- *Roundwood harvest (including firewood) in the Republic of Ireland in 2018 was 3.69 M m³, the highest level since records began. The private forest harvest exceeded 1 M m³ for the first time.*
- *Softwood available for processing in 2018 was 3.25 M m³, virtually unchanged on 2017.*
- *There was strong demand for wood fibre across all assortments.*
- *Product output in 2018 comprised 1,014,000 m³ of sawn softwood, 165,000 m³ of round stakes and 808,000 m³ of wood-based panels.*
- *Exports of wood products reached €450 M, €243 M of wood-panels, €146 M of sawn timber and €61 M of pulp, paper & paper-board products.*
- *The demand for wood fibre for the production of forest-based biomass energy sector declined by 11% over 2017 to 1.58 M m³.*
- *In 2018, 40% of the wood fibre available for use in the Republic of Ireland was used for energy purposes.*

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Woodflow and forest-based biomass energy use on the island of Ireland (2018)

Gordon Knaggs[1] and Eoin O'Driscoll[2]

Introduction

This COFORD Connects Note provides the 2018 woodflows for the Republic of Ireland and for the island of Ireland, together with an analysis of the use of forest-based biomass for energy production. It is largely based on national wood harvest and forest product trade data, compiled on behalf of the Department of Agriculture, Food and the Marine, and used to complete the annual Joint Forest Sector Questionnaire (JFSQ), run by EUROSTAT, the UNECE[3] Committee on Forests and the Forest Industry, the Food and Agriculture Organisation (FAO) and the International Tropical Timber Organisation (ITTO). JFSQ and other data sources are used to compile global forest statistics which can be accessed at the FAOSTAT website[4,5].

Roundwood harvest in the Republic of Ireland (2010-2018)

Over the period 2010-2018, the annual harvest of roundwood in the Republic of Ireland has increased by 27% to 3.7 M m³[6]. Over this period, the harvest of roundwood from Coillte forests has shown a marginal increase of 5.6%, while the roundwood harvest from the private forest estate has increased by 265% (Figure 1).

This is in line with production forecasts for the Irish forest estate, which sees the increase in roundwood harvest over the period 2016 - 2035 as primarily coming from the private forest estate[7].

Demand for wood fibre in the Republic of Ireland has remained strong over this period. Since 2010, there has been an expansion of production capacity and output from both the sawmill and wood-based panel (WBP) sectors.

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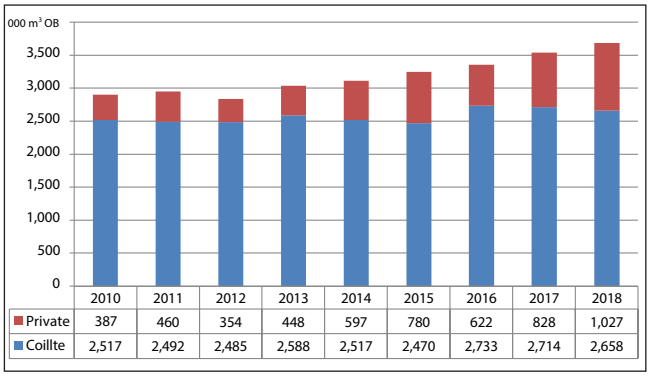
2. *eoin@drima.com*
3. *UNECE: United Nations Economic Commission for Europe: http://www.unece.org/forests/welcome.html*
4. *http://faostat.fao.org/site/626/default.aspx#ancor*
5. *Domestic production of harvested wood products (mainly sawn timber and panel products) forms part of the national calculation of greenhouse gas (GHG) emissions and removals under the Kyoto Protocol which runs to the end of 2020.*
6. *This roundwood harvest includes firewood.*
7. *http://www.coford.ie/toolsservices/allirelandroundwoodproductionforecast2016-2035/*

The Irish forest products sector is largely export oriented, primarily driven by exports of sawn timber and WBP. In 2018, forest products to a value of €450 M were exported from the Republic of Ireland (Table 6). Key markets are the UK and Benelux countries.

The key market for Irish forest products exports is the UK. However, at the time of writing, Brexit remains an issue of concern for the Irish forestry and forest products sector.

Figure 1: Total roundwood harvest (including firewood) from Coillte and private forests in the Republic of Ireland (2010-2018).



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Private	387	460	354	448	597	780	622	828	1,027
Coillte	2,517	2,492	2,485	2,588	2,517	2,470	2,733	2,714	2,658

Sources and uses of roundwood available for processing in the Republic of Ireland

In 2018, 3.69 M m³ of roundwood was harvested in the Republic of Ireland (Table 1)[8], an increase of 4.0% over 2017. This increase in roundwood harvest was driven by the increase in the roundwood harvest from the private forest estate. Over the same period, the roundwood harvest from Coillte's forest estate decline by 2.1% (Table 1).

Over the period 2017-2018, the harvest of roundwood by the private forestry sector increased by 24% to 1.03 M m³, a new record. This is the first time that the private roundwood harvest in the Republic of Ireland has exceeded 1 M m³. This increase was driven by a strong demand for wood fibre from both home and export markets.

Table 1: Total roundwood harvest (including firewood) in the Republic of Ireland (2014-2018).

Harvest type	2014	2015	2016	2017	2018
			000 m³ OB		
Coillte	2,517	2,470	2,733	2,714	2,658
Private	597	780	622	828	1,027
TOTAL	3,114	3,250	3,355	3,542	3,685

In 2018, 3.25 M m³ of roundwood was available for processing[9] in the Republic of Ireland[10], virtually unchanged on 2017. In 2018, the level of roundwood harvest in the private sector was 27% higher than in 2017 (Table 2).

Table 2: Roundwood available for processing in the Republic of Ireland (2014-2018).

Item	2014	2015	2016	2017	2018
			000 m³ OB		
Commercial softwood					
Imports less exports	68	40	-16	-65	-205
Coillte	2,434	2,377	2,600	2,613	2,591
Private sector	447	646	518	676	857
Commercial hardwood					
Imports less exports	–	–	–	–	–
Coillte	6	3	5	7	–
Private sector	–	–	1	11	5
TOTAL	2,955	3,066	3,108	3,242	3,248

8. Historic harvest and trade data for the period 1961-2015 is on the FAOSTAT website: http://faostat.fao.org/site/626/default.aspx#ancor

9. Roundwood available for processing is defined as: (domestic roundwood harvest + roundwood imports) – (exports of roundwood).

10. Firewood is excluded.

Wood fibre sources for the processing and wood energy sectors, and residue outturn are shown in Table 3; uses are in Table 4[11,12]. Wood residues are primarily used as a fuel for sawmill kilns and for process heat in the manufacture of wood-based panels (WBP).

Table 3: Sources of softwood wood fibre (2014-2018)[13].

Fibre source	2014	2015	2016	2017	2018
	000 m³ OB RWE[14]				
Roundwood[15]	2,949	3,063	3,102	3,224	3,243
Sawmill residues[16]	925	949	1,007	1,142	1,098
Wood-based panel residues[17]	114	114	115	124	120
Residue imports	49	47	144	144	98
Harvest residues	60	60	60	60	90
Post-consumer recovered wood (PCRW)	300	300	300	300	300
TOTAL	4,397	4,533	4,728	4,994	4,949

In 2018, sawmill roundwood intake was 2.25 M m³, which was converted to 1.01 M m³ of sawn timber and 0.165 M m³ of round stakes (Tables 4 & 5). In 2018, sawmill roundwood intake declined by 12.1% over 2017. This was primarily caused by extensive fire damage to GP Wood's sawmill at Lissarda, Co Cork in July 2018 (this sawmill formerly traded as Palfab)[18]. It is expected that this mill will be operational again by early 2020.

In 2018, 808,000 m³ of wood-based panels (WBP) were produced from an intake of 1.43 M m³ of wood fibre[19], a decline of 3.3% over 2017 (Table 5). A very high proportion (86%) of WBP manufacture was exported (691,000 m³) to a value of €243 M (Table 6). WBP exports mainly comprised oriented strand board (OSB) and medium density fibreboard (MDF), manufactured by Masonite, MEDITE and SMARTPLY. Key export markets were the UK and the Benelux countries.

Table 4: Uses of softwood fibre (2014-2018).

Fibre use	2014	2015	2016	2017	2018
	000 m³ OB RWE				
Sawmilling	1,815	1,867	1,977	2,178	2,084
Round stake	147	169	164	148	165
Wood-based panels	1,377	1,370	1,395	1,505	1,430
Wood for energy use by the power generation and forest products sector[20]	760	796	844	883	966
Other uses					
Horticultural bark mulch	40	30	30	30	40
Wood chip for heating[21]	100	114	117	49	42
Export of forest product residues	88	36	44	44	139
Pellet manufacture	70	151	106	106	83
Other uses including shavings and animal bedding	–	–	51	51	–
TOTAL	4,397	4,533	4,728	4,994	4,949

Table 5: Production of sawnwood and wood-based panels (2014-2018)[22,23,24].

Product	2014	2015	2016	2017	2018
	000 m³				
Construction timber	478	491	519	553	535
Pallet/packaging	209	221	234	249	241
Square edge fencing	203	203	215	229	221
Other	17	16	17	18	17
TOTAL sawn wood	907	931	985	1,049	1,014
TOTAL wood-based panels	773	769	774	836	808

11. UNECE Joint Wood Energy Enquiry (2014-2018) and EUROSTAT Joint Forest Sector Questionnaire (2014-2018).

12. Wood fibre that is reused is counted twice in this model.

13. UNECE Joint Wood Energy Enquiry (2014-2018) & EUROSTAT Joint Forest Sector Questionnaire (2014-2018).

14. RWE: roundwood equivalent

15. Data are from Table 1.

16. A breakdown of sawmill residues is shown in AnnexA4.

17. Includes bark (from the debarking lines at MEDITE & SMARTPLY and sawdust from the sanding of wood-based panels. A breakdown of WBP residues is provided in Annex A4.

18. http://www.epa.ie/newsandevents/incidents/recent/name,64294,en.html

19. This includes pulpwood, wood chips, sawdust and post-consumer recovered wood (PCRW).

20. Wood biomass is used by the forest products sector for process drying, heating and for the generation of electricity (s including the use of wood biomass for co-firing by Bord na Móna at Edenderry).

21. Primarily used for the production of space or production heat.

22. EUROSTAT Joint Forest Sector Questionnaire (2014-2018).

23. Over the period 2015-2017, sawmill output was estimated by a sawmill survey.This has provided a better estimate of products manufactured and the volume of output.

24. This output includes the production of sawn hardwood.

Trade in timber products and trade balance

In 2018, exports of forest products from the Republic of Ireland were €450 M, an increase of 6.8% on 2017. WBP accounted for €243 M, the balance comprising paper and sawn timber exports. Export values of WBP and sawn timber increased by 13.2% and 8.5% on 2017 (Table 6).

In 2018, forest products to the value of €642 M were imported into Ireland, an increase of 6.8% over 2017. This trade is dominated by the importation of pulp, paper and paper-board products, and they represented 61% of forest product imports.

In 2018, net imports of forest products to the Republic of Ireland were €192 M, largely driven by the import of pulp and paper products, while the net exports of sawn timber and WBP were both positive at €20 M and €117 M respectively (Table 7).

Table 6: Timber and paper products trade, volume and value (2014-2018)[25].

Product	Imports									
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
	000 m³					€ M				
Sawn timber	205	227	250	266	339	74	88	92	99	126
Wood-based panels	235	240	242	273	275	98	112	112	129	126
	000 tonnes									
Pulp products	46	51	46	45	41	42	53	45	45	37
Paper and paper-board products	404	427	417	407	388	340	359	337	335	353
TOTAL						554	612	586	608	642
Product	Exports									
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
	000 m³					€ M				
Sawn timber[26]	718	701	806	875	832	122	121	122	129	146
Wood-based panels	662	610	628	660	691	199	190	206	224	243
	000 tonnes									
Pulp products	–	–	3	–	18	–	–	1	1	1
Paper and paper-board products	67	86	137	40	37	50	44	51	69	60
TOTAL						370	355	380	423	450

Table 7: Overall balance of the trade in the value of primary forest products (2014-2018)[27].

Product	2014	2015	2016	2017	2018
			€ M		
Sawn timber	48	33	30	30	20
Wood-based panels	101	78	94	95	117
Pulp products	-42	-53	-44	-44	-36
Paper and paper-board products	-290	-315	-286	-266	-293
TOTAL	-183	-257	-206	-185	-192

[25] *Includes import/export figures for sawn timber, wood-based panels and pulp/paper products only. Data are taken from Ireland's EUROSTAT Joint Forest Sector Questionnaire (JFSQ) returns (2014-2018). Roundwood, sawmill residues and secondary processed timber products are not included. Trade data for the JFSQ was estimated using net mass and value figures received at SITC level from the CSO: www.cso.ie*

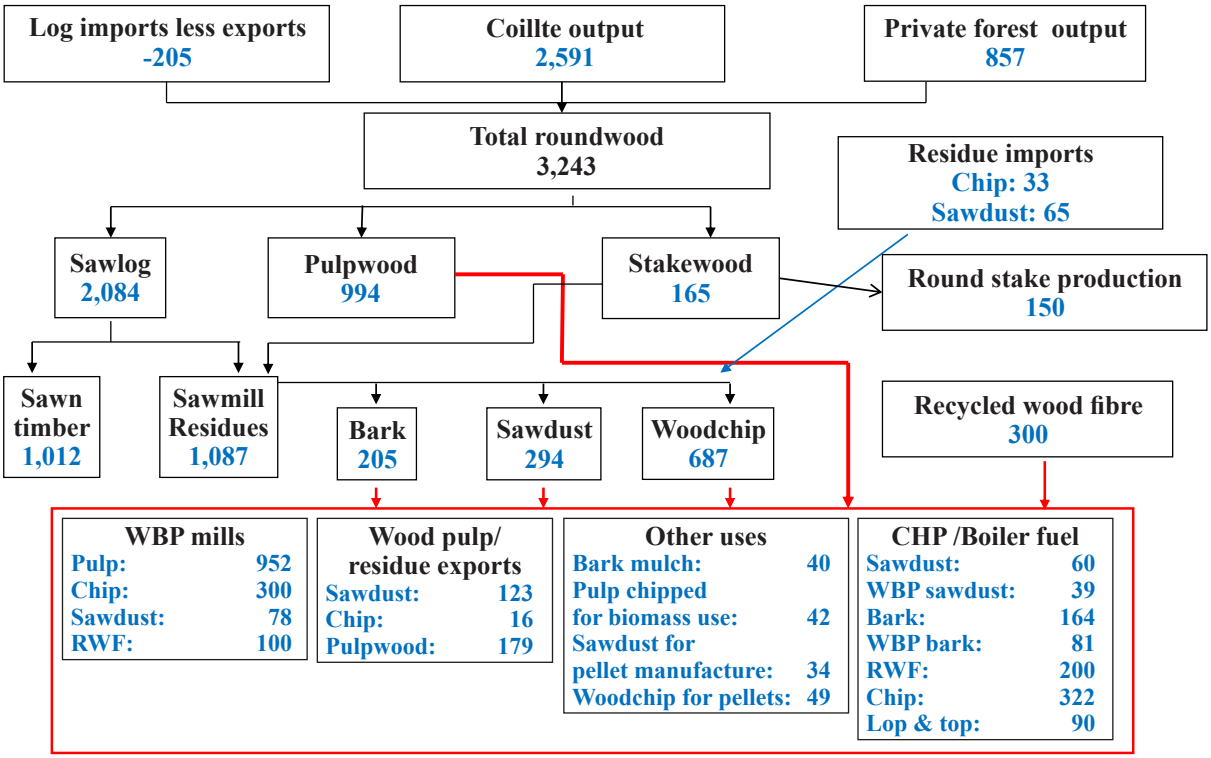
[26] *In 2013-2014, the value of sawn timber exports grew by 51%, while volume grew 20%. The difference between value and volume may be due to a combination of changes in the euro/Sterling exchange rate and increases in product prices.*

[27] *Negative values show a surplus of imports over exports.*

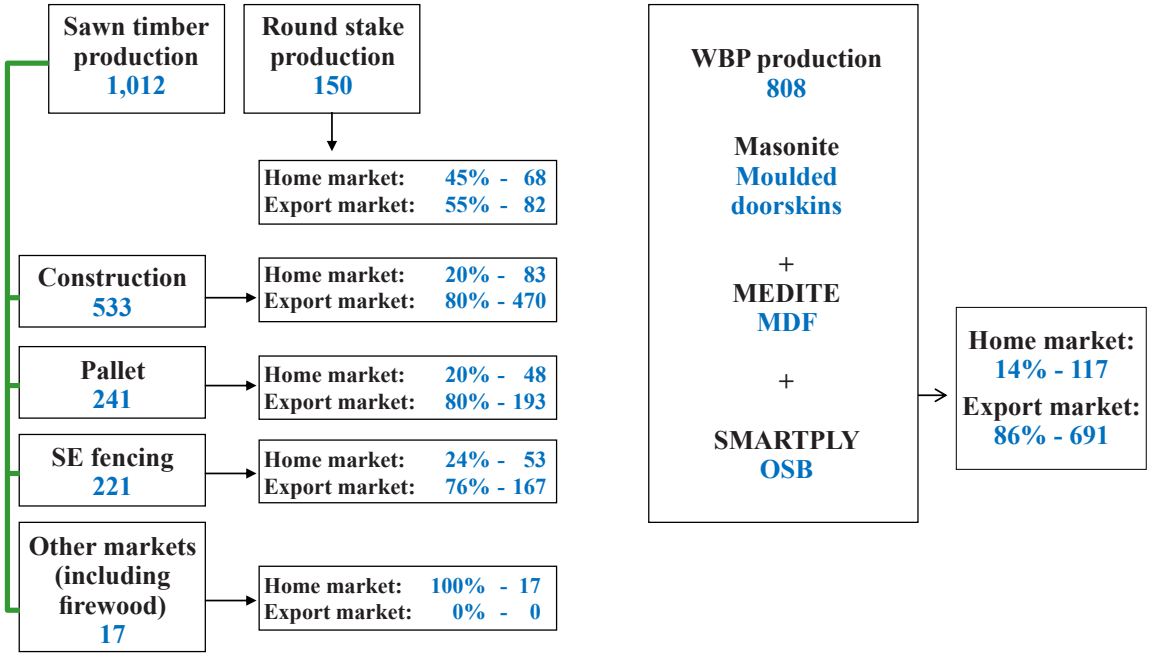
Woodflow for the Republic of Ireland in 2018

The woodflow for the Republic of Ireland in 2018 is in Figure 2.

Figure 2: Woodflow for the Republic of Ireland for 2018 (000 m³) [overbark].



Breakdown of 2018 wood products (000 m³).



All island woodflow (2016-2018)

The all island woodflow for the period 2016-2018 is provided in Annex A. In 2018, the volume of roundwood processed on the island of Ireland was 3.91 M m^3, a 0.3 % increase over 2017 (A1). Over the same period the output of sawmill sector (i.e. sawn timber + round stakes) declined by 2.1% (A2), while the production of WBP declined by 3.3% over 2017 (A5). The decline in sawmill output was largely caused by the temporary closure of the GP Wood sawmill at Lissarda, Co Cork. This sawmill was badly damaged by fire in July 2018 and is set to reopen in early 2020[28].

Forest-based biomass use for energy production and relationship with national policies and goals

In 2018, 40% of the wood fibre used in the Republic of Ireland was used for energy generation, mainly within the forest products sector (Table 8). This includes, roundwood, sawmill and WBP residues (i.e. bark, sawdust and woodchip), short rotation coppice (SRC) and manufactured products (i.e. charcoal, wood pellets and briquettes).

Table 8: Use of forest-based biomass and as a proportion of total wood fibre availability (2014-2018)[29].

Item	2014	2015	2016	2017	2018
	000 m^3 OB RWE				
Wood-biomass use by the energy[30] and forest products industry	760	796	1,049	1,296	1,080
Roundwood chipped for primary energy use[31]	100	114	117	49	67
Household firewood use	235	237	237	239	243
Short rotation coppice (SRC)	5	5	20	20	18
Wood pellets and briquettes	150	154	160	175	172
Charcoal	1	1	1	1	2
TOTAL	1,251	1,307	1,584	1,780	1,582
Of which supplied from domestic resources	1,166	1,132	1,139	1,465	1,393
Roundwood available for processing	2,975	3,016	3,108	3,242	3,248
Firewood used	235	237	237	235	243
Total roundwood use[32]	3,210	3,253	3,345	3,477	3,491
Domestic wood-biomass use as a % of roundwood used	36.3	34.8	34.1	42.1	40.0

In 2018, the output of the forest-based biomass energy sector declined by 11.1% over 2017 (Table 10). This resulted in greenhouse gas (GHG) emission saving of 0.88 M tonnes of carbon dioxide (CO_2). The reduced output from the sawmill and WBP sectors and the reduction in the demand for wood-biomass by Edenderry Power caused this decline.

In 2018, 243,000 m^3 of firewood was used in the Republic of Ireland to a value of €35 M, which provides a good market for first thinnings (Table 11). 4.5% of the supply (i.e. 11,000 m^3) was imported. In addition, firewood is also harvested by forest owners for their own use. Wood-biomass fuels used by the sector are shown in Table 8.

In 2017, the biomass fuelled combined heat and power (CHP) had an installed capacity of 5.5 megawatts[33] (Table 9)[34,35]. However, in 2017, only 71.1% of the installed CHP capacity (by number of units) was in use[36].

Table 9: Number of CHP units and installed capacity by fuel type (2017).

Fuel type	No	Capacity (Mwe)	No of units %	Installed capacity %
Biomass	3	5.5	1	2

Table 10: Heat and electrical energy output from forest-based biomass, and associated greenhouse gas emissions savings (2014-2018)[37].

Item	Unit	2014	2015	2016	2017	2018
				Output		
Heat	TJ	7,562	7,730	9,017	11,686	10,386
Electricity	TJ	530	446	932	1,208	1,074
TOTAL	TJ	8,092	8,176	9,949	12,894	11,460
CO_2 emission savings	000 tonnes	619	625	761	986	876

Table 11: Volume and value of the domestic firewood market in the Republic of Ireland (2014-2018)[38].

Year	000 m^3 OB	€ M
2014	235	34.05
2015	237	34.34
2016	237	34.34
2017	239	34.63
2018	243	35.21

[28] http://www.epa.ie/newsandevents/incidents/recent/name,64294,en.html
[29] UNECE Joint Wood Energy Enquiry (JWEE); 2014-2018
[30] Includes co-firing of wood biomass at Edenderry Power; www.edenderrypower.ie
[31] Primarily used forspace and process heating
[32] Roundwood use includes the use of domestically sourced and imported roundwood
[33] Mwe
[34] https://www.seai.ie/resources/publications/Energy-in-Ireland-2018.pdf
[35] At the time of publication, data for 2018 was not available.
[36] https://www.seai.ie/resources/publications/Energy-in-Ireland-2018.pdf
[37] UNECE Joint Wood Energy Enquiry (2014-2018)
[38] drima market research study

In 2017, the contribution of renewable energy to gross final consumption (GFC) was 10.6%, compared to a 2020 target of 16%. This avoided 4.2 M tonnes of carbon dioxide (CO_2) emissions and saved €382 M of fossil fuel imports[39]. Ireland's progress towards meeting its renewable energy targets are shown in Table 12[40].

Table 12: Renewable energy progress to targets (2010-2017)[41,42,43,44].

Energy type	Progress towards targets by year							Target
	2010	2011	2012	2013	2014	2016	2017	2020
RES-E (normalised)	14.5	17.3	19.5	20.8	22.7	27.2	30.1	40
RES-T	2.4	3.8	4.0	4.9	5.2	5.0	7.4	10
RES-H	4.5	4.9	5.1	5.5	6.6	6.8	6.9	12
Directive (2009/29/EC)	5.6	6.5	7.1	7.6	8.6	9.5	10.6	16

Data sources & data consistency

Data for Woodflow 2018 is taken from a number of sources as follows.

Roundwood harvest

The domestic roundwood harvest in the Republic of Ireland is estimated by a survey[45] of: forest management companies, investment funds, producer groups, sawmills and co-ops. An additional 5% is added to account for those not covered by the survey.

Roundwood imports and exports

Import and exports of roundwood are provided by survey. Those surveyed include forest management companies, Coillte, the Northern Ireland Forest Service (DARDNI/ NIFS) and sawmills. This data is also checked with similar data provided by the Central Statistics Office (CSO).

Sawmill output

Output of the sawmill sector is estimated by survey.

Wood-based panel output

Output of the wood-based panel sector is by survey of WBP manufacturers.

Trade in forest products

Trade in forest products is provided by the Central Statistics Office (CSO)[46].

Wood energy data

Wood energy data is from an annual energy survey by the Sustainable Energy Authority of Ireland (SEAI)[47]. Additional data are from the forest sector surveys and an annual survey for the production of the UNECE Joint Wood Energy Enquiry (JWEE).

Data accuracy

Prior to publication data are reviewed by a group of industry experts.

Actual and forecast harvest (2011-2018)

Actual and forecast harvest (net realisable volume (NRV) for the Republic of Ireland has been compared for the period 2011-2017. NRV forecast data is taken from the All-Ireland Roundwood Production Forecast (2011-2028)[48] for 2011-2015 and from the NRV forecast for 2016-2035 for the period 2016-2017[49]. Actual harvest is from the COFORD Connects Woodflow Series[50].

Over the period 2011-2018, private sector harvest was 109% of NRV forecast, the Coillte harvest was 94% of NRV forecast, while the combined harvest (i.e. Coillte + private) was 97% of NRV forecast (Table 13).

Table 13: Actual and forecast roundwood harvest in the Republic of Ireland (2011-2018).

Harvest type	2011			2012			2013		
	A	F	%	A	F	%	A	F	%
	000 m³ OB								
Private	460	371	124	354	384	92	448	369	121
Coillte	2,492	2,979	84	2,485	2,737	91	2,588	2,798	92
Total	2,952	3,350	88	2,839	3,121	91	3,036	3,167	96

Harvest type	2014			2015			2016		
	A	F	%	A	F	%	A	F	%
	000 m³ OB								
Private	597	425	140	780	504	155	622	916	68
Coillte	2,517	2,906	87	2,470	2,844	87	2,733	2,505	109
Total	3,114	3,331	93	3,250	3,348	97	3,355	3,421	98

Harvest type	2017			2018			Total (2011-2018)		
	A	F	%	A	F	%	A	F	%
	000 m³ OB								
Private	828	859	96	1,027	868	118	5,116	4,706	109
Coillte	2,714	2,568	106	2,658	2,613	102	20,657	21,950	94
Total	3,542	3,427	103	3,685	3,481	106	25,773	26,656	97

Notes

A: Actual harvest. F: Forecast harvest. D: Difference % = actual harvest expressed as a percentage of NRV forecast

[39] *https://www.seai.ie/resources/publications/Energy-in-Ireland-1990-2016-Full-report.pdf*
[40] *At the time of publication, data for 2015 was not available.*
[41] *At the time of publication, data for 2018 was not available.*
[42] *https://www.seai.ie/resources/publications/Energy-in-Ireland-1990-2016-Full-report.pdf*
[43] *https://www.seai.ie/resources/publications/Energy-in-Ireland-2018.pdf*
[44] *https://www.seai.ie/resources/publications/Renewable-Energy-in-Ireland-2019.pdf*
[45] *Survey data are confidential and are reported in aggregate.*
[46] *www.cso.ie*
[47] *www.seai.ie*
[48] *http://www.coford.ie/media/coford/content/publications/projectreports/forecast_31Jan11.pdf*
[49] *http://www.coford.ie/toolsservices/allirelandroundwoodproductionforecast2016-2035/*
[50] *www.coford.ie*

Abbreviations

Abbreviation	Description
CO_2	Carbon dioxide
CHP	Combined heat & power
GB	Great Britain
FAO	Food and Agriculture Organisation of the United Nations
GHG	Greenhouse gas
JFSQ	Joint Forestry Section Questionnaire (Eurostat)
JWEE	Joint Wood Energy Enquiry (UNECE)
ktoe	Kilotonne of oil equivalent
m^3	Cubic metre
MDF	Medium density fibreboard
NI	Northern Ireland
NIFS	Northern Ireland Forest Service
NRV	Net realisable volume
OB	Overbark
OSB	Oriented strand board
PCRW	Post-consumer recovered wood
ROI	Republic of Ireland
RWE	Roundwood equivalent
SEAI	Sustainable Energy Authority of Ireland
TJ	Terajoule
UK	United Kingdom of Great Britain and Northern Ireland
UNECE	United Nations Economic Commission for Europe
WBP	Wood-based panels
WBP B	Bark produced during the production of wood-based panels
WBP SD	Sawdust produced from the sanding of wood-based panels
WRAP	Waste and Resources Action Programme (UK)

Annex A: All island woodflow (2016-2018) and breakdown of use categories

A1: Softwood fibre processed[51].

Item	2016			2017			2018		
	ROI	NI	Total	ROI	NI	Total	ROI	NI	Total
	000 m³ OB								
Roundwood source									
Imports less exports[52]	-16	321	305	-65	231	166	-205	253	48
NIFS[53]	–	364	364	–	407	407	–	373	373
Coillte[54]	2,600	–	2,600	2,613	–	2,613	2,591	–	2,591
Private[55]	518	27	545	676	36	712	857	40	897
Roundwood processed	3,102	712	3,814	3,224	674	3,898	3,243	666	3,909
Sawlog	1,977	517	2,494	2,178	489	2,667	2,084	463	2,547
Stakewood	164	87	251	148	83	231	165	87	252
Pulpwood	961	108	1,069	898	102	1,000	994	114	1,108
Roundwood processed	3,102	712	3,814	3,224	674	3,898	3,243	666	3,909
PCRW[56,57]	300	60	360	300	60	360	300	60	360
TOTAL fibre including PCRW	3,402	772	4,174	3,524	734	4,258	3,543	726	4,269

A2: Sawmill input/output.

Item	2016			2017			2018		
	ROI	NI	Total	ROI	NI	Total	ROI	NI[58]	Total
	000 m³ OB								
Input[59]									
Sawlog	1,977	517	2,494	2,178	489	2,667	2,084	463	2,547
Stakewood	164	87	251	148	83	231	165	87	252
TOTAL	2,141	604	2,745	2,326	572	2,898	2,249	550	2,799
Output[60,61]									
Sawn timber	985	250	1,235	1,049	236	1,285	1,012	223	1,235
Round stakes	149	79	228	135	75	210	150	79	229
Sawmill residues	1,007	275	1,282	1,142	261	1,403	1,087	248	1,335
TOTAL	2,141	604	2,745	2,326	572	2,898	2,249	550	2,799

[51] Roundwood available for processing excludes both hardwood and firewood.
[52] Sources: Coillte, NIFS, Forestry Commission (GB), trade estimates.
[53] Source: Northern Ireland Forest Service (NIFS).
[54] Source: Coillte.
[55] Sources: Private forest management companies, Forestry Commission (GB).
[56] Sources: EPA, Environment Service (NI), Trade Estimates, Joint wood Energy Enquiry (JWEE) [2012-2017], WRAP UK.
[57] PCRW: Post consumer recovered wood.
[58] https://www.forestresearch.gov.uk/tools-and-resources/statistics/forestry-statistics/
[59] Sources: Coillte, NIFS, private forest management companies, Forestry Commission (GB) and trade estimates.
[60] Sawmill output data has been checked against industry estimates.
[61] Sources: Forestry Commission (GB) sawmill survey and industry expert opinion.

A3: Sawmill output by market/end use[62,61,64].

Product(s)	2016							2017							2018						
	ROI			NI			Total	ROI			NI			Total	ROI			NI			Total
	Hm	Exp	T	Hm	Exp	T		Hm	Exp	T	Hm	Exp	T		Hm	Exp	T	Hm	Exp	T	
	000 m³ UB																				
Construction	69	450	519	45	45	90	609	83	470	553	46	46	92	645	83	470	533	43	44	87	620
Pallet/packaging	54	180	234	25	25	50	284	62	187	249	25	65	90	339	48	193	241	25	60	85	326
SE fencing[65]	42	173	215	55	55	110	325	11	218	229	14	40	54	283	53	167	221	16	35	51	272
Round stakes	74	75	149	39	40	79	228	45	74	135	38	37	75	210	68	82	150	39	40	79	229
Other markets	17	–	17	–	17	–	–	18	–	18	–	18	–	–	17	–	17	–	–	–	17
TOTAL			1,134			329	1,430			1,184			311	1,495			1,162			302	1,464

A4: Feedstock for WBP, biomass energy & other uses.

Item	2016			2017			2018		
	ROI	NI	Total	ROI	NI	Total	ROI	NI	Total
	000 m³ OB								
Pulpwood net of imports and exports[66]	961	108	1,069	898	102	1,000	994	114	1,108
PCRW[67]	300	60	360	300	60	360	300	60	360
Sawmill residues[68]									
Woodchip imports	32	7	39	32	7	39	33	8	41
Sawdust imports	112	37	149	112	37	149	65	40	105
Bark	145	40	185	211	38	249	204	35	239
Sawdust	222	51	273	228	48	276	230	45	275
Woodchip	640	176	816	703	167	870	654	160	814
Woodchip from stakes	–	8	8		8	8	–	8	8
WBP residues[69]									
Bark	80	–	80	84	–	84	81	–	81
Sawdust	35	–	35	40	–	40	39	–	39
TOTAL	2,527	487	3,014	2,608	467	3,075	2,600	478	3,070

A5: WBP input/output[70,71].

Item	2016			2017					
	ROI	NI	Total	ROI	NI	Total	ROI	NI	Total
	000 m³ OB								
Pulpwood	844	–	844	759	–	759	952	–	952
PCRW[72]	70	–	70	100	–	100	100	–	100
Sawdust[73]	68	–	68	92	–	92	78	–	78
Woodchip[74]	413	–	413	554	–	554	300	–	300
TOTAL input	1,395	–	1,395	1,505	–	1,505	1,430	–	1,430
TOTAL output[75,76]	774	–	774	836	–	836	808	–	808

62. Sawmill output data has been checked against industry estimates.
63. Hm: home market; Exp: export market: T: total
64. Sources: Forestry Commission (GB) & industry expert opinion.
65. SE: Square edged.
66. Source: Industry expert opinion.
67. Sources: Industry expert opinion and the Environmental Protection Agency (EPA), www.epa.ie
68. Source: Industry expert opinion.
69. Source: Industry expert opinion.
70. This input is for the production of wood-based panels. This excludes boiler fuels. These are detailed overleaf.
71. In January 2011, Finsa Forest Products Ltd. ceased producing particleboard in Scariff, Co Clare.
72. Sources: EPA & industry expert opinion.
73. Source: Industry expert opinion.
74. Source: Forestry Commission (GB) & industry expert opinion.
75. Sources: Board mill survey & industry expert opinion.
76. All Ireland WBP output includes the output of the all WBP plants operating on the island of Ireland. These are Masonite Ireland (Carrick-on-Shannon), Medite Europe (Clonmel) and SmartPly Europe (Waterford).

A6: Feedstock for wood-biomass energy (WBE) & other uses.

Item	WBE 2016			WBE 2017			WBE 2018			Other uses 2016			Other uses 2017			Other uses 2018		
	ROI	NI	Total	ROI	NI	Total	ROI	NI	Total	ROI	NI	Total	ROI	NI	Total	ROI	NI	Total
									000 m³ OB									
Harvest residues																		
CHP/WBP boiler fuel	60	–	60	90	–	90	90	–	90	–	–	–	–	–	–	–	–	–
Pulpwood																		
Domestic/ industrial heating fuel[77,78]	117	30	147	49	30	79	42	34	76	–	–	–	–	–	–	–	–	–
Bio energy[79]	–	78	78	–	72	72	–	80	80	–	–	–	–	–	–	–	–	–
Other markets	–	–	–	–	–	–	–	–	–	–	–	–	90	–	90	179		179
Total pulpwood	117	108	225	139	102	241	132	114	246	–	–	–	90	–	90	179		179
PCRW																		
CHP/WBP boiler fuel (BF)[80]	230	30	260	200	30	230	200	30	230	–	–	–	–	–	–	–	–	–
Exported	–	–	–	–	–	–	–	–	–	–	30	30	–	30	30	–	30	30
Total PCRW	230	30	260	200	30	230	200	30	230	–	30	30	–	30	30	–	30	30
Bark																		
Sawmill bark used for biomass energy[81]	115	30	145	181	28	209	164	25	189	–	–	–	–	–	–	–	–	–
WBP bark used for biomass energy[82]	80	–	80	84	–	84	81	–	81	–	–	–	–	–	–	–	–	–
Bark mulch[83]	–	–	–	–	–	–	–	–	–	30	10	40	30	10	40	40	10	50
Total bark	195	30	225	265	28	293	245	25	270	30	10	40	30	10	40	40	10	50
Sawdust																		
Sander line sawdust used for WBP BF	35	–	35	40	–	40	39	–	39	–	–	–	–	–	–	–	–	–
Sawdust used as BF by sawmills	100	35	135	90	37	127	5	25	30	–	–	–	–	–	–	–	–	–
Other energy use	23		23	–	–	–	55	–	55	–	–	–	–	–	–	–	–	–
Exported	–	–	–	–	–	–	–	–	–	37	23	60	37	24	61	123	10	133
Pellet manufacture[84]	106	30	136	70	24	94	34	50	84	–	–	–	–	–	–	–	–	–
Other uses including animal bedding	–	–	–	–	–	–	–	–	–	–	–	–	51	–	51	–	–	–
Total sawdust	264	65	329	200	61	261	133	75	208	37	23	60	88	24	112	123	10	133
Woodchip[85]																		
Woodchip used for CHP	201	65	266	138	65	203	322	57	379	–	–	–	–	–	–	–	–	–
Woodchip exports	–	–	–	–	–	–	–	–	–	7	7	14	7	7	14	16	40	56
Pellet manufacture	–	91	91	36	110	146	49	71	120	–	–	–	–	–	–	–	–	–
Other uses including animal bedding	–	–	–	–	–	–	–	–	–	51	28	79	–	–	–	–	12	12
Total woodchip	201	156	357	174	175	349	371	128	499	58	35	93	7	7	14	16	52	68
TOTAL	1,067	389	1,456	978	396	1,374	1,081	372	1,453	125	98	223	215	71	286	358	102	460

77. Sources: SEAI survey (ROI), industry expert opinion.
78. This includes pulp used for the manufacture of wood pellets.
79. Source: Forestry Commission (GB).
80. Sources: EPA survey & industry expert opinion.
81. Sources: SEAI, Forestry Commission (GB).
82. Sources: Forestry Commission (GB) & industry expert opinion.
83. Sources: Industry expert opinion.
84. Sources: Industry expert opinion.
85. Sources: Forestry Commission (GB) & industry expert opinion.