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The Voice of the Irish Bioenergy Industry, working towards a Sustainable Energy Future on behalf of the Biomass, Biogas, Biofuel, Wood Fuel & Energy Crop Sectors

An updated proposal from the Irish Bioenergy Association (IrBEA) to regulate the moisture content of firewood for sale in Ireland.

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1 Background and Objectives

IrBEA has previously submitted an outline proposal to the Department of Communications, Climate Action and the Environment for the regulation by the Department of the moisture content of firewood for sale for domestic combustion. This document updates the previous proposal and suggests a pathway and timeline for regulation of the moisture content of firewood for sale.

The objectives of the proposal to regulate the moisture content of firewood for sale are:

- to contribute to improving air quality in Ireland in the context of the developing Clean air Strategy, the recent EPA report *Air Quality in Ireland 2018*[1], and the CAFE Directive, and
- to enable the continued use of sustainable firewood fuel in domestic heating as a replacement for fossil fuel and thereby contribute to climate change mitigation.

[1] *Air Quality in Ireland*. 2019 EPA. https://www.epa.ie/pubs/reports/air/quality/Air%20Quality%20In%20Ireland%202018.pdf

2 About IrBEA and WFQA

2.1 Irish Bioenergy Association (IrBEA)

IrBEA was founded in 1999. Its role is to promote the bioenergy industry and to develop this important sector on the island of Ireland. The diverse membership includes farmers and foresters, fuel suppliers, energy development companies, equipment manufacturers and suppliers, engineers, financiers and tax advisers, legal firms, consultants, planners, research organisations, local authorities, education and advisory bodies – anyone with an interest in the bioenergy industry. IrBEA is recognised by Government and agencies as the voice of the bioenergy industry.

The association's main objectives are to influence policy makers to promote the development of bioenergy, and to promote the interests of members. Improving public awareness, networking and information sharing, and liaising with similar interest groups are other key areas of work in promoting bioenergy as an environmentally, economically and socially sustainable energy. The organisation is a self-governing association of voluntary members and is affiliated to Bioenergy Europe and the European Biogas Association (EBA). The organisations activities are managed by the CEO assisted by a small executive staff team and is governed by a board of Directors which includes an elected President and Vice President. Policy direction is provided by a Management Executive Committee and specific subcommittees. Further information on the association is available at www.irbea.org

2.2 Wood Fuel Quality Assurance (WFQA) Scheme

The Wood Fuel Quality Assurance (WFQA) scheme for Ireland is an all island scheme established to increase consumer confidence in wood fuel products sold in Ireland.

The WFQA is a voluntary fuel quality certification scheme where members are certified against biomass fuel standards set out in ISO 17225-1 to ISO 17225-9. See www.wfqa.org

3 Overall IrBEA Approach to tackling emissions from domestic biomass combustion

In addition to wood fuel quality, IrBEA recognises that tackling emissions from domestic biomass burning requires a number of related actions, based on the findings of two recent publications: the IrBEA document, *Biomass Combustion Emissions*[2] and a recent publication from Bioenergy Europe on tackling emissions from residential wood heating[3]:

1. Providing information and advice about the heating, cost and air quality benefits of moving to the use of closed stoves and boilers in conformity with the Eco-design Directive[4]
2. *Use of sustainable, quality wood fuels (including firewood) for domestic heating and larger scale use, in conformity with ISO Standard 17225 Solid biofuels – Fuel specifications and classes and sustainability criteria*– which forms part of this proposal.
3. Advocating for the correct installation and maintenance of domestic biomass combustion appliances and associated chimneys and venting.
4. Providing information to the general public on fuel loading, fire starting and air controls in domestic combustion of wood.

While the focus of this submission is on point 2, IrBEA is engaging with its members and the public on all four areas, particularly around points 1 and 4, in order to harness public awareness of the importance of choosing and maintaining suitable wood burning stoves and boilers, and how they should be installed and maintained.

4 Evidence base that combustion of dry wood fuels reduces pollutant emissions

Pollutants from combustion largely fall into two categories, Greenhouse Gas emissions, comprising mainly of CO2, CH4 and NOx that have a long-term global impact on climate, and local pollutants such as particulates and VOCs that can have a short-term effect on local air quality.

[2] *Biomass Combustion Emissions* 2016. Irish Bioenergy Association. https://www.irbea.org/emissions-biomass-study/. 2016.
[3] BIOENEGY EXPLAINED 6. *SLASHING EMISSIONS FROM RESIIDENTIAL WOOD HEATING.* 2019. Bioenergy Europe.
[4] Although the Eco-design Regulation will have a very positive effect in reducing emissions it will do nothing to reduce emissions from appliances already installed. Implementation of this proposal will have an immediate impact on emissions from all stoves and indeed fireplaces currently installed.

4.1 Greenhouse (GHG) emissions

Wood fuel from Irish forest biomass, such as firewood, are estimated by SEAI to have carbon emission levels of 3.2gCO2eq/MJ, which compares very favourably with kerosene at 73.3gCO2eq/MJ, Natural gas at 56.9gCO2eq/MJ and heat pumps at 40.4gCO2eq/MJ (assuming a COP of 3.0 using electricity from the Irish grid). Clearly the use of wood fuels from Irish forests have a significant role in reducing Ireland's overall GHG emissions.

4.2 Local Pollutants

Moisture content of wood fuel is demonstrated to be the primary quality parameter that influences emissions generation, being directly linked to the calorific value (energy content) of the fuel – the higher the moisture content, the lower the calorific value of the fuel. High moisture content in wood fuel i.e. >c. 25% for firewood, results in a prolonged combustion start up, where the moisture that evaporates from the fuel keeps the fire too cool to fully oxidise the volatile tars that are released during combustion, resulting in increased emissions. The evaporation of this excess moisture also promotes 'steam stripping' of tars which increases their release which, in combination with the cooler fire temperature, also contributes to higher emissions[5]. A 2018 report assessing residential wood combustion in Nordic countries found that moist fuel generally increased emission levels by a factor of 1.5 – 2[6]. This study also found that modern stoves are more sensitive to wood fuel moisture content, due to their design in order to meet tightening emission limit values (which are discussed further in the following sections), which reinforces the importance of wood fuel quality in terms of emissions control. The CERIC report[7] found that wood dried to 20% moisture content can reduce particulate emissions from combustion by a factor of 3 compared with firewood at 30%.

[5] Emission factors for SLCP emissions from residential wood combustion in the Nordic countries; https://www.diva-portal.org/smash/get/diva2:1174670/FULLTEXT01.pdf

[6] Emission factors for SLCP emissions from residential wood combustion in the Nordic countries; https://www.diva-portal.org/smash/get/diva2:1174670/FULLTEXT01.pdf

[7] Avis d'expert CERIC, 2017. Impact of the quality of firewood and the evolution of the wood burning appliances on the quality of air http://www.leboisenergie.be/wp-content/uploads/2017/09/etude-ceric-chauffage-au-bois-et-qualite-de-l-air-juliet-2017-web.pdf

5 The Wood Fuel Quality Assurance (WFQA) Scheme

In order to become a member of the WFQA suppliers must first comply with a number of sustainability requirements:

1. the European Timber Regulation (EUTR), which places an onus on those supplying wood to the market for the first time to show it is sourced from legal felling,
2. conformance with the felling licence system of the Forest Service for domestically sourced firewood,
3. that the fuel meets the greenhouse gas savings requirements of the EU REDII Directive and
4. compliance with EU phytosanitary regulations must also be demonstrated.

In the case of firewood, the supplier must supply at a maximum of 25% moisture content, as ascertained by testing by WFQA in compliance with ISO 17225 Part 5[8] (quality classes AI and A2). Currently there are eight firewood supplier members of WFQA. Our aim is to substantially increase the membership of the scheme, to contribute to enabling A1 or A2 quality firewood being more widely available. Currently a substantial volume of wet firewood is being placed on the market, with moisture contents well in excess of 25%, which can only contribute to raising particulate and other emissions during the winter heating season. Not only is this material a recipe for increased pollution levels, it is completely unsuitable for domestic combustion being a very inefficient use of wood for heating.

6 The Proposal & Suggested Implementation Pathway

The proposal is that a statutory upper limit of 20% (wet weight basis in accordance with ISO 17225 – Part 5 see Appendix 1) be placed on the moisture content of firewood offered for sale, to enter into force from 1 January 2022, with an upper limit of 25% be set from 1 September 2020.

[8] The objective of ISO 17225 is to provide unambiguous and clear classification systems for solid biofuels, to serve as a tool to enable efficient trading of biofuels, to enable good understanding between buyer and seller, as well as a tool for communication with equipment manufactures. It will also facilitate authority permission procedures and reporting. This part of ISO 17225 supports the use of graded firewood for residential, small commercial and public building applications. (Taken from Introduction to ISO 17225 Part 5 Graded Firewood – see ISO.org).

Suggested implementation pathway

Ghantt Chart	Start	Finish	2019	2020				2021				2022
			Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
IrBEA Submission of Proposal		14-Oct-19										
Drafting of SI	14-Oct	31-Dec-19										
Consultation with EPA	01-Nov	31-Jan-20										
Announcement by DCCAE of intended changes		01-Feb-20										
Preparation of wood fuel suppliers	01-Feb-20	01-Sep-20										
Introduction of 25% Limit	01-Sep-20	01-Jan-22										
Preparation of wood fuel suppliers	01-Feb-20	01-Jan-22										
Introduction of 20% Limit	01-Jan-22											

7 Legislation

SI 128 2016 *Air Pollution Act (Marketing, Sale, Distribution and Burning of Specified Fuels (Amendment* 2016)) may offer an existing legislative process to implement the proposal, by extending the fuels covered to firewood, referencing ISO 17225 Part 5, Class A1 and Class A2, specifying M25 from 1 September 2020 and M20 from January 2022. These proposed dates of introduction of statutory limits to firewood moisture content, if announced by DCCAE and or EPA before the end of 2019 or in early 2020, would enable firewood suppliers prepare stock for sale that would meet the 25% and 20% moisture content limits.

8 Preparation and Operation

A proposed timeframe for the implementation of the proposal as outlined in the previous paragraph, and for ancillary measures such as expanding the coverage of the WFQA is outlined the Gannt chart below. WFQA is engaging with large scale firewood producers and held two workshops on firewood and moisture content during August in Laois and Limerick. Two further workshops are planned for November in Meath and Cork. Four further workshops are planned for 2020. The workshops have been supported by the Department of Agriculture Food and the Marine.

The operation of an SI (as envisaged) could be through annual certification of firewood suppliers as conforming with the standards (ISO 17225 Part 5 or part thereof) set down in the SI, carried out by an appointed body or person such as the WFQA or NSAI or other, to be appointed by the DCCAE and/or EPA. The EPA would maintain a register of approved suppliers, similar to the current registers of Coal Bagging Operators & Solid Fuel Suppliers[9]. WFQA is seeking to engage with the EPA on this area. Suppliers who conform with the SI

[9] https://www.epa.ie/licensing/air/coalbaggingandsolidfuelsupplierregistrations/

would be required to label their product as conforming with the SI, quoting their registration number. WFQA already operates a similar labelling system, requiring the WFQA logo be displayed on bags of complaint fuel (below).

Market surveillance is regarded as an important feature of the proposed regulation of firewood for sale. WFQA suggests that Local Authorities would be most appropriate body to undertake the work. Spot checks for the presence of complaint labelling on firewood for sale could be undertaken at relatively low cost at retail locations such as supermarkets and filling stations, Firewood is also sold directly to consumers by suppliers. Regulatory compliance in those cases could be through a public awareness campaign on the benefits of using dry firewood conforming with the regulation, including also information on the benefits of using enclosed stoves, well installed and maintained.

9 Appendix 1

The main quality aspects of firewood are tree species, moisture content, the size of the logs (diameter and length) and the amount of splitting.

Quality aspects of firewood are dealt with comprehensively in the ISO standard 17225, Part 5, which has been developed by the ISO working group TC238 Solid Biofuels (see Table below taken from Part 5). Three quality classes of firewood are recognised. The proposal is for firewood for sale to conform to class AI or A2, based primarily on moisture content, as determined in accordance with ISO 18134-1:2015 Solid biofuels — Determination of moisture content — Oven dry method — Part 1: Total moisture — Reference method, or ISO 18134-2:2017 Solid biofuels — Determination of moisture content — Oven dry method — Part 2: Total moisture — Simplified method.

	Property class, Analysis method	Units	A1	A2	B
Normative	**Origin and source,** ISO 17225-1		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 1.1.4 Logging residues 1.2.1 Chemically untreated wood residues
	Wood species [a]		To be stated		To be stated
	Diameter, D [b]	cm	D2 ≤ 2 D5 2 < D ≤ 5 D15 5 < D ≤15 D15+ >15 (actual value to be stated)		D15 5 < D ≤15 D15+ >15 (actual value to be stated)
	Length, L [c]	cm	L20 ≤ 20 (± 2 cm) L25 ≤ 25 (± 2 cm) L30 ≤ 30 (± 2 cm) L33 ≤ 33 (± 2 cm) L40 ≤ 40 (± 2 cm) L50 ≤ 50 (± 4 cm) L100 ≤ 100 (± 5 cm)		L30 ≤ 30 (± 2 cm) L33 ≤ 33 (± 2 cm) L40 ≤ 40 (± 2 cm) L50 ≤ 50 (± 4 cm) L100 ≤ 100 (± 5 cm)
	Moisture, M [d] ISO 18134-1, ISO 18134-2	w-% as received wet basis	M20 ≤ 20 M25 ≤ 25		M20 ≤ 20 M25 ≤ 25 M35 ≤ 35
	Volume or weight	Volume m^3 stacked or loose or weight, kg as received	To be stated which unit is used when retailed (m^3 stacked or loose, kg) and/or packaged log woods weight.		
Informative	**Energy density, E** [e] or **Net calorific value, Q,** ISO 18125	MJ/m^3 or kWh/m^3 stacked or loose MJ/kg or kWh/kg, as received	Recommended to be stated.		
	Drying		Recommended to be stated, if firewood is dried by natural seasoning by ambient air or artificially by hot air.		
	Moisture, U [d]	w-% dry basis	U25 ≤ 25 U33 ≤ 33		U33 ≤ 33 U54 ≤ 54
	Decay and mould	% of pieces	No visible decay	≤ 5	If significant amount (more than 10 % of pieces) of decay or mould exists it should be stated.
	Proportion of split volume	% of pieces	≥ 90	≥ 50	No requirements
	The cut-off surface		Even and smooth [f]	No requirements	No requirements