Nordic Ecolabelling seeks to ensure that the health and environmental impacts of the products are as low as possible. Requirements are therefore made for the prohibition of CMR substances in solid fuels.

7.5 Energy consumption

The RPS analysis shows that most of the total energy consumption takes place during the actual pellet production process (sawmills + production). This is because energy is required for the processes of debarking, stripping, chipping, drying/boiling, crushing/grinding, compressing and cooling. Most energy is used for drying wet raw materials.

A report published[77] by the Swedish pellets industry shows that in the production of pellets (sawmills + pellet plants), when the moisture content of raw materials is 50-55%, 66% of the energy is used to dry the raw materials, 33% is used to power the machinery (electricity) and 1% is used for transportation. If pellet production is extended to the whole life cycle, energy is also used to operate machinery in the forests, to transport raw materials out of the forests to the pellet plants, to transport processed raw materials and during the combustion phase. However, these are still limited quantities compared to the production phase[78].

In a life-cycle perspective for pellets, the use of fossil fuels is of major significance for emissions of greenhouse gases. Fossil energy raw materials (as fuel) are mainly used to operate machinery in the forests, to transport raw materials out of the forests to sawmills, to dry raw materials, and for the electricity that powers machinery at sawmills and pellet plants.

Nordic Ecolabelling has chosen only to set energy requirements for the process that covers the drying/boiling of raw materials in the production of solid fuels, as this particular process has a high RPS. The processes of harvesting and transporting raw materials are relevant (R), but there are limited potential (P) and steerability (S) as the industry itself is constantly improving the efficiency of these parameters. The maximum distance for the transportation of raw materials by truck from the forest to the plant is about 100 km in Sweden, Latvia and Russia, while in Canada the distance is 200 km[79]. The point is that it's the market which determines how far it is worth transporting raw materials, which is why the Nordic Ecolabel's energy requirements do not include these processes.

The requirement for use of fossil energy sources in the drying/boiling/distillation process of raw materials in solid fuel production covers pellets, briquettes, wood chips, firewood and barbecue charcoal and briquettes. It only covers the energy used for drying/boiling/distillation raw materials. It does not cover any electricity used to power machinery in the drying/boiling/distillation process.

The requirement for energy consumption includes energy (kWh/tonne) used for drying/boiling/distilling raw materials in the production of pellets, wood briquettes and barbecue charcoal and briquettes. It only covers the energy used for drying/boiling/distilling raw materials. It does not cover the electricity used to power machinery in the drying/boiling/distillation process.

O10 Fossil energy sources

Energy produced by fossil fuels may not exceed 5% of the total annual energy consumption for drying/boiling raw materials for the production of 1 tonne (pellets, wood briquettes, wood chips, firewood and barbecue charcoal/briquettes) per year. The requirement includes any use of fossil energy sources for starting up drying processes.

[77] Hagberg, L., Särnholm, E., Gode, J., Ekvall, T.,Rydberg, T. 2009. LCA calculations on Swedish wood pellet production chain – according to the Renewable Energy Directive. IVL. Stockholm

[78] CHEN S: “Life Cycle Assessment of Wood Pellet”, Department of Energy and Environment - Division of Environmental System Analysis CHALMERS UNIVERSITY OF TECHNOLOGY, Göteborg, Sweden, 2009

[79] Hansson J. et.al 2014; Greenhouse gas performance of heat and electricity from wood pellet value chains – based on pellets for the Swedish market. IVL, Biofuels, Bioproducts & Biorefining

For barbecue charcoal/briquettes, the requirement applies to both the drying and distillation process.

Electricity may not be used as a source of energy for drying/boiling/distillation unless the manufacturer generates the electricity itself.

This means that the manufacturer is the actual owner of the electricity generation facility.

If using district heating, the calculations are based on the percentage of fossil fuels used for production of heating in the local heating network.

Fossil fuels are stored solar energy that has been in the ground for millions of years. The fuels were formed from plant and animal matter that has been subjected to massive pressure. Fossil fuels include oil, coal and natural gas. Nordic Ecolabelling categorises peat as a fossil fuel in these criteria due to the high emission factor for carbon dioxide when peat is burned.

✉ Calculation and documentation showing compliance with the requirement.

Background to requirement O10

The requirement also existed in the previous version 2 of the criteria and specifies requirements for which types of raw materials can be used for drying/boiling raw materials for pellets. In version 3 of the criteria, the requirement has been tightened and its wording has been modified, but it continues to focus on limiting the use of fossil energy sources in the drying/boiling process. In this version, the requirement has been extended to include the product types wood briquettes, wood chips, firewood and barbecue charcoal/briquettes, since the conclusions of the RPS analysis for pellets may be transferred to these new product types, i.e. that there are RPS to limit the use of fossil energy sources in the raw material drying process.

In version 2 of the criteria, we require that fuels used for pellet production (drying/boiling) shall contribute a maximum of 100 kg CO_2 per tonne of pellets to the greenhouse effect. This means that between 30% (coal/peat) and 50% (natural gas) of the energy used for drying/boiling may come from fossil sources. According to the findings of two Swedish studies,[80] [81] biofuels (wood) are used almost exclusively for the drying/boiling process in the production of pellets and wood briquettes in Scandinavia and countries where timber is readily available. Nordic Ecolabelling therefore proposes a tightening of requirements so that energy produced by fossil sources may not exceed 5% of the total annual energy consumption for drying/boiling raw materials for the production of 1 tonne of pellets and wood briquettes, wood chips, firewood and barbecue charcoal/briquettes) per year. The requirement includes any use of fossil energy sources for starting up drying processes.

[80] Höglund, J. 2011. Greenhouse gas emissions for Swedish pellets production. IVL Swedish Environmental Research Institute

[81] Hagberg, L., Särnholm, E., Gode, J., Ekvall, T.,Rydberg, T. 2009. LCA calculations on Swedish wood pellet production chain – according to the Renewable Energy Directive. IVL. Stockholm

Natural gas or diesel are the primary fossil energy types alternatively used in the raw material drying process in the production of solid biofuels. Nordic Ecolabelling categorises peat as a fossil fuel in these criteria due to the high emission factor for carbon dioxide when peat is burned (350 g CO_2/kWh[82]).

Electricity may not be used as a source of energy for drying/boiling/distillation unless the facility generates its own electricity. The use of electricity for heating is inefficient compared with other forms of energy. This means that the manufacturer is the actual owner of the electricity generation facility.

For the production of barbecue charcoal and briquettes, the requirement covers both the energy used to dry raw materials and the actual distillation process.

O11 Energy consumption in the production of pellets, wood briquettes and barbecue charcoal and briquettes

Pellets and wood briquettes:

Energy consumption for drying/boiling raw materials in the production of pellets or wood briquettes must not exceed the figures in the table below (kWh/tonne pellets/wood briquettes):

If raw materials with varying moisture content are used, the energy requirement must be calculated as a weighted annual average of the raw materials used.

Table 6: Energy consumption kWh/tonnes of pellets or wood briquettes

Moisture content of raw materials	>55%	50%	40%	30%	20%	10%
	kWh/tonne	kWh/tonne	kWh/tonne	kWh/tonne	kWh/tonne	kWh/tonne
Direct dryers	1100	900	600	386	225	113
Steam dryers	825	675	450	289	169	84

Barbecue charcoal and briquettes:

Energy consumption for drying and distillation of raw materials in the production of barbecue charcoal or barbecue briquettes (moisture content max. 8%) must not exceed the figures in the table below (kWh/tonne barbecue charcoal or barbecue briquettes):

Table 7: Energy consumption kWh/tonne barbecue charcoal or barbecue briquettes

Product type	kWh/tonne
Barbecue charcoal	4000
Barbecue briquettes	4600

Reference values for the energy content of fuels specified in Appendix 7 must be used.

✉ Calculation and documentation showing that the requirement is met.

[82] http://www.biograce.net/home, accessed 16 June 2016

Background to requirement O11 Energy consumption

Pellets and wood briquettes: The requirement also existed in the previous version 2 of the criteria, but has now been amended so that only the energy consumption for drying/boiling raw materials in the production of pellets and wood briquettes is covered. The wording of the requirement has also been modified so it is now differentiated according to the moisture content of the raw material. An absolute requirement for energy consumption for the drying and distillation process in the production of barbecue charcoal or briquettes (kWh/tonne barbecue charcoal/briquettes) has been introduced for the barbecue charcoal and barbecue briquettes product types.

Version 2 of the criteria requires that energy consumption for pellet production must not exceed 1200 kWh primary energy per tonne of pellets. The processes included in the requirement are debarking, chipping, drying, grinding, boiling, pressing, cooling and sifting. As mentioned earlier, the RPS analysis shows that energy consumption for the production of pellets and wood briquettes is significant, and that the drying of damp raw materials is the process that consumes most energy. Furthermore, the RPS analysis shows that there is limited potential (P) for the energy requirement to include all the processes that use electricity to power the machinery, since the pellet factories, to a great extent, use the same electricity-powered technologies (debarking, chipping, grinding, pressing, cooling and sifting). The requirement for energy consumption therefore only covers energy for the drying/boiling process in this version 3 of the criteria.

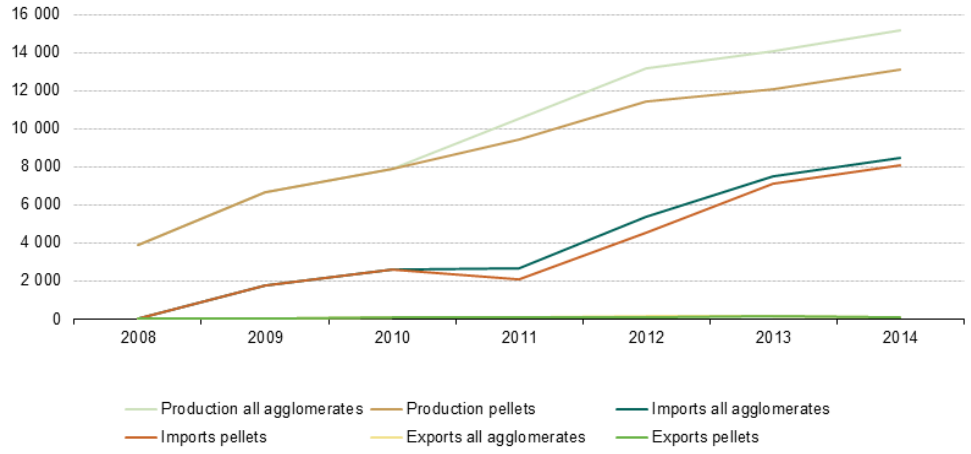
The evaluation of version 2 of the criteria showed that the limit value of 1200 kWh/tonnes of pellets is based partly on the use of dry raw materials (moisture content >20%) and that the dry energy partly comes from waste heat from external production, i.e. pellet plants are located at sites where there is a surplus of heat from pulp or paper mills or are close to a heating plant[83]. This is not the situation today.

By-products from the forest industry are the dominant raw materials used in the production of pellets today, with residual/waste wood, wood chips and sawdust most commonly used. The majority of these raw materials are “moist” materials which require drying. In recent years, it has become more common to use moist/wet raw materials in pellet production due to increased competition for dry raw materials from the pellets industry and other industries[84].

[83] The evaluation is based on a study of the energy requirements in the pellets criteria, carried out as a Ph.D study in 2012 by Charlotta Porsö at the Swedish University of Agricultural Sciences, together with Eva-Lotta Lindholm at Ecolabelling Sweden (Miljömärkning Sverige AB).

[84] Hagberg, L et al. 2009. LCA calculations on Swedish wood pellet production chains – according to the Renewable Energy Directive, IVL Swedish Environmental Research Institute, IVL Report B1873, available online:
http://www3.ivl.se/rapporter/pdf/B1873.pdf

The EU policy of promoting sustainable sources of energy has also resulted in increased production/demand for pellets (see Figure 1[85] below. The unit on the y-axis is 1,000 tonnes).



(*) EU-27: 2008–11.

Figure 1: Development in the demand and production of pellets in the EU 2008-2014

It is unclear what percentage of waste heat from the Nordic production of pellets/wood briquettes can be used to dry raw materials. Information from interviews with pellet manufacturers in Sweden, in connection with an evaluation of version 2 of the criteria, indicates that only a marginal percentage of the pellet manufacturers use waste heat.

Energy used in the pellet-drying process

The requirement limit is based on how much energy is needed to remove water from the raw material. Sawdust used to produce pellets usually has a moisture content of 50-55% prior to drying. After drying, the moisture content should be below 15% [86] [87]. The total weight of the sawdust is the dry substance plus the water content. Sawdust contains unbound and bound water. Unbound water is the moisture between the fibres in the sawdust and is usually removed using evaporation. Bound water is the moisture inside the fibre of the sawdust. More energy is required to remove the bound water as it first has to be heated and then transported to the surface by diffusion before being evaporated[88].

[85] http://ec.europa.eu/eurostat/statistics-explained/index.php/Forestry_statistics_in_detail
[86] Wimmerstedt, R. & Linde, B. 1998. Assessment of Technique and Economy of Biofuel Drying. Stockholm: Värmeforsk Service AB.
[87] Wimmerstedt, R. & Hallström, A. 1984. Drying of Peat and Biofuels, Techniques, Economy and Development Needs. Lund's Institute of Technology: Department of Chemical Engineering.
[88] Mujumdar, A.S. & Menon, A., S. 1995. Drying of Solids: Principles, Classification and Selection of dryers. I Mujumdar, A.S. (Editor) Handbook of Industrial Drying. (Second Edition). Marcel Dekker, Inc. 1-20-22.

The drying process for wood raw materials can be divided into three stages. In stage one, the unbound water is evaporated and the drying time and temperature are constant. In stage two, the sawdust starts to form dry patches, the drying time reduces and the temperature of the material starts to get closer to the temperature of the drying gas.

Stage three commences when the moisture content drops below 20%. All unbound water has then been evaporated and only bound water is left, which means that the drying rate decreases further[89] [90].

Nordic Ecolabelling has compiled data on the use of energy in different drying models that are used in pellet plants to remove 1 tonne of water from biomass. See Table 8.

Table 8: Energy consumption for the evaporation of one tonne of water from biomass.

Type of dryer	kWh per tonne of evaporated water
Direct-fired dryers	
Rotary (drum dryer)[91]	1000
Bed/conveyor (belt dryer)[92]	1050 - 1350
Low-temperature dryer[93]	1000
Indirect-fired dryers	
Steam dryer (Super-heated steam dryer)[94]	750
Steam dryer (ÅF 2005)[95]	810
It is unclear whether those below are indirect or direct	
Smoke dryer (ÅF 2005)[96]	850

The total energy used to dry a tonne of pellets, calculated using the compilation of energy used to remove 1 tonne of water from biomass, is presented in Table 9. The table shows the amount of water that has to be evaporated to obtain a moisture content of 10%, depending on the original moisture content of the raw material. It can be seen that if a raw material has a moisture content of 55% (1.1 tonne of water has to be removed by drying), then between 825 and 1485 kWh/tonnes of pellets are needed to dry the raw material, depending on the drying model. Nordic Ecolabelled pellets must not have a moisture content of more than 8% (see requirement O12) which means that slightly more energy is used than the amount specified at 10% in the table below.

[89] Ibid
[90] Pang, S. (2001). Improving MDF fibre drying operation by application of a mathematical model. Drying Technology, 19 (8), 1789-1805.
[91] Thek, G & Obernberger, I. 2010. The Pellet Handbook: The Production and Thermal Utilization of Biomass Pellets.
[92] ibid
[93] ibid
[94] ibid
[95] ÅF Process. 2005. Internal report that the Nordic Ecolabel commissioned ÅF to prepare prior to the development of version 1 of the pellets criteria.
[96] ÅF Process. 2005. Internal report that the Nordic Ecolabel commissioned ÅF to prepare prior to the development of version 1 of the pellets criteria.

Table 9: Drying raw materials for 1 tonnes of pellets with 10% moisture content.

Moisture content of raw material	55%	50%	40%	30%	20%	10%
Tonne of water to evaporate to 10%	1.10	0.90	0.60	0.39	0.23	0.11
	kWh/tonne	kWh/tonne	kWh/tonne	kWh/tonne	kWh/tonne	kWh/tonne
Direct-fired dryers						
Rotary (drum dryer)	1100	900	600	386	225	113
Bed/conveyor (belt dryer)	1150-1485	945-1215	630-810	410-527	242-311	116-149
Low temperature dryer	1100	900	600	386	225	113
Indirect-fired dryers						
Steam (super-heated steam dryer)	825	675	450	289	169	84
Steam dryer (ÅF 2005)	891	729	486	312	182	91

The most common methods used for drying are air, steam or smoke. Air is effective as its capacity to absorb water vapour increases as the temperate increases.[97] Rotary dryers, pneumatic dryers, bed/conveyor dryers and fluid bed dryers use hot air or smoke as a heating gas. Rotary dryers are the commonest type of dryer and are usually direct-fired. This means that the heating gas is in direct contact with the material that needs drying[98] [99].

The most common steam dryer model is an indirect-fired dryer. First the steam is heated using heating steam and then the material to be dried is mixed with the steam, i.e. the heating gas never comes into contact with the material. Steam drying is often a much faster method than air drying and the risk of fire is virtually non-existent. Another advantage is that the steam can be recirculated and reused, or can be used to generate district heating or electricity. The limited prevalence of the steam dryer model in the industry is primarily due to the initial investment cost. It is also more expensive than air drying and a steam dryer is not a profitable investment unless it is integrated with another process that can make use of the surplus heat that it produces[100],[101],[102].

[97] Jensen, T. 2014. Production of Pellets Integrated with a Thermal Power Station: Economic and Technical Evaluation. Master thesis. The Faculty of Health, Science and Technology. Karlstad University.
[98] Kudra, T. & Mujumdar, A., S. (2009). Advanced Drying Technologies. New York: Tylor & Francis Group, LLC.
[99] Pang, S. & Mujumdar, A.S. (2010). Drying of woody biomass for bioenergy: Drying technologies and optimization for an integrated bioenergy plant. Drying Technology, 28 (5), 690-701.
[100] Amos, W.A. 1998. Report on biomass drying technology. National Renewable Energy Laboratory Golden, CO.
[101] Kudra, T. & Mujumdar, A., S. (2009). Advanced Drying Technologies. New York: Tylor & Francis Group, LLC.
[102] Wimmerstedt, R. & Hallström, A. 1984. Drying of Peat and Biofuels (Techniques, Economy and Development Needs. Lund Institute of Technology: Department of Chemical Engineering

Nordic Ecolabelling wants to introduce an energy requirement that makes it possible to comply with the energy requirements of the Nordic Ecolabel using both drying technologies (direct-fired and steam). The requirement level ensures that the most energy-demanding production sites do not meet the requirements. Moreover, O10 Fossil energy sources requires renewable raw materials to be used in the dryers which is the most energy-demanding process.

Barbecue charcoal and barbecue briquettes: This is a completely new requirement in this version 3 of the criteria. The requirement covers energy consumption for drying and distillation of raw materials in the production of barbecue charcoal or barbecue briquettes.

There is a high RPS (relevance - potential - steerability) for limiting the energy consumption in the production of barbecue charcoal and barbecue briquettes, where most of the consumption is in the actual production of barbecue charcoal[103]. This is primarily due to the drying and distillation (pyrolysis) processes, which are very energy-intensive. The use of electricity to power the machinery is very limited in relation to these processes, and electricity is therefore exempted from the requirement. Energy is used in the production of barbecue briquettes to dry raw materials (crushed barbecue charcoal mixed with binding agents and water) before and after the briquettes are pressed.

Production technology is of major importance to the energy efficiency and environmental impacts (emissions, particulate matter and uncombusted gases) in the production of barbecue charcoal. A study comparing[104] traditional and modern industrial production of charcoal shows that the production methods differ greatly in energy efficiency and environmental impacts. Nordic Ecolabelling wants to introduce an energy requirement that ensures that only modern industrial forms of production for charcoal are able to meet the energy requirements of the Nordic Ecolabel, i.e. forms of production that use retorts and where pyrolysis gases from the distillation process are used to dry raw materials and make the process more efficient.

Data from 5 separate production facilities of equivalent modern industrial production facilities show that, on average, these facilities use 3,800 kWh/tonnes of barbecue charcoal[105]. This is equivalent to the energy from 1.35 m^3 (3,800 kWh/2,800 kWh) which was combusted. 2,800 kWh is the energy content of 1m^3 of beech wood. Here, the combustion of wood refers to wood that is completely incinerated to produce heat (steam) after which only ash remains. The less efficient a production unit is, the more energy from the burning of wood is required (or external energy, such as natural gas).

[103] Rousset P. et al: "LCA of eucalyptus wood charcoal briquettes", Journal of Cleaner Production 19 (2011) 1647e1653
[104] http://envimpact.org/node/153 viewed 4 June 2016
[105] Production data comes from dialogue with European manufacturer of barbecue charcoal and briquettes.

This concurs with the findings of a study[106] from 2013, which shows that when using modern technologies (retorts and use of pyrolysis gases), between 1.5 and 2 m^3 of wood is used to produce 1 tonne of barbecue charcoal. I.e. an energy consumption of between 4,200 kWh/tonnes (1.5∗2,800 kWh) and 5,600 kWh/tonnes (2∗2,800 kWh). The energy consumption in the production of barbecue charcoal using traditional kiln-technology is almost 4 times greater, i.e. up to 5 m^3 of beech wood must be used for the distillation process. 5 m^3 is equivalent to 14,000 kWh/tonnes (5∗2,800 kWh).

The production of the briquettes occurs by crushing of charcoal, which is then added a binder (starch dissolved in water), before the mixed material passes into a mold and dried in an oven. Energy data from the aforesaid production facilities shows that these uses on average 550 kWh/ton of briquettes in the drying process.

Based on the above data, Nordic Ecolabelling has set requirements for maximum energy consumption for drying and distillation processes to 4,000 kWh/tonnes of barbecue charcoal and 4,600 kWh/tonnes of barbecue briquettes.

The energy content of wood depends on a number of parameters, such as type of wood and moisture content. Nordic Ecolabelling has therefore stipulated reference values for different types of fuels that are used in the calculation of energy.

7.6 Use and quality requirements

This chapter covers the requirements relating to quality and information for pellets, briquettes, wood chips, firewood, barbecue charcoal and briquettes and firelighting products.

O12 Quality specifications for pellets, briquettes and wood chips

Pellets, briquettes and wood chips must comply with the quality specifications and requirement limits listed in the table below. Products for testing taken from the manufacturer's warehouse, in compliance with the methodology specified in EN 14778; EN 14780.

Table 10: Quality specifications for pellets, briquettes and wood chips

		Pellets	Briquettes	Wood chips	
Property	**Unit**	**A1**	**A1**	**A1/A2**	**Method of analysis**
Diameter	mm	6 ± 1 or 8 ± 1	In accordance with Figure 1, ISO 17225-3	-	ISO 17829
Length	mm	Maximum 4∗D (D=diameter)	According to Figure 1, ISO 17225-3	-	Pellets: SS187120 Briquettes: ISO 17829
Width W and Height H	mm	-	According to Figure 1, ISO 17225-3	-	ISO 17225-3
Particle density, DE	g/cm^3 as received	-	≥ 1.0	-	ISO 18847

[106] E. Marshal, W. Kusiak (2013): Charcoal production in the Bieszczady Mts. in the past and at present, s. 164-183

Particle size distribution, P	mm	-	-	Either (P16S, P31S, P45S), in accordance with Table 1 in ISO 17225-4	ISO 17225-4
Moisture content, M	w % as received	≤ 8.0	≤ 12.0	M10 ≤ 10 M25 ≤ 25 M35 ≤ 35	ISO 18134
Ash content, A	w % dry	≤ 0.5	≤ 1.0	A1.0 ≤ 1.0 A1.5 ≤ 1.5	ISO 18122
Mechanical durability	w % as received	> 98.0*	-	-	ISO 17831-1
Fines	w % as received	Bulk ≤ 1.0** Small bags 0.2%** Big bags 0.5%**	-	-	ISO 18846
Additives	w % as received	≤ 2 type and quantities must be specified***	≤ 2 type and quantities must be specified***	-	ISO 18846
Lower calorific value (energy content)	MJ/kg or kWh/kg as received	≥ 17.3 or ≥ 4.8	≥ 15,5 or ≥ 4,3	Minimum value must be specified****	ISO 18125
Bulk density, BD	Kg/m^3 as received	≥ 650 ±30	-	BD150 ≥ 150 BD200 ≥ 200 BD250 ≥ 250 BD300 ≥ 300	ISO 17828
Ash melting point temperature	C°	>1400*****	-	-	CEN/TC 15370-1
Nitrogen, N	w % dry	≤ 0.3	≤ 0.3	-	ISO 16948
Sulphur, S	w % dry	≤ 0.04	≤ 0.04	-	ISO 16994
Chlorine, Cl	w % dry	≤ 0.02	≤ 0.02	-	ISO 16994
Arsenic, As	mg/kg dry	≤ 1	≤ 1	-	ISO 16968
Cadmium, Cd	mg/kg dry	≤ 0.5	≤ 0.5	-	ISO 16968
Chromium, Cr	mg/kg dry	≤ 10	≤ 10	-	ISO 16968
Copper, Cu	mg/kg dry	≤ 10	≤ 10	-	ISO 16968
Lead, Pb	mg/kg dry	≤ 10	≤ 10	-	ISO 16968
Mercury, Hg	mg/kg dry	≤ 0.1	≤ 0.1	-	ISO 16968
Nickel, Ni	mg/kg dry	≤ 10	≤ 10	-	ISO 16968
Zinc, Zn	mg/kg dry	≤ 100	≤ 100	-	ISO 16968

* Wood pellets: Mechanical durability: at factory gate or when loading truck for deliveries to end-users. Not valid for briquettes.

** Wood pellets: Fines: at factory gate in bulk transport (at the time of loading) and in small (up to 20 kg) and big bags (at time of packing) or sealed Big Bags or when delivering to end-user. Not valid for briquettes.

*** The amount of additives in production shall be limited to 1.8% by weight, the amount of post-production additives (e.g. coating oils) shall be limited to 0.2% by weight of the pellets.

Limit for the temperature of pellets at the loading point for end-user deliveries: 40°C.

**** See Appendix D, ISO EN 17225-1 for calculation.

***** All characteristic temperatures (shrinkage starting temperature (SST), deformation temperature (DT), hemisphere temperature (HT) and flow temperature (FT)) in oxidising conditions should be stated. Pre-ashing temperature other than 550°C should be stated.

The requirements concerning test laboratories and test instructions are stated in Appendix 8.

✉ Full test report.

Background to the O12 quality specification requirement for pellets, briquettes and wood chips

The requirement has been amended and tightened for a number of quality properties in relation to version 2 of the criteria. The requirement has been updated to comply with ISO 17225-2 for pellets and extended to include the product types briquettes and wood chips according to ISO 17225-3 and -4. For pellets, this means new content requirements for the following heavy metals; arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc.

Sampling requirements have been updated in compliance with EN14778 and EN 14780 - Solid biofuels (Sampling and Methods for sample preparation).

The European Biomass Association (AEBIOM[107]) has developed its own quality assurance standard for pellets, ENplus class A1, which is based on the specifications of the ISO 17225-2 standard, but has stricter limits for individual quality parameters. An overview of requirement levels for the Nordic Ecolabel, ENplus and DINplus standards is presented in Appendix 1.

Requirements for the length of pellets has been amended in relation to version 2 of the criteria, where the requirement is consistent with EN 14961-2 (now ISO 17225-2). The Nordic Ecolabel now requires the length of pellets to be a maximum of 4 times the diameter of the pellet, which corresponds to the requirement definition in the Swedish standard (SS 187120) and is consistent with the quality requirement for pellets produced in the Nordic countries[108]. The requirement means that the maximum length of a Nordic Ecolabelled pellet is 36 mm (4∗9), while ISO 17225-2 and ENplus specify a length of 40 mm.

The requirement for the moisture content of pellets has been tightened in relation to version 2 of the criteria from ≤10% to ≤8 % based on input from stakeholders, making it stricter than ISO 17225-2 and ENplus, where the requirement is ≤10%. Water is naturally bound in wood and if the percentage of water is too high, the heat output will be low and the risk of a build-up of chimney deposits will increase. A very low water content is not necessarily the same as a good wood pellet, because the wood pellet won't have the required strength unless it has the right moisture content.

The requirement for the ash content of pellets remains at the same level (≤ 0.5) as in version 2 of the criteria, which is stricter than ISO 17225-2 and ENplus (≤ 0.7). An ash content of 0.5% by weight means that only debranched and debarked raw materials may be used in Nordic Ecolabelled pellets and briquettes.

The requirement for the durability of pellets (mechanical durability) has been tightened in relation to version 2 of the criteria from ≥97.5 to ≥98.0, which is the same level as ENplus and stricter than ISO 17225-2. The durability of a pellet is an important quality parameter as it affects the pellet's tendency to crumble.

[107] http://www.aebiom.org/, accessed 22 June 2016
[108] Interview with Bengt-Erik Löfgren, Swedish Pellets Association, 11 May 2016

The mechanical durability is one of the most important quality requirements for pellets that are used in small boilers for heating private residential properties, since the requirement for a high percentage of fines may cause problems for the automatic feeding system of the boilers[109].

The requirement for the calorific value of pellets has been tightened from ≥17.1 MJ/kg in version 2 of the criteria to ≥17.3 MJ/kg, which is consistent with the quality requirement for pellets produced in the Nordic countries[110]. The equivalent requirement level in ISO 17225-2 and ENplus is ≥ 16.5 MJ/kg.

The requirement for the ash melting behaviour deformation temperature of pellets has been tightened from T ≥1,300C° in version 2 of the criteria to T ≥1,400C°, which is consistent with the quality requirement level for pellets produced in the Nordic countries. The requirement is stricter than ENplus, which requires T ≥1,200C°, while ISO 17225-2 only has a disclosure requirement. A requirement for a high ash melting point ensures that slag does not accumulate during combustion[111].

The requirement for additives in pellets is a separate requirement (K13) in version 2 of the criteria, which in this version 3 has been moved to requirements for quality specifications. The requirement also covers briquettes. Additives are permitted up to a maximum of 2% by weight. Of that amount, 1.8% by weight may come from the production process and 0.2% by weight from post-production. The requirement level is equivalent to ISO 17225-2 and ENplus for pellets and ISO 17225-3 for briquettes. ISO 17225-2 permits unmodified additions, such as starch and grease from agricultural and forestry operations in the pellet production process. Grease may reduce the energy consumption in the pellet pressing process[112, 113] and starches may increase the mechanical durability of the pellets, i.e. reduce dust from pellets. Some studies show that additives such as lignosulphonate, residues from the production of paper pulp, and different types of starches (potato and corn starch) can cause sintering in the pellet boiler. Lignosulphonate can also result in higher particle emissions (200 mg/m^3 10% O_2) and emissions of SO_2 in comparison with a normal level of 30-50 mg/m^3 10% O_2) for pellets[114].

A lot of manufacturers market their pellets with the statement “Contains no additives”. Interviews with Nordic pellet manufacturers in conjunction with an evaluation of version 2 of the criteria show that it is possible to produce pellets with good durability without the use of additives.

[109] Thek, G & Obernberger, I. 2010. The Pellet Handbook: The Production and Thermal Utilization of Biomass Pellets.
[110] Interview with Bengt-Erik Löfgren, Swedish Pellets Association, 11 May 2016
[111] Strömberg & Herstad Svärd. 2012 Bränslehandboken (The Fuel Handbook). VÄRMEFORSK ISSN 1653-1248.
[112] Haas, J & Hackstock, R. 1998. Brennstoffversorgung mit Biomassepellets. Berichte aus Energie- und Umweltforschung, No 6. Bundersministerium für Wissenschaft und Verkehr. Austria.
[113] Ståhl, M. et al. 2014. SUSTAINABLE IMPROVEMENTS IN THE WOOD FUEL PELLET CHAIN Proceedings of SEEP2014, 23-25 November 2014, Dubai-UAE.
[114] Rönnbäck, M. et al. 2011. Experimental evaluation of pellet quality - Burners for houses and large buildings. Swedish National Testing and Research Institute SP. Report 2011:60.

Quality properties and requirement levels for briquettes are consistent with ISO 17225-3, Class A1, which is also identical to ENplus. Briquettes are increasingly used by private homeowners in stoves and small boilers as a replacement or supplement to firewood. This sets high requirement to the stove/boiler as well as the quality of the used briquettes, to ensure a clean and efficient combustion. Because of this Nordic Ecolabelling only wish to brand briquettes that meet the class A1.

Quality properties and requirement levels for wood chips are identical to ISO 17225-4, Class A1 and A2. This is to ensure that the wood chips has a high quality so that it also can be used in smaller boilers.

O13 Quality specifications for firewood

Firewood must comply with the quality specifications and requirement limits listed in the table below.

Table 11: Quality specifications for firewood

Property	Unit	
Diameter, D	cm	8 – 12*
Moisture content	%, at time of delivery	≤ 18.0**
Lower calorific value (energy content)	MJ/kg or kWh/kg as received	Must be indicated
Rot, mould and dust		No visible rot, mould or dust

* At least 95% of the firewood must have a diameter of 8-12 cm

**The moisture content must be determined using the weighing/drying method:

$$\text{Water content (M)} = \frac{\text{wet weight of wood (Ww)} - \text{ovendry weight of wood(Wo)}}{\text{wet weight of wood (Ww)}} \times 100\%$$

☒ Declaration from the manufacturer/distributor of the firewood showing that the requirement has been met. Appendix 9 may be used.

☒ A quality procedure to show how the requirement for quality specifications is routinely checked.

Background to the O13 quality specification requirement for firewood

Firewood is split, dry wood that is primarily used in wood-burning stoves, fireplaces, masonry stoves or solid fuel boilers. The quality of the firewood depends on parameters such as the size and diameter of the log, rot and dust, moisture content and tree species.

Nordic Ecolabelling requires that at least 95% of the firewood shall have a diameter of 8-12 cm. This means the firewood meets the requirements of Classifications A^+ and A in the Danish Biofuel Association's labelling scheme for firewood[115]. Also, there must be no visible rot, mould or dust on the firewood.

Wood used for firewood has different calorific values or densities, depending on how hard the wood is and how slowly the tree grows. The density of the firewood plays a role in the amount of energy or heat it releases.

[115] http://www.biobraendselsforeningen.dk/info-om-braende/, viewed 24 June 2016

The calorific value is the amount of energy or heat produced by the complete combustion of a defined amount of firewood. The calorific values or energy content of dry wood are measured in MJ/kg, kWh/kg and Kcal/kg.

The fact is that 1 kilo of completely dry wood contains more or less the same amount of energy regardless of what type of wood it is. The calorific value of 1 kg of dry wood (18% moisture) is about 19 MJ/kg (approx. 4.2 kWh/kg). This is equivalent to about 0.5 litres of fuel oil. Nordic Ecolabelling requires that the calorific value of the delivered quantity of firewood is disclosed to the purchaser.

Factors affecting the calorific value of firewood are 1) moisture content, and 2) how much the individual wood types fill the volume referred to as density.

Moisture content: It is important that the firewood is dry before using it. The drier the firewood, the better it is, as dry firewood burns better and produces less pollutants than wet firewood. Wet firewood produces more steam during combustion, which means the combustion takes place at a lower temperature. When the temperature is low, the wood smoke contains more soot and harmful particles and thus a higher level of pollution. Wet firewood also creates a build-up of soot in the chimney, which can, in the worst case, form deposits of creosote, which is a sticky, tarry condensate. This is formed when the flue gases that are formed during combustion react with the steam from the wet firewood. Creosote increases the risk of the chimney catching fire and can also give off odours and cause discolouration of the walls next to the chimney.

Nordic Ecolabelling requires that the water content of delivered firewood does not exceed 18%, which is also the recommendation of the Danish Environmental Protection Agency in Denmark. This means that the firewood meets the requirements of Classification A in the Danish Biofuel Association's labelling scheme for firewood. The moisture content of firewood shall be tested a suitable number of times to ensure that the water content of the delivered firewood (crates/boxes or loose loads) does not exceed 18%.

The water content shall be determined using the weighing/drying method, whereby a log is weighed on accurate scales, after which it is placed inside an oven at a temperature of just above 100 degrees (103 degrees Celsius is the standard temperature used). Drying the wood at a temperature just above 100 degrees ensures that all the water is vaporised. When all the water has been removed after 24 hours or more, the log is weighed again. The weight loss is equivalent to the original water content of the log.

Density: One kilo of completely dry wood (dry substance) contains more or less the same amount of energy regardless of what type of wood it is. One kilo of completely dry beech wood therefore contains the same amount of energy as one kilo of completely dry spruce wood. It just doesn't take up as much space.

The calculation of calorific value is thus about how much space the firewood takes up. What this means is that a kilo of dry beech wood will take up less space than a kilo of dry spruce wood. The energy content is thus calculated in relation to the solid mass of wood.

In other words, the amount of energy in one cubic metre (measurement of volume) of completely dry wood mass without any air in the container. The amount of firewood that the container can hold does not weigh as much since the densest types of wood with the higher energy content will be much heavier than the lightest, such as spruce. The table below shows the density of the most common types of wood. The density is specified as kg per m^3 (completely dry wood)[116].

Table 12: Density of the most common tree species specified as kg per m^3

Tree species	Density in kg per m^3 (dry wood)
Hornbeam	640
Beech	580
Ash	570
Oak	570
Birch	540
Electricity	440
Scots pine	430
Spruce	370

Naturally dried/seasoned firewood: To reduce the moisture in the wood to below 18% before it is burned, the newly-felled firewood must be dried for at least 1½ years in a dry (covered) and well-ventilated place. It can take longer to get heavier wood types like beech, oak and birch sufficiently dry. The moisture content of firewood can be measured using a moisture meter which many builder's merchants sell.

Oven-dried firewood: Oven-drying is a process that uses energy to rapidly reduce the moisture content of the wood. The wet firewood is stacked in containers through which hot air is blown to dry the wood. The firewood is usually stacked in firewood crates. Gas, coal or biofuels are often used to dry the wood. The drying time depends on the type of wood, how the firewood is stacked and the amount of wood inside the container. Firewood is often marketed as “Oven-dried firewood” or similar, but this is not always accurate. For example, sometimes only the outer layer of oven-dried firewood is dry, while the core is still too wet for it to be used as firewood[117].

O14 Quality specifications for barbecue charcoal and barbecue briquettes

If the applicant is a manufacturer of barbecue briquettes only, all the following requirements for production facilities (both barbecue charcoal manufacturer and/or barbecue briquette manufacturer) must also be fulfilled and documented.

Requirements for production facilities:

- The production of barbecue charcoal and briquettes must take place at a permanent production facility with the infrastructure to support the operations (defined raw material warehouse, drying facility, distillation facility, packing facility and storage space).

[116] http://www.skovforeningen.dk/site/traearternes_egenskaber/ viewed 6 March 2015
[117] http://politiken.dk/forbrugogliv/boligogdesign/energi/ECE2445216/kvalitetsmaerkning-af-braende-skal-goere-faerre-syge-af-braendeovnsroeg/ viewed 6 March 2015

- The distillation process must take place in an automatic closed-loop production system, where the flue gasses from the distillation processes is collected and reused in the drying/distillation processes, before they are released into the air.
- All defined production facilities must be inspected at least once a year by an independent competent third party to ensure compliance with requirements O3, O4 and O6 for raw materials, requirements O9 and O10 for energy consumption and production facilities.

Requirements for quality specifications for barbeque charcoal/-briquettes:

- Barbecue charcoal and barbecue briquettes must be tested in accordance with the EN 1860-2:2005 and must meet the quality specifications listed in the table below.
- All quality specifications stated in the table below must be tested once a year by an independent testing laboratory. The samples must be taken from the manufacturer's warehouse.

Table 13: Quality specifications for barbecue charcoal and barbecue briquettes

Property	Barbecue charcoal	Barbecue briquettes
Fixed carbon	≥ 83%	≥ 68%
Ash content	Max. 4%	Max. 15%
Moisture content	Max. 8%	Max. 8%
Volatile components (dry barbecue briquettes)	-	Max. 20%
Granulation	Max. 10% > 80 mm Min. 70% > 20 mm Max. 20% between 10-20 mm Max. 7% between 0-10 mm	< 20 mm max. 10%
Binder	-	See*
Foreign substances	-	See**
*The gases that are emitted from binding agents when burned must not pose any risk to health when they come into contact with food. The binder must meet food quality standards.		
**Tests conducted in accordance with 6.5 (EN1860-2:2005) must show that a maximum of 0.4% of the volume is a substance that does not normally occur after the distillation process in the production of barbecue charcoal. Barbecue briquettes must not contain: Organic fossil material, e.g. stone coal, brown coal and petroleum coke, and inorganic materials, e.g. stone, sand, glass, slag and metal splinters.		

The requirements concerning test laboratories and test instructions are stated in Appendix 8.

☒ Declaration from the manufacturer of barbeque charcoal/-briquettes showing that the requirement to production facilities has been met. Appendix 10 may be used.

☒ Complete test report.

Annual reporting:

☒ A report issued by an independent competent third party verifying compliance with the Nordic Ecolabel's requirements O3, O4 and O6 for raw materials, and O9 and O10 for energy consumption. All reports must be available to Nordic Ecolabelling. If the annual report shows that the requirement is not met, the licensee should contact Nordic Ecolabelling.

✉ Test Report, issued by independent test laboratory showing that the requirements for quality specifications listed in Table 13 are met. All reports must be available to Nordic Ecolabelling. If the annual report shows that the requirement is not met, the licensee should contact Nordic Ecolabelling.

Background to the O14 quality specification requirement for barbecue charcoal and briquettes

Requirements for production facilities:

Trade in charcoal from illegally harvested forests is taking place on a large scale, mainly in regions of the African continent and also in South America[118]. In a report published in 2014, the WWF estimates[119] that an area the size of a football pitch is lost every second as a result of illegal logging. Moreover, the illegal trade in charcoal is helping finance terrorist groups[120], such as al-Shabaab in Nigeria, Somalia, etc. The United Nations and the USA have therefore together banned the import of charcoal from several African countries[121]. Barbecue charcoal and briquettes from illegally harvested timber is also sold in the Scandinavian market. There are "traders" in Europe that repackage barbecue charcoal and briquettes and then sell them as European-produced products (greenwashing)[122]. To ensure that the wood raw materials used in Nordic Ecolabelled barbecue charcoal/briquettes are legal and sustainably produced, Nordic Ecolabelling (as mentioned previously in Section 7.3 (Resources)) has stringent requirements for the use of certified wood and traceability.

Nordic Ecolabelling has a number of requirements for production facilities, for both barbecue charcoal and barbecue briquettes, to ensure that the products are manufactured under controlled conditions and in an environmentally-responsible and energy-efficient manner. The requirement that the production of barbecue charcoal and briquettes must take place at a permanent production facility with the infrastructure to support the operations ensures that mobile production facilities cannot be used in a Nordic Ecolabelled production. The use of transportable metal vessels/drums or primitive earth/clay kilns for charcoal production is very common in Africa and South America, for example. The mobility of these production facilities makes it simple to transport them to wherever the raw material (wood) is and thus, potentially, use timber that has been harvested illegally.

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[118] http://www.naturskyddsforeningen.se/nyheter/grillkol-kan-komma-fran-olagliga-avverkningar, 27 May 2016

[119] *WWF report "Illegal timber trade 6 August 2014",http://www.wwf.eu/?226851/EU-countries-failing-to-halt-illegal-timber-trade*

[120] *Dagens Industri newspaper 11 October 2014http://www.di.se/artiklar/2014/10/11/terrorgrupp-tjanar-miljarder/*

121 UN Resolution 2036; p.22; http://www.un.org/ga/search/view_doc.asp?symbol=S/RES/2036(2012)) (source attached: SvD newspaper 28 September 2013).

[122] Interview with Alexander Brömer, Gruvskand, Stockholm. 31 October 2014

Moreover, this form of production is linked to serious health impacts for the workers (emissions of unburned gases in the distillation process and particulate matter/coal dust), and the use of safety and protection equipment is very limited[123].

The requirement saying that the distillation process must take place in an automatic production system where the flue gasses from drying and distillation processes is collected and and reused in the drying/distillation processes, before they are released into the air, ensure that only "modern" methods of producing barbecue charcoal/briquettes (retort technologies) meet the Nordic Ecolabel requirements. The requirement also ensures that air emissions are reduced significantly compared to the primitive production technologies (metal vessels or earth/clay miler), where the flue gas is discharged directly into the air[124].

All defined production facilities must be inspected at least once a year by an independent, qualified third party to ensure compliance with requirements O3, O4 and O6 for raw materials, requirements O10 and O11 for energy consumption and production facilities. The requirement therefore covers all sites where barbecue charcoal and barbecue briquettes that are included in a Nordic Ecolabel licence are manufactured. If an applicant only manufactures barbecue briquettes, then the requirement covers subcontractors of barbecue charcoal/residues from barbecue charcoal production. All reports must be available to Nordic Ecolabelling. If the annual report shows that the requirement is not met, the licensee should contact Nordic Ecolabelling.

To ensure that the Nordic Ecolabelled barbecue charcoal/briquettes maintain a high level of quality, Nordic Ecolabelling requires quality control inspections of the Nordic Ecolabelled products to be conducted annually. They shall be tested for compliance with all quality specifications stated in Table 13, and shall be conducted by an independent testing laboratory. A test sample must be taken from the manufacturer's warehouse. All reports must be available to Nordic Ecolabelling. If the annual report shows that the requirement is not met, the licensee should contact Nordic Ecolabelling.

Quality specifications for barbecue charcoal and barbecue briquettes:

Barbecue charcoal and barbecue briquettes must be tested for compliance with EN 1860-2:2005. The quality of barbecue charcoal/briquettes depends on a number of parameters, such as the ash, water and fixed carbon content. The requirements for quality specifications for barbecue charcoal and briquettes in different standards are set out in Appendix 2.

The requirements for fixed carbon say something about the ability of the charcoal/briquette to emit heat, so the higher the percentage of fixed carbon, the better the quality. In the case of barbecue charcoal, the Nordic Ecolabel requires a fixed carbon content of at least 83%, which is the same requirement level as that specified by Det Norske Veritas (DNV (SBC 184)) in its certification standard.

[123] FERN Report (August 2015): "Playing with fire – Human misery, environmental destruction and summer BBQs"
[124] FAO TCP/CRO/3101 (2008: Development of a sustainable charcoal industry, p. 20-21

However, the requirement is stricter than EN 1860-2:2005, Danske Varefakta (DVN) and DINplus, where the requirement is a minimum of 75%, a minimum of 75% and a minimum of 80% respectively. In the case of barbecue briquettes, the Nordic Ecolabel requires a fixed carbon content of at least 68%, which is stricter than DNV (min. 65%), EN 1860-2:2005 (min. 60%), DVN (min. 65%) and DINplus (min. 65%). The difference in requirements for fixed carbon content in barbecue charcoal and barbecue briquettes respectively is primarily due to the use of binding agents in the briquettes.

The requirements for ash content say something about how "pure" the materials are from which barbecue charcoal or barbecue briquettes are made. A high ash content after combustion indicates that the products probably contain other materials than wood, e.g. sand, minerals (lignite or stone coal) and others. Consumer tests showed that the ash content could fluctuate between 4 and 40%[125]. Thus, the lower the ash content, the better the quality. The ash content of barbecue briquettes is higher than barbecue charcoal due to the content of binding agents. In the case of barbecue charcoal, the Nordic Ecolabel requires that the ash content shall not exceed 4%, which is the same requirement level as that specified by DNV (SBC 184) and DINplus in their certification standards. However, the requirement is stricter than EN 1860-2:2005 and DVN, where the requirement specifies a maximum ash content of 8%. In the case of barbecue briquettes, the Nordic Ecolabel requires that the ash content shall not exceed 15%, which is the same level as that specified by DNV (SBC 184) and DIN plus, but is stricter than EN 1860-2:2005 and DVN, which permits 18%.

The requirement for moisture content says something about the quality of the barbecue charcoal/briquettes. The higher the moisture content, the lower the burning properties. In the case of barbecue charcoal and barbecue briquettes, the Nordic Ecolabel requires that the moisture content shall not exceed 8%, which is the same level as in the previously mentioned standards and certification schemes.

In order to be able to light barbecue charcoal/briquettes, they must contain small amounts of volatile components. However, if the content of volatile components is high, flames will be produced instead of the steady glow that you want from the coals/briquettes[126]. The requirement is most relevant for barbecue briquettes due to their composition and size. In the case of briquettes, the Nordic Ecolabel requires that the volatile component content shall not exceed 20%, which is the same requirement level as that specified by DNV (SBC 184). EN 1860-2:2005, Danske Varefakta (DVN) and DINplus have no requirements for the content of volatile components.

Barbecue briquettes are made by compressing pulverised charcoal or heat-treated mineral coal, and adding a binding agent such as corn starch or potato starch. The quality of briquettes is thus determined by the quality of the charcoal that is used and what is added at the compression stage. The Nordic Ecolabel requires that binding agents shall not pose any risk to health when the gases that are emitted from the binding agents when burned come into contact with food.

[125] http://forcetechnology.com/~/media/force-technology-media/div-6-metrology-chemical-analysis-and-managemetn-systems/datasheets/a163/2705-3-da, viewed 4 July 2016
[126] http://gryfskand.pl/en/business-areas/charcoal-products/terminology/, viewed 4 July 2016

The binder must meet food quality standards. At the same time, a number of organic fossil materials and inorganic materials are not permitted for use in barbecue briquettes. These are organic fossil materials, e.g. stone coal, brown coal and petroleum coke, and inorganic materials, e.g. stone, sand, glass, slag and metal splinters. The requirement is consistent with EN1860-2:2005. The requirement for quality specifications must be documented with a complete test report.

O15 Quality specifications for firelighting products

Firelighting products must be tested and comply with EN 1860-03:2003, including the requirements below for radiation intensity according to article 4.4.2 in the standard.

- The average time (test 3) from lighting a firelighting product to the point where a radiation intensity of 500 W/m^2 is reached must not exceed 9 minutes.

The requirements concerning test laboratories and test instructions are stated in Appendix 8.

✉ Complete test report.

Background to requirement O15

Firelighting products must be tested for compliance with EN 1860-3:2003. The quality of firelighting products mainly depends on how efficiently and effectively a firelighting product transfers its energy in the form of fire/heat to the product (for example, firewood or barbecue charcoal/briquettes) that you wish to light. At the same time, the product must be safe to use for lighting (i.e. in its packaging) and when the product is lit. The EN 1860-3:2003 standard has requirements for the safety of firelighting products, how effectively they perform and for their packaging.

The requirement to reach a radiation intensity of 500 W/m^2 is an expression of how quickly a firelighting product transfers its thermal energy to the product that you wish to light. A long burning time is not necessarily a good quality parameter if the flame produced is very small. The requirement in terms of quality is that the firelighting product must be easy to light and the fire must spread quickly across the surface of the whole firelighting product to ensure high heat generation. The results of a Norwegian test[127] of solid firelighting products show that the products burn (from lighting until the flame goes out) between 8 and 10 minutes. This is in line with the information provided on products in the Nordic market, where the burning time is specified to be 8 to 12 minutes on average. Nordic Ecolabelling has therefore set 9 minutes as the average (test 3) maximum limit value for reaching a radiation intensity of 500 W/m^2. The requirement in EN 1860-3:2003 is 25 minutes.

The requirement must be documented with a complete test report to show that the firelighting product complies with the EN 1860-3:2003 standard and the Nordic Ecolabel's amended requirement limit for reaching a radiation intensity of 500 W/m^2.

[127] http://www.hyttemag.no/vi-tester/i-fyr-og-flamme, viewed 13 July 2016

O16 Information to consumers about pellets, briquettes, wood chips and firewood

The following information must appear on the labels/packaging/delivery note of pellets, briquettes, wood chips or firewood:

- Information about the manufacturer
- Tree species (species name)/names of renewable raw materials
- That the product complies with Classification A1 according to ISO 17255:2014 part 2/3 or 4 (does not apply to firewood)
- Solid fuel dimensions
- The volume/weight of the sold/delivered Nordic Ecolabelled solid fuel
- Moisture content
- Ash content (does not apply to firewood)
- Calorific value in MJ/kg, kWh/kg or Kcal/kg

✉ Copy of the text on labels/packaging/delivery note.

O17 Information to consumers about barbecue charcoal and barbecue briquettes

The following information must appear on the labels or packaging of barbecue charcoal and barbecue briquettes:

- Information about the manufacturer of both barbecue charcoal and barbecue briquettes
- Tree species (species name)/names of renewable raw materials
- Weight of unit in kg
- Fixed carbon content
- Ash content
- Moisture/water content
- Calorific value in KJ/kg

✉ Copy of the text on labels/packaging/delivery note.

O18 Information to consumers about firelighting products

The following information must be included on the firelighting product's labels or packaging:

- Information about the manufacturer
- Tree species (species name)/names of renewable raw materials
- Burning time
- Recommended number of firelighting units for lighting

✉ Copy of the text on labels/packaging/delivery note.

Background to requirements O16, O17 and O18

Requirements for information to consumers are also set out in version 2 of the criteria for pellets. The requirement has now been slightly amended and extended to include briquettes, wood chips, firewood, barbecue charcoal/briquettes and firelighting products.

The requirement shall ensure that consumers are provided with relevant information about the products at the time of purchase, with regard to relevant quality parameters and information about raw materials and place of production. The information may also be used to compare the requirements of the Nordic Ecolabel with other similar types of products.

Information about tree species/renewable raw materials ensures that consumers know which raw materials the product contains. Information about raw materials and place of production is very limited in particular in the case of barbecue charcoal and briquettes. Often, the only information given about the raw material is “wood” or “hardwood” and, in some cases, a country is stated as the place of production. As previously explained, the illegal harvesting of wood, particularly in Africa and South America where charcoal is manufactured under poor working, environmental and production conditions, is causing serious problems for the barbecue charcoal/briquette industry[128]. This barbecue charcoal is exported on a major scale to Europe and elsewhere, where it is repackaged or reformed into barbecue briquettes. Nordic Ecolabelling requires that the names of the manufacturer of barbecue charcoal and the manufacturer of barbecue briquettes are both printed on the packaging to ensure full traceability. The requirement supports the requirement of the criteria to guarantee legal and sustainable raw materials.

7.7 Quality and official requirements

The following procedures must be implemented to ensure that the Nordic Ecolabel requirements are met.

If the manufacturer has a certified environmental management system in accordance with ISO 14 001 or EMAS in which the following procedures are implemented, it is sufficient for the accredited auditor to confirm that the requirements are being implemented.

O19 Person responsible for the Nordic Ecolabel

The company shall appoint an individual responsible for ensuring the fulfilment of Nordic Ecolabel requirements, and a contact person for communications with Nordic Ecolabelling.

✉ Organisational chart showing who is responsible for the above.

O20 Documentation

The licensee must be able to present a copy of the application and factual and calculation data supporting the documents submitted with the application (including test reports, documents from subcontractors and such like).

🔑 To be checked on site.

O21 Product quality

The licensee must guarantee that the quality of the Nordic Ecolabelled solid fuel is maintained throughout the validity period of the licence.

✉ Procedures for collating and, where necessary, dealing with claims and complaints regarding the quality of the Nordic Ecolabelled product.

[128] http://www.tft-earth.org/what-we-do/product-groups/ viewed 13 July 2016

O22 Planned changes

Written notice of planned product and marketing changes that affect the Nordic Ecolabelling requirements must be given to Nordic Ecolabelling.

✉ Procedures detailing how planned product and marketing changes are dealt with.

O23 Unforeseen non-conformities

Unforeseen non-conformities that affect the Nordic Ecolabel requirements must be reported in writing to Nordic Ecolabelling and logged.

✉ Procedures showing how unforeseen non-conformities are handled.

O24 Traceability

The licensee must have a traceability system for the production of the Nordic Ecolabelled product.

✉ Description/procedures for how the requirement is to be met.

O25 Take-back system

Relevant national regulations, legislation and/or agreements within the sector regarding take-back systems for products and packaging shall be complied with in all the Nordic countries where the Nordic Ecolabelled solid fuels are marketed.

✉ Inserts from applying for membership of existing agreements on recycling/disposal.

O26 Laws and regulations

The licensee must ensure compliance with the applicable legislation on health and safety, environmental legislation and installation-specific terms/permits at all the production sites for the Nordic Ecolabelled product.

✉ Signed application form.

Background to requirement

Requirements O19 to O26 are general quality assurance requirements for ensuring that the ecolabelled products fulfil the requirements and comply with legislation and regulations such that the products maintain the environmental quality which is the purpose of the requirements. Most of these requirements are general and apply to all production of ecolabelled products. Individual requirements are not justified in greater detail here.

7.8 Areas without requirements

The following proposal for requirements has been discussed and analysed during the review process. However, for the reasons explained below, Nordic Ecolabelling has decided that it will not be included in the consultation draft.

Carbon footprint

In our communications during the review process, the Swedish Pellet Association expressed a wish[129] that a Carbon Footprint requirement be included in the Nordic Ecolabel's criteria for pellets.

[129] http://www.pelletsforbundet.se/ (17 June 2016)

The Swedish Pellet Association wishes it to be included as there is a requirement for it to be calculated in the ENplus and Sustainable Biomass Partnership (SBP) certification schemes. These two certification schemes dominate the European market today. In 2010, the European Commission issued the non-binding recommendations for sustainability criteria for solid biofuels[130] which if developed by the Member States would be, in almost every respect, the same as those laid down in the Renewable Energy Directive (RED) (2009/30/EC). The European Commission's recommendations included a requirement that biofuels must achieve greenhouse gas savings of at least 35% in their life cycle (cultivation, processing, transport, etc.) in comparison with fossil fuels. Nordic Ecolabelling has decided not to propose, in the consultation document, an equivalent requirement as it considers that a requirement for maximum greenhouse gas emissions during the life cycle (carbon footprint) would not result in any substantial environmental effect because the data used for the calculation would largely be based on the default values.

A greenhouse gas emissions requirement also entails challenges, with the key questions being:

1) to what extent should default values be used for the calculations, for example, which greenhouse gas value should electricity, which is used in the life cycle, be allowed to use.

2) must the requirement have a limit value, i.e. a defined reduction of greenhouse gas emissions compared with a fossil alternative or a maximum greenhouse gas emission per functional unit (product) or only a disclosure requirement, i.e. only calculations without limit values in order to set a limit value in the next version of criteria.

Nordic Ecolabelling asks specifically for comments on the decision to not introduce requirements for the calculation of greenhouse gas emissions during the life cycle. Further information about the European Commission's recommendations and methods of calculating greenhouse gas emissions can be found in Appendix 5.

The requirement for the use of fossil energy sources (O10) severely limits the use of fossil energy sources and thus also emissions of greenhouse gases.

Individual, primary and transport packaging

In the current criteria generation 2 is a requirement that ban the use of chlorine-based plastics in packaging. This requirement is proposed removed in the new generation 3 of the criteria for solid fuels. A review of solid fuel products that are sold in the Nordic market shows that the manufacturers are aware of the packaging (type and quantities) in relation to the products.

[130] The European Commission. 2010. Report from the Commission to the Council and the European Parliament on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling SEC(2010) 65 final SEC(2010) 66 final.

None of the examined products use chlorine-based plastics, such as PVC (polyvinyl chloride) and PVDC (polyvinyl dichloride), in the individual, primary and transport packaging. Nordic Ecolabelling believes there is very little potential (P) to extend the requirements for packaging.

Use of individual packaging in firelighting products are covered by the requirements O7 for paper, cardboard and mass in those cases where single packaging and solid fuels constitute a whole.

The primary packaging for pellets, briquettes, barbecue charcoal and briquettes for private customers is usually paper, cardboard and plastic film. This is used for transportation purposes, to protect the products from moisture, to display the products and to provide space for consumer information. Pellets or wood chips for businesses are usually transported as loose loads by weight or in big-bags (polyethylene/polypropylene). Some types of firelighting products may be packaged in individual packaging, often made of polyethylene (e.g. firelighting sachets), but primary packaging is generally cardboard, paper and plastic. Firewood is mainly sold as loose loads by weight or in wooden crates.

8 Amendments compared with the previous version 2

The following are the key amendments compared with the previous version 2.

Table 14: Overview of amendments to requirements following the version 2 to version 3 revision.

Requirements draft version 3	Requirements version 2	Same req.	Amendment	New requirement	Comment
Products that may be Nordic Ecolabelled	Products that may be Nordic Ecolabelled		*		The product group has been expanded to include the product types: briquettes, wood chips, firewood, barbecue charcoal/briquettes and firelighting products. The name of the product group has been changed from pellets to solid fuels.
O1				*	Description of the product, materials used in the product, production site, subcontractors and the manufacturing process.
O2	K9		*		The requirement for raw materials has been expanded to include the product types: briquettes, wood chips, firewood, barbecue charcoal/briquettes and firelighting products.
O3	K10		*		The requirement has been amended to include a list of tree species that may not be used in Nordic Ecolabelled solid fuels.

O4	K11		*		The requirement has been amended so that suppliers of wood raw materials must be Chain of Custody (CoC) certified under the FSC or PEFC schemes. For barbecue charcoal/briquettes, both the manufacturer of barbecue charcoal and the manufacturer of briquettes must have CoC certification. The requirement for pellets has been amended so that at least 95% of the wood raw materials must be recycled material. The minimum certified percentage for briquettes, wood chips, firewood and firelighting products is 70%. The requirement for barbecue charcoal/briquettes has been raised to 100%.
O5				*	Applies to barbecue charcoal/briquettes and firelighting products. If using raw materials from palm oil, the palm oil provider must have CoC certification. 100% of the palm oil must be certified in accordance with RSPO.
O6				*	Applies to barbecue charcoal/briquettes and firelighting products. If other renewable raw materials than wood and palm oil are used, there must be procedures in place to ensure that they are legal and sustainable.
O7				*	Paper used in firelighting products must satisfy the Nordic Ecolabel's Basic Module and chemicals module for paper.
O8				*	New requirement that chemical products used in the production of solid fuels may not be classified according to a number of hazard classifications in accordance with the CLP Regulation.
O9				*	New requirement that chemical products may not contain CMR substances.
O10	K15		*		The requirement has been amended. Energy produced from fossil sources may not exceed 5% of the total energy consumption for drying/boiling raw materials for the production of 1 tonne of a product.

O11	K14		*		The requirement for energy consumption has been amended so that it now only includes the following processes; drying/boiling and distillation (barbecue charcoal) of raw materials in the production of pellets, briquettes and barbecue charcoal and briquettes.
O12	K21 and K13		*		The requirement for quality specifications for pellets has been tightened for a number of properties. Requirements for additives have been added to the requirement. New requirement for quality specifications for briquettes and wood chips.
O13				*	The requirement for quality specifications for firewood.
O14				*	The requirement for quality specifications for barbecue charcoal and briquettes.
O15				*	The requirement for quality specifications for firelighting products.
O16	K22		*		The requirement has been amended to also include briquettes, wood chips and firewood.
O17				*	New requirement for information to consumers about barbecue charcoal and briquettes.
O18				*	New requirement for information to consumers about firelighting products.
O19-O26	K1-K8	*			Quality and official requirements.
Requirements that have been removed					
	K12				Management of wood shavings.
	K16				Annual documentation for energy requirement compliance.
	K17				Annual verification of pellet quality specifications by an external agency.
	K18				Daily control/test of selected pellet quality specifications.
	K19				Requirements for delivery of pellets to consumers.
	K20				Ban on use of chlorinated plastics in product and transport packaging.
	K23				Requirements for pellet storage space at the consumer's site.

9 New criteria

As part of any future evaluation of the criteria, it will be relevant to consider the following:

- Requirements concerning renewable raw materials
- Requirements for energy consumption in the production of solid fuels
- Requirements for quality aspects

10 Terms and definitions

Term	Explanation or definition
CMR substances	CMR substances are substances that are known to be Carcinogenic, Mutagenic and/or Reprotoxic.
CO	Carbon monoxide.
Individual packaging	Individual packaging refers to packaging around each individual solid fuel, e.g. plastic cover around each separate firelighting product. The individual packaging and the solid fuel constitute a unit.
Renewable oil material	Renewable raw materials are biological materials that are constantly replenished by natural processes. This includes the degradable part of products, waste and residues from agriculture (both vegetable and animal), sustainable forestry operations and similar industries and the biodegradable fraction of industrial waste and municipal waste.
Fossil raw materials	Fossil raw materials were originally organic matter (primarily plants) that has been buried under the ground or beneath the ocean for many millions of years. They therefore contain large amounts of CO2 that is released when burned.
NOx	Nitrogen oxides.
OGC	Organic gaseous carbon.
PAH	Polycyclic aromatic hydrocarbons.
Primary packaging	Cardboard, paper and plastic foil are typical examples of primary packaging. Its purpose is to protect the products, display them (visual design) and provide space for consumer information.
PVC	Polyvinyl chloride.
Residual products/waste	Residues are products that do not constitute the main product and which the manufacturer is not intentionally trying to produce. Waste is any substance or object which the holder discards or intends or is required to discard. Raw materials that have been intentionally changed to enable them to be counted as waste (e.g. a waste material mixed with a non-waste material) do not comply with the requirement.
RPS	Relevance, Potential and Steerability: Tool used by Nordic Ecolabelling to analyse whether environmental problems are relevant, whether there is potential for improvement, and whether the licensee has the steerability to be able to achieve these environmental improvements.

VOC	Volatile organic compounds.
Transport packaging	Transport packaging refers to packaging for the handling and transport of a number of sales units or multipack consignments, e.g. pallets, boxes and bags made from paperboard and corrugated board.

Bilag 1 Overview of quality standards and requirements levels in different quality standards for pellets

Table 15: Overview of quality standards and requirements levels of different quality (Swan proposal, generation 3, ISO EN17225, ENplus and DINplus) for pellets

		Swan proposal generation 3	ISO EN17225	ENplus	DINplus
	Unit	A1	A1	A1	
Diameter, D	mm	6 ± 1 eller 8 ± 1	6 (±1) eller 8 (±1)	6 (±1) eller 8 (±1)	6 (±1) eller 8 (±1)
Length, L	mm	Maximum 4∗D (D=diameter)	3,15 ≤ L ≤ 40	3,15 ≤ L ≤ 40	3,15 ≤ L ≤ 40
Moisture, M	w-% as received, wet basis	≤ 8.0	≤ 10,0	≤ 10,0	≤ 10,0
Ash, A	w-% dry	≤ 0.5	≤ 1,0	≤ 0,7	≤ 0,7
Mechanical durability, DU	w-% as received	> 98.0	≥ 97,5	≥ 98,0	≥ 97,5
Fines, F	w-% as received	Bulk ≤ 1.0 Small bags ≤ 0,2 Big bags ≤ 0,5	≤ 1.0	≤ 1.0 Big bags ≤ 0,5	≤ 1.0 Big bags ≤ 0,5
Additives,	w-% as received	≤ 2 Type and amount to be stated	≤ 2,0	≤ 2,0	≤ 2,0
Net calorific value, Q	MJ/kg or kWh/kg as received	≥ 17,3 or ≥ 4,8	≥ 16,5 or ≥ 4,6	≥ 16,5 or ≥ 4,6	16,5 ≤ Q ≤ 19,0
Bulk densitet	Kg/m^3 as received	≥ 650 ±30	≥ 600	600 ≤ BD ≤ 750	600 ≤ BD ≤ 750
Ash melting point temperature	C°	> 1400	to be stated	> 1200	> 1200
Nitrogen, N	w-% dry	≤ 0,3	≤ 0,3	≤ 0,3	≤ 0,3
Sulfur, S	w-% dry	≤ 0,04	≤ 0,04	≤ 0,04	≤ 0,04
Chlorine, Cl	w-% dry	≤ 0,02	≤ 0,02	≤ 0,02	≤ 0,02
Arsenic, As	mg/kg dry	≤ 1	≤ 1	≤ 1	≤ 1
Cadmium, Cd	mg/kg dry	≤ 0,5	≤ 0,5	≤ 0,5	≤ 0,5
Chromium, Cr	mg/kg dry	≤ 10	≤ 10	≤ 10	≤ 10
Copper, Cu	mg/kg dry	≤ 10	≤ 10	≤ 10	≤ 10
Lead, Pb	mg/kg dry	≤ 10	≤ 10	≤ 10	≤ 10
Mercury, Hg	mg/kg dry	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,1
Nickel, Ni	mg/kg dry	≤ 10	≤ 10	≤ 10	≤ 10
Zinc, Zn	mg/kg dry	≤ 100	≤ 100	≤ 100	≤ 100

Bilag 2 Overview of quality standards and requirements levels in different quality standards for barbeque charcoal/-briquettes

Characteristic	Specified requirements				
	Swan proposal generation 3	DNV-SBC 184	DINplus	EN1860-2:2005	DVN5180: 2009
Fixed carbon					
Barbeque charcoal:	≥83%	≥83%	≥80%	≥75%	≥75%
Barbeque briqettes:	≥68%	≥65%	≥65%	≥60%	≥60%
Ash content					
Barbeque charcoal:	Max 4%	Max 4%	Max 4%	Max 4%	Max 8%
Barbeque briqettes:	Max 15%	Max 15%	Max 15%	Max 18%	Max 18%
Moisture content:					
Barbeque charcoal:	Max 8%	Max 8%	Max 8%	Max 8%	Max 8%
Barbeque briqettes:	Max 8%	Max 8%	Max 8%	Max 8%	Max 8%
Volatile components (dry barbecue briquettes):					
Barbeque charcoal:	-	-	-	-	Max 13%
Barbeque briqettes:	Max 20%	Max 20%	-	-	Max 20%
Granulation:					
Barbeque charcoal:	Maks 10% > 80 mm Mindst 70% > 20 mm Maks 20% mellem 10-20 mm Maks 7% mellem 0-10 mm	Maks 10% > 80 mm Mindst 70% > 20 mm Maks 20% mellem 10-20 mm Maks 7% mellem 0-10 mm	Min 80% mellem 20-80 mm Maks 20% mellem 0-20 mm Maks 6% mellem 0-10 mm	Maks 10% > 80 mm Mindst 80% > 20 mm Maks 7% mellem 0-10 mm	Maks 10% > 80 mm Mindst 80% > 20 mm Maks 7% mellem 0-10 mm
Barbeque briqettes:	< 20 mm maks 10%	< 20 mm maks 10%	< 20 mm maks 10%	< 20 mm maks 10%	< 20 mm maks 10%
Binder					
Barbeque charcoal:	-	-	-	-	-
Barbeque briqettes:	See*	See*	See*	See*	See*
Foreign substances					
Barbeque charcoal:	-	-	-	-	-
Barbeque briqettes:	See**	See**	See**	See**	See**
Effektiv brændværdi	Stated on pack	Stated on pack	Stated on pack	Stated on pack	Max 5% negtiv deviation from the declared value

Net Weight	Stated on pack	Stated on pack	Stated on pack	Stated on pack	Max 5% negtiv deviation from the declared value
∗The gases that are emitted from binding agents when burned must not pose any risk to health when they come into contact with food. The binder must meet food quality standards.					
∗∗Tests conducted in accordance with 6.5 (EN1860-2:2005) must show that a maximum of 0.4% of the volume is a substance that does not normally occur after the distillation process in the production of barbecue charcoal. Barbecue briquettes must not contain: Organic fossil material, e.g. stone coal, brown coal and petroleum coke, and inorganic materials, e.g. stone, sand, glass, slag and metal splinters.					

Bilag 3 EU directives, legislation and regulations

The product group solid biofuels are opposite liquid and gaseous biofuels not yet regulated by the EU. Common binding sustainability criteria for solid biofuels is expected no earlier adopted in 2020.

Directives and Regulations

The EU has as part of the Renewable Energy Directive (2009/28/EC) sets out sustainability criteria for liquid biofuels, but not for solid biofuels. On the basis of a public consultation process in February 2010 the commission presented its report on sustainability requirements for biomass fuels for electricity, heating and cooling COM (2010)[131]. The repport concludes that EU will not (for the moment) set of common sustainability criteria for solid biomass. By contrast, it is proposed that Member States introduce their own national schemes for common guidelines similar to those that apply to liquid biofuels. Overall, the report recommends that the following criteria:

- Banning the use of biomass from land converted from native forests, areas with significant carbon stores and from areas of high biodiversity.
- Use of a common greenhouse gas calculation methodology which should ensure that the CO_2 saving meets the minimum requirements. The minimum requirement is 35%, rising to 60% for new installations in 2018. Reference is made in the report annexed to a common methodology and displays standard figures.
- Differentiation of national support schemes in favor of installations that have high energy efficiency, and
- Close monitoring of the used biomass origin.

EU Commission presented in October 2012 a proposal for a revision of the directive on renewable energy, so that, inter alia, ILUC (Indirect Land Use Change) is partially counted in regaring liquid biofuels. The proposal is designed primarily to counter criticism compared to the 1st generation biofuels. The proposal introduces CO_2-emission factors for various agricultural crops used for biofuels. Since there no introduced factors for residues or forest products, the proposal has no immediate impact on the calculation of CO_2 emissions from wood chips and wood pellets. The EU proposal can be seen as an expression of an ever-increasing focus on sustainable bioenergy from the EU side.

The Commission "Standing Forestry Committee" released in January 2013, a position paper (EU, 2013)[132], where it was recommended that uniform criteria for solid biomass should:

- Strive for sustainable wood regardless of end use.
- Find inspiration in the criteria of the Forest Europe Agreement.

[131] http://ec.europa.eu/energy/renewables/bioenergy/doc/2014_biomas s_state_of_play_.pdf
[132] Standing Forestry Committee, European Commission. 2013. Opinion of the Standing Forestry Committee on sustainability criteria for solid and gaseous biomass in electricity, heating and cooling. Standing Forestry Committee, European Commission

- Find inspiration in national public procurement policies for sustainable wood.
- Building on the experience of liquid biofuels in the Renewable Energy Directive.

The EU Commission has in a working paper dated July 31, 2014 "State of play on the sustainability of solid and gaseous biomass overused for electricity, heating and cooling in the EU" announced, that common binding sustainability criteria (EU, 2014)[133] can be expected the earliest in 2020. One reason is that it is estimated that the existing national criteria is consistent with each other and therefore only have a very limited market-distorting effect.

Among the EU Member States there is different views on the need for criteria for solid biofuels[134]. In general, the member state countries expecting to import large quantities of biomass is in favor of a proposal on sustainability criteria at EU level, while primarily the forest producing Member States is opposed to the introduction of such criteria. Belgium and the UK, have already established national sustainability criteria.

EU Timber Regulation:

Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010[135] laying down the obligations of operators who place timber and timber products on the market – also known as the (Illegal) Timber Regulation counters the trade in illegally harvested timber and timber products through three key obligations:

1. It prohibits the placing on the EU market for the first time of illegally harvested timber and products derived from such timber;
2. It requires EU traders who place timber products on the EU market for the first time to exercise "due diligence".

Once on the market, the timber and timber products may be sold on and/or transformed before they reach the final consumer. To facilitate the traceability of timber products economic operators in this part of the supply chain (referred to as traders in the regulation) have an obligation to

3. Keep records of their suppliers and customers.

The Regulation covers a wide range of timber products listed in its Annex using EU Customs code nomenclature.

The Regulation entered into application on 3 March 2013.

[133] State of play on the sustainability of solid and gaseous biomass used for electricity, heating and cooling in the EU. EU Kommissionen. Hentet fra http://ec.europa.eu/energy/renewables/bioenergy/doc/2014_biomas s_state_of_play_.pdf
[134] Energistyrelsen 2014. Analyse af bioenergi i Danmark, ISBN: 978-87-93071-68-1.
[135] http://ec.europa.eu/environment/forests/timber_regulation.htm

Bilag 4 Standards

Relevant standards for pellets, briquttes, wood chips and firewood:

ISO 17225:2014 (solid biofuels)

- Del 1 General requirements
- Del 2 Graded wood pellets
- Del 3 Graded wood briquettes
- Del 4 Graded wood chips
- Del 5 Graded firevood
- Del 6 Graded non-wody pellets
- Del 7 Graded nod-wody briquettes

EN 14778:2011 – Solid biofuels sampling

EN 14780:2011 – Solid biofuelt sample preparation

ISO 16559 - Terminology, definitions and descriptions

ISO 16948 – Determination of total content og carbon, hydrogen and nitrogen

ISO 16967 – Determination of major elements

ISO 16968 – Determination of minor elements

ISO 19993 – Conversion of analytical results from one basis to another

ISO 19994 – Determination of total content of sulfor and chlorine

ISO 17828 – Determination of bulk density

ISO 17829 – Determination of length and diameter for pellets

ISO 17831 – Determination of mechanical durability of pellets and briquettes

ISO 18122 – Determination of ash content

ISO 18123 – Determination of the content of volatile matter

ISO 18125 – Determination of calorific value

ISO 18134 – Determination of moisture content

ISO 18847 – Determination of particle density

ISO 18846 – Determination of fines

CEN/TS 15370 – Method for the determination of ash melting behaviour

Relevant standards for barbeque charcoal and barbeque briquettes:

EN 1860:2005 – Solid fuels and firelighters for barbecuing

EN 1860-2:2005 – Barbecue charcoal and barbecue charcoal briquettes

Relevant standards for firelighters:

EN 1860-3:2003 – Fireligthers for igniting solid fuels for use in babeque appliances

Bilag 5 Carbon footprint standards

In 2010, the European Commission issued non-binding recommendations that the Member States introduce national systems for sustainability requirements for the use of solid and gaseous biomass fuels in the production of electricity, heating and cooling[136]. Along with the recommendations, a method of measuring greenhouse gas performance for solid and gaseous biomass fuels was also presented (see the Carbon Footprint Method below for more details).

In our communications during the review process, the Swedish Pellet Association expressed a wish[137] that a Carbon Footprint requirement be included in the Nordic Ecolabel's criteria for pellets. The Swedish Pellet Association has asked for this as it is a requirement of the ENplus and Sustainable Biomass Partnership (SBP) certification schemes. These two certification schemes dominate the European market today. ENplus is a quality certification system for wood pellets, developed by the European Biomass Association (AEBIOM)[138]. ENplus has quickly become the main system for household pellets and facilities up to 1 MW. In 2015, 1.7 million tonnes of pellets were produced within ENplus, which is 15% of the European pellets for the household market and commercial, small-scale heating production. SBP was founded by seven major European energy producers[139], which together account for more than 70% of the use of industrial pellets in Europe. Both ENplus and SBP use the Carbon Footprint method introduced by the European Commission in 2010[140].

A strong argument for a Carbon Footprint requirement is that the RPS analysis shows that energy consumption in the life cycle of bioenergy is significant. Since the environmental benefit of bioenergy is that it is a renewable raw material, its greenhouse gas emission performance is extremely significant from a sustainability perspective. The European Commission also considers the greenhouse gas emission performance of bioenergy to be one of the key sustainability criteria. The software available today for calculating greenhouse gas emissions during the production of solid biofuels are the ENplus and BioGrace II calculation tools. Both use the Carbon Footprint method introduced by the European Commission in 2010. The BioGrace-II project was run between 2012 and 2015 and was funded by the Intelligent Energy for Europe programme. The overall objective of the action was European harmonisation of greenhouse gas emission calculations for bioenergy (electricity, heat, cooling and biofuels). A number of organisations and authorities from different countries support the BioGrace project.

A status assessment conducted in 2014 by the European Commission to determine how many countries had introduced sustainability criteria for solid and gaseous

[136] The European Commission. 2010. Report from the Commission to the Council and the European Parliament on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling SEC(2010) 65 final SEC(2010) 66 final.
[137] http://www.pelletsforbundet.se/ (17 June 2016)
[138] ENplus: http://www.enplus-pellets.eu/about-enplus/ (17 June 2016)
[139] DONG, Drax, Eon, Engie, HOFOR, RWE and Vattenfall.
http://www.sustainablebiomasspartnership.org/about-us/membership (17 June 2016)
[140] The European Commission. 2010. Report from the Commission to the Council and the European Parliament on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling SEC(2010) 65 final SEC(2010) 66 final.

biomass used in electricity, heating and cooling in the European Union[141] showed that only a few Member States (Belgium, Italy, UK) had adopted a requirement for the reduction of greenhouse gas emissions (GHG) from biomass used in electricity/heating. Other Member States (Belgium, Hungary, UK) have introduced criteria for sustainable forest management (SFM) for biomass from forests and criteria for agricultural biomass (UK). Since the European Commission's assessment, the Netherlands has introduced an extensive set of sustainability criteria for the reduction of greenhouse gas emissions, the impact on forest carbon stocks and indirect land-use change (ILUC). It has also introduced criteria for sustainable forest management (SFM) and traceability certification[142]. Belgium has introduced regulations aimed at reducing competition for biomass through the introduction of green power certificates for electricity produced from wood biomass which is suitable for use by the wood processing industry. Poland has adopted a policy that prohibits national economic incentives for renewable energy being provided for purposes for which stem wood (with a diameter over a certain size) is used.[143]

Carbon Footprint method

The Commission's proposal from 2010 for non-binding recommendations was that the sustainability criteria that the Member States developed would, in almost every respect, be the same as those laid down in the Renewable Energy Directive (2009/30/EC)[144]. The European Commission specifies the following[145]:

• forbid the use of biomass from land converted from forest, and other high carbon stock areas, as well as highly bio-diverse areas.

• ensure that biofuels emit at least 35% less greenhouse gases over their life cycle (cultivation, processing, transport, etc.) than fossil fuels. For new installations this amount rises to 50% in 2017 and 60% in 2018

• favour national biofuel support schemes for highly efficient installations

• encourage the monitoring of the origin of all biomass consumed in the EU to ensure sustainability.

[141] The European Commission. 2014. State of play on the sustainability of solid and gaseous biomass used for electricity, heating and cooling in the EU [SWD (2014)259]. https://ec.europa.eu/energy/sites/ener/files/2014_biomass_state_of_play_.pdf
[142] http://english.rvo.nl/subsidies-programmes/sde/sustainability-criteria (17 June 2016)
[143] The European Commission. 2014. State of play on the sustainability of solid and gaseous biomass used for electricity, heating and cooling in the EU [SWD (2014)259].
[144] The European Commission. 2010. Report from the Commission to the Council and the European Parliament on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling SEC(2010) 65 final SEC(2010) 66 final.
[145] The recommendations can be found in the European Commission's report from 2010, Chapter 3.2 and at: https://ec.europa.eu/energy/en/topics/renewable-energy/biomass (27 May 2016)

In 2015, JRC published a report in which they had calculated typical and default greenhouse gas emission values for wood chips, pellets and briquettes in accordance with the European Commission's method from 2010[146]. These typical and default GHG emission values for wood chips (5 g CO_2-eq/MJ wood chips), pellets and briquettes (9 g CO_2-eq/MJ pellets/briquettes) could be used as the initial values in a potential ecolabelling requirement for pellets and briquettes. The life cycle calculations on which the default values are based use a European marginal mix (209 g CO_2-eq/MJ of electricity). The default values selected are up to 500 km for transportation distances, and that a biofuel boiler fired using wood chips provides the heat required in the process. Other studies conducted in Sweden show that greenhouse gas emissions performance for Swedish production is 3.6 g CO_2-eq per MJ of pellets and 4.2 g CO_2-eq per MJ of briquettes, with the values based on a mix of Nordic electricity in 2009 (97.3 g CO_2-eq/kWh electricity = 27 g CO_2-eq/MJ electricity) (trading of Guarantees of Origin has not been taken into account).[147]

According to the method set forth in the European Commission's recommendations to Member States to introduce national systems with sustainability criteria for biomass[148] and updates in the Commission's working document,[149] greenhouse gas emissions from the production of solid and gaseous biomass fuels before they are converted into electricity, heating and cooling shall be considered as:

E = eec + el + ep + etd + eu - esca - eccs - eccr,

where

E = total emissions from the production of the fuel before conversion to energy,

eec = emissions from the extraction or cultivation of raw materials,

el = annualised emissions from carbon stock changes caused by land-use change,

ep = emissions from processing,

etd = emissions from transport and distribution,

eu = emissions from the fuel in use, i.e. greenhouse gas emissions during combustion of solid and gaseous biomass fuels,

[146] European Commission - Joint Research Centre. 2015. Solid and gaseous bioenergy pathways: input values and GHG emissions - Calculated according to methodology set in COM(2010) 11 and SWD(2014) 259. Version 1a.
[147] Gode et al. 2011. Miljöfaktaboken 2011 Estimated emission factors for fuels, electricity, heat and transport in Sweden. Thermal Engineering Research Association (Värmeforsk) A08-833. Stockholm.
[148] The European Commission. 2010. Report from the Commission to the Council and the European Parliament on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling SEC(2010) 65 final SEC(2010) 66 final.
[149] European Commission (2014): COMMISSION STAFF WORKING DOCUMENT State of play on the sustainability of solid and gaseous biomass used for electricity, heating and cooling in the EU [SWD (2014)259].

esca = emission saving from soil carbon accumulation via improved agricultural management,

eccs = emission saving from carbon capture and geological storage,

eccr = emission saving from carbon capture and replacement.

Emissions from the extraction, harvesting or cultivation of raw materials (eec) shall include emissions from the extraction, harvesting or cultivation process itself; from the collection of raw materials; from waste and leakages; and from the production of chemicals or products used in extraction or cultivation. Capture of CO2 in the cultivation of raw materials shall be excluded. The greenhouse gases to be taken into account are CO_2, N_2O and CH_4. For the purpose of calculating CO_2 equivalence, those gases shall be valued as follows: CO_2: 1; N_2O: 296; CH_4: 23.

Wastes, secondary biomass and primary forest and agricultural crop residues, including tree tops and branches, straw, bagasse, husks, cobs and nut shells, and residues from processing, including crude glycerine (glycerine that is not refined), shall be considered to have zero life-cycle greenhouse gas emissions up to the process of collection of those materials.

Annualised emissions from carbon stock changes (el) shall only be calculated if they are caused by land-use change, e.g. if forest land is used for purposes other than forestry after harvesting.

Emissions from processing (ep) shall include emissions from the processing itself; from waste and leakages; and from the production of chemicals or products used in processing. In accounting for the consumption of electricity not produced within the fuel production plant, the greenhouse gas emission intensity of the production and distribution of that electricity shall be assumed to be equal to the average emission intensity of the production and distribution of electricity in a defined region. By derogation from this rule, producers may use an average value for an individual electricity production plant for electricity produced by that plant, if that plant is not connected to the electricity grid. Emissions from the fuel in use (eu) shall be taken to be zero for solid and gaseous biomass.

Allocation

Where a fuel production process produces, in combination, the energy carrier for which emissions are being calculated and one or more other products ("co-products"), greenhouse gas emissions shall be divided between the energy carrier or its intermediate product and the co-products in proportion to their energy content. For the accounting of useful heat as a co-product, the allocation between the useful heat and other co-products shall be made using the Carnot efficiency (C), where all other co-products than heat have a C equal to 1. This means that allocation is based on the energy content of the different products.