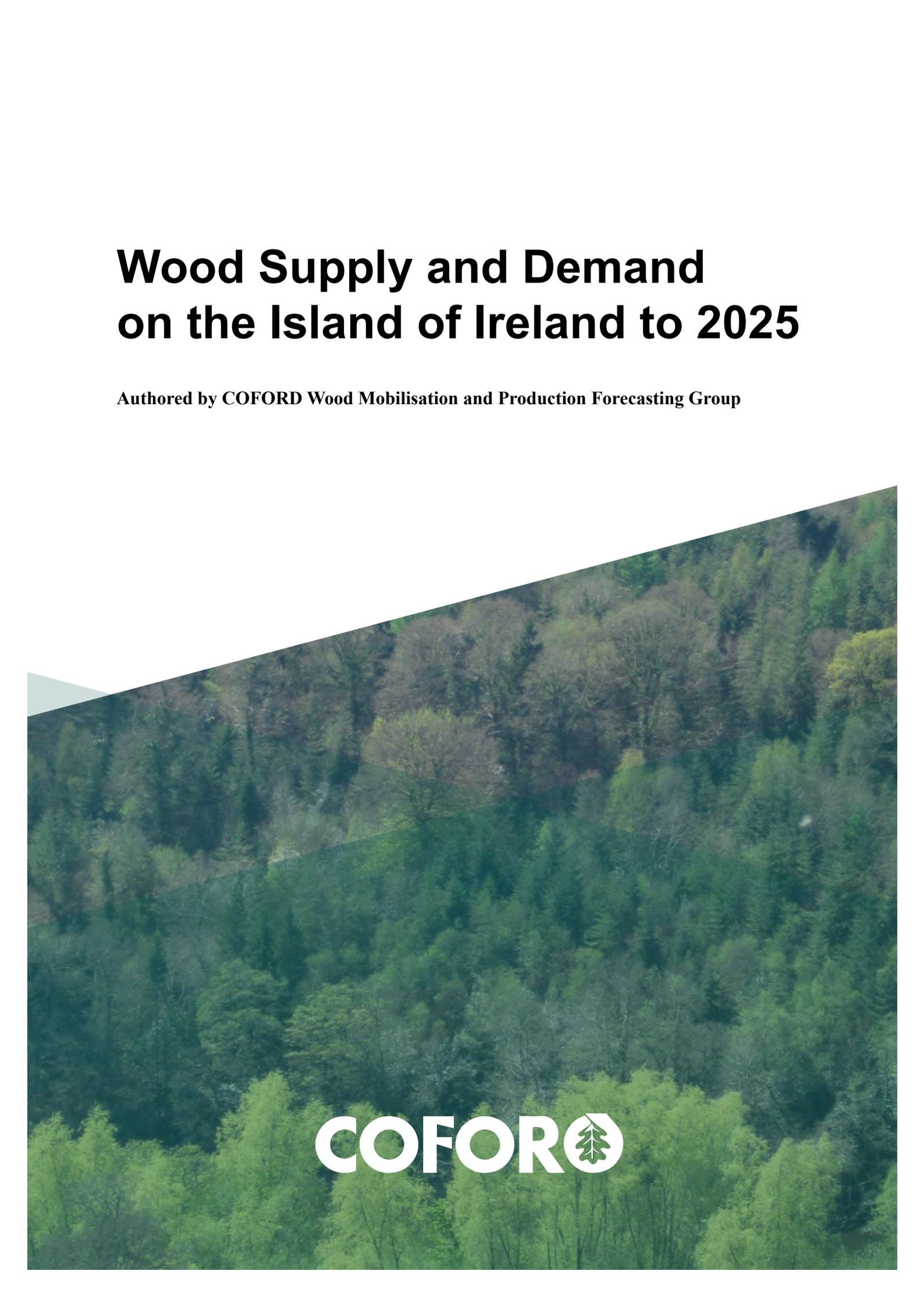


# Wood Supply and Demand on the Island of Ireland to 2025

Authored by COFORD Wood Mobilisation and Production Forecasting Group



**COFORO** 



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## **COFORD**

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The COFORD Council for Forest Research and Development is a representative body from the Forest Sector in Ireland. The Council advises the Department of Agriculture Food and the Marine on research and developmental issues. Working groups established by the COFORD Council provide an important role in facilitating the development of the forest sector in Ireland.

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## Foreword

This report on the supply and demand for roundwood and wood in the island of Ireland over the medium term to 2025 has been compiled by the Wood Mobilisation and Production Forecasting Group under the direction of the COFORD Council. It brings together the best available information from the 2016 *All Ireland Roundwood Production Forecast*, and demand assumptions based on inputs from the processing sector, SEAI and Action Renewables (NI).

The prediction is for a continuation of a shortage of sawlog and stakewood supply on the island up to 2020, reaching 0.73 million cubic metres per annum, or in round numbers, the annual intake of two large sawmills. After 2020, the supply position is expected to ease, notwithstanding assumed further increases in sawlog demand, so that by 2025, it is predicted that an annual sawlog and stakewood harvest of 4.11 million cubic metres will be sufficient to meet sawmill demand on the island.

As the report shows, almost all of the sawlog increase is due to come from the private sector in the Republic of Ireland. Realising this potential is in our view the major challenge facing the forest sector over the coming decade. To this end, the members of the COFORD Wood Mobilisation and Production Forecasting Group are working through the issues in the mobilisation challenge.

Looking to the wood-based panel and wood energy sectors, we predict increases in demand for those sectors also, especially on the energy side. However, energy is the largest and most uncertain element of the wood supply demand equation. Based on work undertaken by the Sustainable Energy Authority of Ireland (SEAI), the annual supply gap in the RoI could be upwards of 1.4 million cubic metres by 2020, and 2.25 million cubic metres by 2025. Whether this level of demand will arise and over what time is uncertain, depending not only on government policy measures but also on fossil fuel prices and other factors. Likewise, while an increase in the level of imports to meet wood energy demand is forecast, the size and source of wood energy imports is outside the scope of this report, which is focussed on wood supply on the island.

Greater certainty can be attached to demand from sawmilling and boardmilling, given a well-grounded existing demand, allied to expected expansion.

Given the current and likely future supply and demand situations that we predict, it is vital that all planned policy interventions are carefully considered. Sawmilling provides the highest wood price paying potential for the forest owner, based on an open market and it being an export-led sector. Likewise, the boardmilling sector is largely export oriented. Energy use of wood has a significant role to play over the coming decades as a renewable fuel to displace fossil fuels, especially in the heating sector. It will also play a primary role in opening up of forests through first thinning and adding value to the remaining crop. However, it would be unwise if the price point available to the grower from the energy market, heavily influenced by policies such as the Support Scheme for Renewable Heat resulted in an erosion of the supply of roundwood for fencing and wood-based panel manufacture.

Overall the key challenge is to ensure a balanced approach to the development of the island's wood resource to best meet the needs of both the wood processing and energy sectors, against the backdrop of an increasing overall wood supply deficit. What this work also confirms is the potential exists from within the existing forest resource to grow the roundwood harvest and increase the output from the forest products and wood energy sectors.

Will this potential be realised? Over the past decades, and through and since the economic crisis, all facets of the forest sector have continued to innovate, develop and expand. Notwithstanding the serious threat posed by Brexit, there is no reason to expect that these efforts will not continue. If these are allied to agile and responsive government, we can expect an increase in output and jobs from the sector, and an

enhanced contribution to meeting the climate change challenge through increased wood product use and by the displacement of fossil fuels.

**Mike Glennon**

Chairperson, COFORD Wood Mobilisation and Production Forecasting Group

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Thanks are also due to Matthew Clancy and Denis Dineen (both of SEAI), Michael Doran (Action Renewables NI) and Henry Phillips (forestry consultant).

We also acknowledge all those in the Irish forest products sector who responded to the wood demand survey.

## **Abbreviations**

CAP	Common Agricultural Policy
CHP	combined heat and power
DAFM	Department of Agriculture, Food and the Marine
GJ	gigajoule
GWh	gigawatt hour
kWh	kilowatt hour
m <sup>3</sup>	cubic metre
MC	moisture content
NI	Northern Ireland
NRV	net realisable volume
OB	overbark
PCRW	post consumer recovered wood
Rol	Republic of Ireland
RWE	roundwood equivalent
SEAI	Sustainable Energy Authority of Ireland
toe	tonne of oil equivalent
TWh	terawatt hour



## Executive summary

In order to inform policy and investment decision making, the COFORD Wood Mobilisation and Production Forecasting Group has established the likely future demand and supply of wood in 2020 and 2025. This has been carried out for the main wood product areas: sawlog for sawnwood manufacture; pulpwood and sawmill residues for the manufacture of wood-based panels (WBP), forest-based biomass and post-consumer wood (PCRW) for heat and power generation applications.

The forecast is that roundwood and wood residue demand for sawmilling, wood-based panel manufacture and wood energy are all predicted to substantially increase over the medium term to 2025.

The supply-demand position shows a continued shortfall in supply of roundwood to the sawmilling sector, reaching 0.73 million m<sup>3</sup> per annum by 2020. By 2025, supply and demand in this sector should largely be in balance. It is assumed that the demand for wood for process use by the WBP sector will be met in full by indigenous supply in the period up to 2025. Under the conservative demand scenario presented for wood energy for the island of Ireland, a deficit of 2.8 million m<sup>3</sup> and 3.0 million m<sup>3</sup> is predicted for 2020 and 2025 respectively (Table 1). Over the same period, the optimistic demand scenario shows potential supply deficits of 3.5 million m<sup>3</sup> and 4.7 million m<sup>3</sup> for 2020 and 2025 respectively (Table 1). While there is scope to sustainably increase the level of harvest over forecast it is likely that part of the supply deficit will be met by wood imports. However, estimating the size and source of wood energy imports is outside the scope of this report.

Table 1: An overview of the supply-demand position for wood on the island of Ireland (2020-2025)<sup>1</sup>.

Sector	Conservative energy wood demand		Optimistic energy wood demand	
	2020	2025	2020	2025
	Balance 000 m <sup>3</sup>			
Sawmills	-729	-7	-729	-7
Wood-based panels (WBP)	0	0	0	0
Wood energy	-2,053	-2,951	-2,732	-4,737
Overall supply-demand position	-2,782	-2,958	-3,461	-4,744

Overall the key challenge is to ensure a balanced approach to the development of the island's wood resource to best meet the needs of both the wood processing and energy sectors, against the backdrop of an increasing overall wood supply deficit. In turn, mobilising private sector supply is key to realising in full the domestic contribution to the forecasted increased demand for the sawmilling, WBP and wood energy sectors in the period up to 2025. This is because the increase in harvest is forecast to come almost exclusively from the private sector in the RoI. Maximising utilisation of the indigenous forest resource, to minimise the effects of the deficit, should be a primary goal. A review of progress on mobilising the indigenous forest resource is examined in the accompanying report *Mobilising Wood from Irelands Forests Meeting the Challenges*, which should be read in conjunction with this report to aid interpretation and planning.

<sup>1</sup> Negative numbers are where demand is greater than supply.

The key current and future mobilisation challenges identified in the latter report include:

*Short term*

1. Public road network
2. Regulatory environment
3. Forest owner's engagement in managing their forest asset
4. Roundwood supply deficit

*Medium term*

5. Maintaining strong roundwood demand in a post Brexit world
6. Voluntary forest certification
7. Felling licence system and forest management plans
8. Common Agricultural Policy – post 2020
9. Wood for energy.

## **Background**

This report on future wood supply and demand on the island of Ireland forms part of the review of *Mobilising Ireland's Forest Resource*<sup>2</sup>, which was published by COFORD in early 2015. The work was undertaken by the Wood Mobilisation and Production Forecasting Group of the COFORD Council<sup>3</sup>. The Group has published a companion report to the present document on the level of progress which has been made in addressing the 2015 recommendations.

The overall objective of this examination of future wood supply and demand trends and scenarios is to inform investment and policy decisions related to the wood processing and energy sectors.

Roundwood demand estimates were derived as outlined in the methodology. Estimates are subject to prevailing market conditions, and policy developments at national and international level.

On the supply side, the main source of information is the *All Ireland Roundwood Production Forecast 2016-2035*<sup>4</sup> published by COFORD in 2016 (Phillips et al. 2016). It provides roundwood production forecasts for public and private forests for both the Republic of Ireland (RoI) and Northern Ireland.

The methodologies used to arrive at roundwood supply and demand now follow.

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<sup>2</sup> <http://www.coford.ie/media/coford/content/publications/2016/MobilisingIrelandsforestresources100516.pdf>

<sup>3</sup> <http://www.coford.ie/aboutcoford/cofordcouncil/>

<sup>4</sup> <http://www.coford.ie/toolsservices/allirelandroundwoodproductionforecast2016-2035/>

## Methodology

The methodology builds on approaches developed in two previous COFORD reports: the *All Ireland Roundwood Demand Forecast 2011-2020* (COFORD 2011) and Annex I of *Mobilising Ireland's Forest Resource*<sup>5</sup>. Given the high levels of anticipated demand for wood energy, further analysis and grounding of conversion factors for energy demand to roundwood equivalent was undertaken (see Appendix 1).

Estimates for sawlog, pulpwood and wood energy supply in 2020 and 2025 were derived from historic product outturns, including new information provided by the Northern Ireland Forest Service, and from Tables 1 and 4 of the 2016-2035 forecast. The sawlog, pulpwood, and co-product (residue) demand (for direct conversion to product by the sawmill and wood-based panel (WBP) sectors) was estimated by a written survey undertaken in late 2016. Energy demand estimates were provided by the SEAI for the RoI and by Action Renewables for NI. The methodologies are now described in further detail.

## Sawlog supply and demand

### Supply

#### *Republic of Ireland*

Forecasted supply of sawlog-sized material<sup>6</sup> (> = 14 cm top diameter) in 2020 and 2025 was taken from the 2016-2035 forecast<sup>7</sup> and are presented in Table 2.

Table 2: Forecasted roundwood production (top diameter > = 14 cm) in RoI by volume and percentage for private sector and Coillte (2020-2035).

Year	Private	Coillte	Total	Private	Coillte	Total
	000 m <sup>3</sup> overbark (OB)			% forecasted production		
2020	773	2,192	2,965	26.1	73.9	100.0
2025	2,229	2,218	4,447	50.1	49.9	100.0
2035	3,971	2,327	6,298	63.1	36.9	100.0

Top diameter categories do not translate directly to product assortments, as there will always be pulp/wood energy recovery from poorly formed sawlog-sized stems. For that reason, and in order to compare forecasted supply with sawlog demand estimated from the survey, it was necessary to derive an estimate of product assortment recovery using historic trends and applying the estimate to future harvest. The estimation process is now described.

Domestic RoI roundwood harvest outturn by product assortment for each year over the period 2010-2016 was first derived from the 2016 COFORD Connects Woodflow<sup>8</sup>, and is presented in Table 3. The averages from Table 2 were then used to allocate the forecasted (top diameter) harvest to product assortments.

A final adjustment was made to account for the fact that a higher proportion of the forecasted harvest in 2020 and 2025 is in 14+ cm sawlog-sized material compared with the base year of 2016:

- the increase in the 14+ cm category was from 73.23% of the forecasted NRV in 2016 to 75.66% in 2020, an increase of 2.43%, bringing the percentage sawlog from 53.9% to 56.3%
- the corresponding figure for 2025 was 79.17%, an increase of 5.94% on 2016, bringing the percentage sawlog available to 59.8%.

<sup>5</sup> <http://www.coford.ie/media/coford/content/publications/2016/MobilisingIrelandsforestresources100516.pdf>

<sup>6</sup> By way of commentary, over the period 2020 to 2025 the net realisable volume (NRV) forecast to come on stream in the RoI increases sharply, by some 50%, due almost entirely to a forecasted 3-fold increase in private harvest of sawlog-sized material. Overall, the forecast estimates a very significant increase in production from the RoI private sector over the period from 2016 to 2035. This is reflected in the proportion of the forecasted supply of 14 cm + material to come from the private estate: 26.1% of total harvest in 2020, to 50.1% in 2025, and 63.1% by 2035.

<sup>7</sup> Table 4 of the 2016-2035 forecast.

<sup>8</sup> <http://www.coford.ie/publications/cofordconnects/>

The forecasted product assortment supply is in Table 4.

#### *Northern Ireland*

The Northern Ireland Forest Service separately provided historic product outturn from roundwood harvest for the period 2010-2016<sup>9</sup>, which was used to determine a sawlog and pulpwood outturn for domestic roundwood harvest in NI over the period 2010-2016 (Table 3).

Product assortment outturn was then calculated using the NRV volumes from Table 4 in the 2016-2035 forecast and applying the averages in Table 3. It was assumed that the expected percentage outturn for sawlog and pulpwood/stakewood for NI in 2020 and 2025 would remain constant at 63.7% and 26.8%, respectively, of the NRV forecast. Firewood production in NI is taken as 9.5% of the NRV harvest (Table 4).

In 2016, the estimated roundwood demand from the sawmill sector in Northern Ireland was for 0.52 million m<sup>3</sup> sawlog and 0.09 million m<sup>3</sup> stakewood. Based on the demand survey, roundwood demand from sawmills (stakewood and sawlog) is predicted to grow to 0.70 million m<sup>3</sup> in 2020 and to remain at a very similar level, 0.71 million m<sup>3</sup>, in 2025.

Over the same period, the forecasted supply of stakewood and sawlog in NI decreases marginally from 0.43 million m<sup>3</sup> in 2020 to 0.41 million m<sup>3</sup> in 2025.

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<sup>9</sup> Personal communication, 7/2017.

Table 3: Annual and average domestic roundwood harvest outturn by product assortment over the period 2010-2016 from the COFORD Connects Woodflow (2010-2016).

Harvesting outturn % <sup>10</sup>	2010			2011			2012			2013			2014			2015			2016		
	Rol <sup>11</sup>	NI <sup>12</sup>	Total	Rol	NI	Total															
Pulpwood/ stakewood	38.7	30.0	38.9	39.8	26.0	39.8	37.1	26.0	37.5	39.2	27.0	39.3	38.4	26.0	38.6	39.4	26.0	39.5	38.8	26.8	38.9
Sawlog	54.4	60.0	53.7	52.8	64.0	52.4	55.0	54.3	54.3	53.5	65.0	53.0	54.3	65.0	53.8	53.6	64.0	53.2	53.9	63.7	53.4
Firewood	6.9	10.0	7.4	7.4	10.0	7.8	7.9	8.2	8.2	7.4	8.0	7.7	7.3	9.0	7.6	7.0	10.0	7.3	7.3	9.5	7.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

% of domestic harvest

Harvesting outturn %	Average (2010-2016)		
	Rol	NI	Total
Pulpwood/ stakewood	38.8	26.8	38.9
Sawlog	53.9	63.7	53.4
Firewood	7.3	9.5	7.7
Total	100.0	100.0	100.0

Table 4: Estimation of product assortment outturn from forecasted domestic roundwood harvest in 2020 and 2025 in Rol and NI (excluding firewood).

Item <sup>13</sup>	Unit	Calculation	Republic of Ireland		Northern Ireland	
			2020	2025	2020	2025
Net realisable volume (NRV) roundwood forecast	M m <sup>3</sup> OB	1	3.92	5.62	0.53	0.52
Estimated proportion of pulpwood & stakewood in forecast	%	2	36.7	33.2	26.8	26.8
Estimated volume of pulpwood & stakewood	M m <sup>3</sup> OB	1*(2/100)	1.44	1.87	0.14	0.14
Estimated proportion of sawlog in forecast	%	3	56.3	59.8	63.7	63.7
Estimated volume of sawlog	M m <sup>3</sup> OB	1*(3/100)	2.21	3.36	0.34	0.33

<sup>10</sup> Due to rounding, not all totals sum to 100.0.

<sup>11</sup> Data for Rol is from the COFORD Connects Woodflow Series; <http://www.coford.ie/publications/cofordconnects/>

<sup>12</sup> Data for Northern Ireland was provided by the Northern Ireland Forest Service (7/2017).

<sup>13</sup> Volumes in the table may differ from the multiple of NRV forecast times volume % due to rounding.

## Demand

It is estimated that the intake of roundwood by the sawmill sector on the island of Ireland was 2.75 million m<sup>3</sup> in 2016, comprising 2.50 million m<sup>3</sup> sawlog and 0.25 million m<sup>3</sup> stakewood (COFORD Connects Woodflow 2016). The larger sawmills in the ROI and in NI are shown in Table 5.

Table 5: Larger sawmills in the Republic of Ireland and Northern Ireland.

Sawmill	Location
Balcas Ltd	Enniskillen, Co Fermanagh
Coolrain Sawmills Ltd	Coolrain, Co Laois
Diamond Sawmills	Coleraine, Co Derry
Drenagh Sawmills	Limavady, Co Derry
ECC Timber Products Ltd	Corr na Móna, Co Galway
Glennon Brothers Ltd	Fermoy, Co Cork and Longford, Co Longford
GP Wood Ltd	Enniskeane and Lissarda, Co Cork
Laois Sawmills Ltd	Portlaoise, Co Laois
Murray Timber Group (MTG)	Ballon, Co Carlow and Ballygar, Co Galway
Woodfab Timber Ltd	Aughrim, Co Wicklow

Future roundwood (stakewood and sawlog) demand by sawmills in 2020 and 2025 was estimated by a survey undertaken in late 2016. The future demand estimate includes some 14 smaller mills not listed in Table 4 (these were taken to account for ca 10% current roundwood intake).

## Pulpwood for WBP manufacture – supply and demand

### Box 1. Supply / demand model for the WBP and wood energy sectors

Depending on market price, location and other factors, pulpwood from the private forest estate can be used for the production of WBP or as a feedstock for wood energy. Most Coillte pulpwood is allocated to the manufacture of WBP and this is the assumption used in Table 1 of the 2016-2035 forecast (Phillips et al. 2016). The same assumption was used for this report; and additional pulpwood supply over and above that allocated by Coillte was allocated first to the manufacture of WBP and after that demand was satisfied, to wood energy use. This is based on a working assumption that any additional pulpwood demand from the WBP mills will be satisfied by private-sector supply. In reality, prevailing market price will strongly influence where wood supplies are used.

The largest and most uncertain element of future supply/demand is wood energy. Increases in demand are likely to be driven mostly by policies and measures such as the Support Scheme for Renewable Heat and any changes to CHP supports. Oil and fossil fuel prices could also be an important driver, but they are of course highly volatile and uncertain. The UK BEIS 2016 fossil fuel price assumptions foresees rising oil and gas prices over the period from 2016 to 2025; for oil these are in the region of 40-50% (Department for Business, Energy and Industrial Strategy 2016). Such rises, if they occur and are sustained are also likely to influence fuel use and investment decision-making.

## Supply

The estimated supply of roundwood for WBP manufacture and wood energy was the residual of the total forecasted supply of roundwood in the three assortment categories less sawlog and stakewood supply (see Table 4 above).

## Demand

Demand for wood and residues for the manufacture of WBP (excluding energy wood) in 2020 and 2025 was estimated in the 2016 survey (see Tables 6 and 12). The estimated demand from the WBP sector for wood for energy purposes<sup>14</sup> is contained within the overall demand for wood energy (Table 12).

Table 6: WBP manufacturers surveyed in 2016 to estimate future roundwood and roundwood equivalent (RWE) demand in 2020 and 2025.

WBP mill	Location
Masonite Ireland Ltd.	Carrick-on-Shannon, Co Leitrim
MEDITE	Clonmel, Co Tipperary
SMARTPLY	Slieverue, Co Kilkenny

## Supply / demand

As outlined in Box 1, the underlying assumption is that increases in wood demand by the WBP sector will be met in full.

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<sup>14</sup> This includes process heat and the generation of electricity.



## **Wood energy as a residual supply - ROI and NI**

In order to estimate the supply of wood for wood-based panel (WBP) manufacture and for wood energy use, the total NRV forecast for all assortments, apart from tip-7 cm, was taken from Table 4 of the *COFORD All Ireland Roundwood Production Forecast 2016-2035*. The sawlog and stakewood supply (from Table 4 of this report) was then subtracted to provide the estimate of roundwood available for pulpwood/energy wood supply (Row 5 in Table 7).

The estimated supply of tip-7 cm assortment and clearfell residues in both years was taken from Table 1 of the *COFORD All Ireland Roundwood Production Forecast 2016-2035*.

Post-consumer recovered wood (PCRW) supply for 2020 and 2025 used the 2016 *COFORD Woodflow* estimate. Given current macro-economic growth forecasts, it is likely that this supply will not decrease. On the other hand there is no reliable way to estimate what any level of increase would be.

Sawmill residue supply was taken from the estimated production of sawmill residues in 2016 (from the *COFORD Woodflow 2016*). This was incremented at the same rate as the expected growth in roundwood intake by the sawmill sector in 2020 and 2025, available from the sawmill survey. The assumption here is that sawnwood recovery rates from roundwood will not increase or decrease. Advances in sawmilling technology and their application have brought about increases in recovery rates of sawnwood over the past decade. However, the extent to which sawmilling technology may further advance to allow higher rates of recovery is unknown.

Willow/short rotation coppice (SRC) supply estimates were provided by Teagasc (ROI) and the Northern Ireland Forest Service (NI). These have been assumed to stay static in 2020 and 2025. The Bioenergy Scheme of the Department of Agriculture, Food and Marine provided grant aid for willow establishment from 2007 to 2015. The scheme is now closed.

These separate net sources of wood for panel board manufacture and wood energy use are totalled in the final row of Table 7. Shaded rows are carried forward to Table 12 for completeness, and to allow an apportionment of the supply to WBP manufacture and wood energy use.

Table 7: Estimated wood supply for the WBP and wood energy sectors in the Rol and in NI in 2020 and 2025. (Shaded rows are carried forward to Table 12.)

Item	2020			2025		
	Rol	NI	Total	Rol	NI	Total
	000 m <sup>3</sup> OB					
(1) NRV forecast <sup>15</sup>	3,919	534	4,453	5,618	518	6,136
(2) Estimated supply of sawlog (see Tables 3-4)	2,206	340	2,546	3,359	330	3,689
(3) Estimated supply of roundwood for stakewood and pulpwood/energy wood (1-2) <sup>16</sup>	1,713	194	1,907	2,259	188	2,447
(4) Estimated supply of stakewood	235	87	337	337	84	421
(5=(3-4)) Estimated supply of roundwood for WBP and wood energy	1,478	107	1,585	1,922	104	2,026
Harvesting residues (tip-7 cm and clearfell residues)	98	22	120	259	21	280
Post consumer recovered wood	300	60	360	300	60	360
Sawmill residues <sup>17</sup>	1,366	308	1,674	1,601	314	1,915
Short rotation willow coppice	20	5	25	20	5	25
Estimated total wood supply for WBP and wood energy	3,262	502	3,764	4,102	504	4,606

<sup>15</sup> Hardwood production is not included in the Net Realisable Volume (NRV) forecast for Northern Ireland. It is estimated by NI Forest Service to be ca 5,000 m<sup>3</sup> per annum.

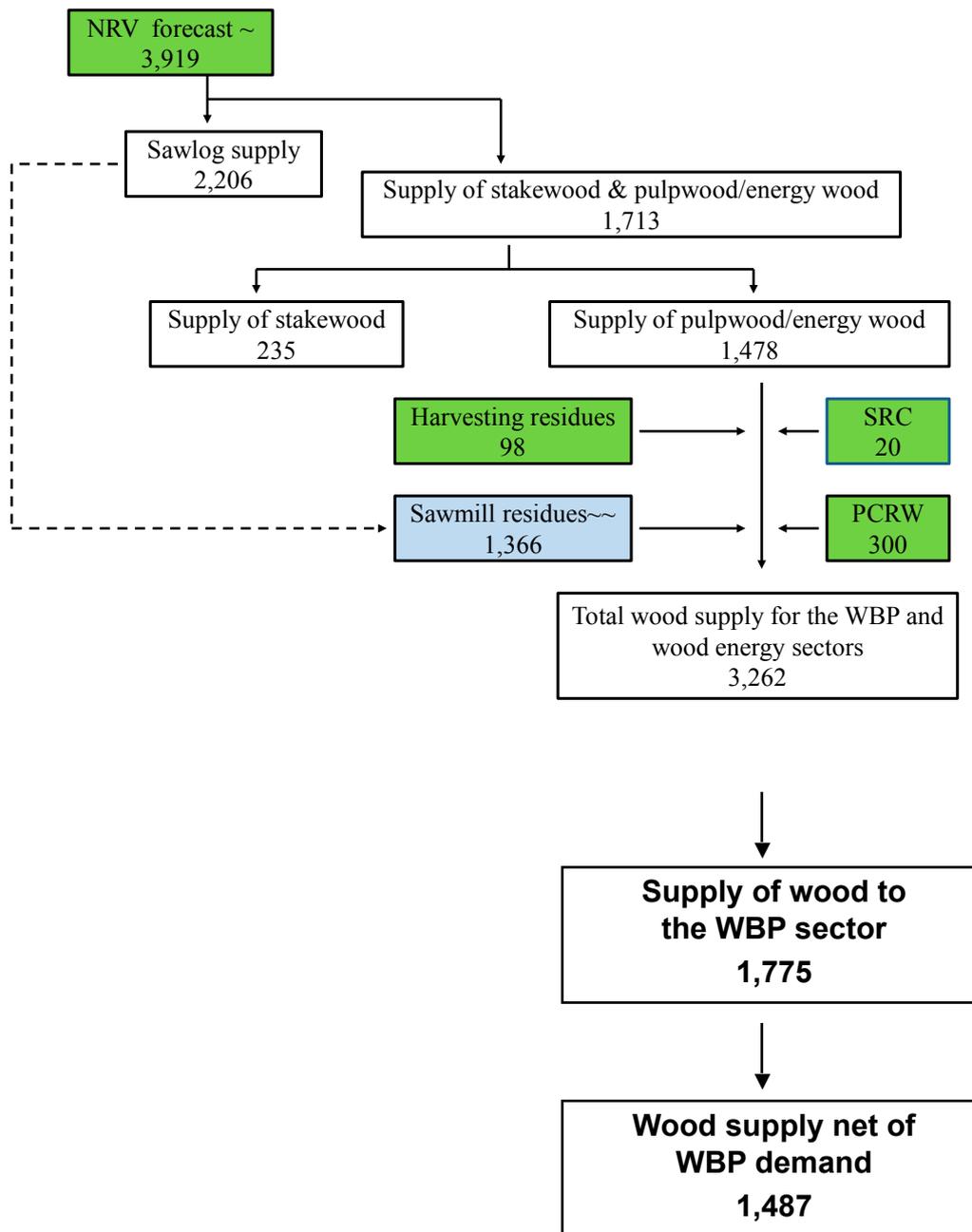
<sup>16</sup> The estimated supply of roundwood is from domestic sources only.

<sup>17</sup> Includes residues which arise from the processing of imported roundwood.

## Step through of wood supply stream estimation

An illustrative example of the forecasted wood supply flow through the sawlog, wood based panel and wood energy demand points, as calculated in previous Sections is provided in Figure 1 for 2020.

Figure 1: Forecasted flow of wood supply to demand end points in 2020 (Republic of Ireland). (Data are '000 cubic metres OB.)



~ NRV forecast is taken from Table 4 of the *COFORD All Ireland Roundwood Production Forecast (2016-2035)*. It includes the assortment classes 7-13 cm, 14-19 cm and 20 cm +.

~~ Sawmill residues includes residues which are produced from the processing of both domestically sourced and imported roundwood.

### Legend

Primary sources of wood supply

Secondary sources of wood supply

## Demand for wood energy

### Republic of Ireland

The SEAI<sup>18</sup> provided estimates of the expected demand for wood energy in 2020 and 2025. This uses the BioHeat model, a detailed techno-economic model of the bioenergy and heat sectors in the RoI. Table 8 shows the potential demand for wood energy in 2020 and 2025 under two scenarios:

#### *Conservative demand scenario for wood energy*

Under this scenario, renewable heat incentive tariffs and imported wood energy use a price at the higher end of the range. Imported wood energy is limited to a maximum heat output of 1.5 TWh/year. Moreover, there is no increase in co-firing above a ceiling of 235 GWh (Table 8)<sup>19</sup>.

#### *Optimistic demand scenario for wood energy*

This estimate assumed that a renewable heat scheme would be introduced which supports bioenergy use, and that there are unlimited amounts of woody biomass imports available at a price which is ca 20% lower than the conservative demand scenario.

Table 8: Estimated demand for wood energy in the Republic of Ireland by demand scenario (2020-2025).

Unit	2020				2025			
	Forest	Sawmill	Imports	Total	Forest	Sawmill	Imports	Total
<b>Conservative demand scenario<sup>20</sup></b>								
GWh	941	1,652	1,988	4,581	3,175	1,866	1,988	7,029
PJ	3.39	5.95	7.16	16.50	11.43	6.72	7.16	25.31
M m <sup>3</sup>	0.59	1.04	1.25	2.88	2.00	1.18	1.25	4.43
<b>Optimistic demand scenario<sup>21</sup></b>								
GWh	941	1,652	2,759	5,352	3,175	1,866	4,435	9,476
PJ	3.39	5.95	9.93	19.27	11.43	6.72	15.97	34.12
M m <sup>3</sup>	0.59	1.04	1.74	3.37	2.00	1.18	2.79	5.97

<sup>18</sup> www.seai.ie Refer to <https://www.dccae.gov.ie/documents/Economic%20analysis%20for%20the%20RHI%20in%20Ireland.pdf> and Applied Energy 213 (2018) 306–321 BioHEAT: A policy decision support tool in Ireland's bioenergy and heat sectors for most up to date and aligned estimates for the impact of the SSRH but too late to inform report

<sup>19</sup> Data source: www.seai.ie Refer to <https://www.dccae.gov.ie/documents/Economic%20analysis%20for%20the%20RHI%20in%20Ireland.pdf> and Applied Energy 213 (2018) 306–321 BioHEAT: A policy decision support tool in Ireland's bioenergy and heat sectors for most up to date and aligned estimates for the impact of the SSRH but too late to inform this report

<sup>20</sup> For both scenarios, cubic metres are expressed as roundwood equivalents (RWE).

<sup>21</sup> 1 PJ = 1,000,000 GJ.

## Northern Ireland

Wood energy demand in Northern Ireland for 2020 and 2025 (Table 9) was derived from a demand outlook for wood energy which was provided by Action Renewables. This was regarded as the optimistic scenario. The conservative demand scenario was derived by applying the same level of discount as in RoI.

Table 9: Estimated demand for wood energy in Northern Ireland by scenario type (2020-2025).

End use	Conservative demand for wood energy		Optimistic demand for wood energy	
	2020	2025	2020	2025
	PJ <sup>22</sup>			
Combined Heat and Power	2.43	2.54	2.84	3.19
Heat only	4.17	4.37	4.88	5.12
Co-firing	0	0	0	0
Total	6.60	6.91	7.72	8.31
Estimated demand in M m <sup>3</sup> (RWE)	1.16	1.21	1.35	1.45

<sup>22</sup> 1 PJ = 1,000,000 GJ.

## **Results**

### **Republic of Ireland**

#### **Sawmill demand and supply balance**

- The baseline for the supply/demand numbers is 2016, when 3.36 million m<sup>3</sup> of roundwood was harvested in the RoI, comprising 2.14 million m<sup>3</sup> of sawlog and stakewood and 0.96 million m<sup>3</sup> of pulpwood, with the balance being firewood/wood chipped in forest and commercial hardwood (COFORD Connects Woodflow, 2016).
- After netting of imports and exports, sawmill roundwood intake in 2016 was 2.14 million m<sup>3</sup>, comprising stakewood and sawlog (COFORD Connects Woodflow, 2016).
- Based on the demand survey, roundwood demand from sawmills (stakewood and sawlog) is predicted to grow rapidly, to 2.90 million m<sup>3</sup> per annum by 2020 and then to 3.41 million m<sup>3</sup> by 2025 (Table 11).
- Over the period 2020 to 2025, the forecasted net realisable volume (NRV) of sawlog and stakewood increases from 2.44 million m<sup>3</sup> in 2020 to 3.70 million m<sup>3</sup> in 2025 (Table 11).
- As a result, in 2020 there is an estimated roundwood supply deficit of 0.46 million m<sup>3</sup>. By 2025, this is estimated to switch to a surplus of 0.29 million m<sup>3</sup> (Table 11).

#### **Demand and supply of wood for wood-based panels in the Republic of Ireland**

- In 2016, the wood-based panel (WBP) sector used 1.40 million m<sup>3</sup> of wood for process use (COFORD Connects Woodflow, 2016).
- The supply of pulpwood and residues for process use by the WBP sector are estimated to be 1.78 million m<sup>3</sup> in 2020 and 1.92 million m<sup>3</sup> in 2025 (Table 12).
- Based on a demand survey, future demand for wood for WBP is predicted to grow to 1.78 million m<sup>3</sup> per annum by 2020 and then to 1.92 million m<sup>3</sup> in 2025 (Table 12).
- As a result, it is estimated that the demand for pulpwood and wood residues from the WBP sector will be met in full in 2020 and 2025 (Table 12).

## **Demand for wood energy in the Republic of Ireland**

In 2016, 1.58 million m<sup>3</sup> of wood energy was used in the RoI (COFORD Connects Woodflow, 2016). The estimated demand for wood energy use in 2020 and 2025 is based on two scenarios.

### *Conservative demand scenario*

- The conservative scenario predicts that the estimated demand for wood energy provision reaches 2.89 million m<sup>3</sup> in 2020 and 4.43 million m<sup>3</sup> by 2025 (Table 12).
- The forecasted supply of wood energy for energy from domestic sources increases from 1.49 million m<sup>3</sup> in 2020 to 2.18 million m<sup>3</sup> in 2025 (Table 12).
- As a result, there is an estimated supply deficit for wood energy of 1.40 million m<sup>3</sup> by 2020, increasing to 2.25 million m<sup>3</sup> by 2025 (Table 12).

### *Optimistic demand scenario*

- On the other hand when applying the optimistic demand scenario the prediction is that the estimated demand for wood energy reaches 3.37 million m<sup>3</sup> in 2020 and 5.97 million m<sup>3</sup> in 2025 (Table 12).
- The forecasted supply of wood energy (from domestic sources) increases from 1.49 million m<sup>3</sup> in 2020 to 2.18 million m<sup>3</sup> in 2025 (Table 12).
- As a result, there is an estimated supply deficit for wood-biomass of 1.88 million m<sup>3</sup> in 2020, increasing to an estimated deficit of 3.79 million m<sup>3</sup> in 2025 (Table 12).

## **Overall wood supply/demand position ROI**

Combining the supply/demand positions for the three sectors, from 2020 to 2025, the total wood supply shortfall in the RoI is estimated to be:

- Under the conservative demand scenario for wood energy, in 2020, the total supply deficit for all three sectors (sawmilling, WBP and wood energy) in the RoI is estimated to be 1.86 million m<sup>3</sup> increasing to a supply deficit of 1.96 million m<sup>3</sup> in 2025 (Table 13).
- Under the optimistic demand scenario for wood energy, the total supply deficit for all three sectors (i.e. sawmilling, WBP and wood energy) in 2020 in the RoI is estimated to be 2.34 million m<sup>3</sup> increasing to a supply deficit of 3.50 million m<sup>3</sup> in 2025 (Table 13).

## Northern Ireland

In 2016, 0.39 million m<sup>3</sup> of roundwood was harvested in NI (COFORD Connects Woodflow, 2016) comprising<sup>23</sup>:

- Firewood: 0.04 million m<sup>3</sup>; pulpwood: 0.03 million m<sup>3</sup>; stakewood: 0.07 million m<sup>3</sup> and sawlog: 0.25 million m<sup>3</sup>.

## Sawmill demand and supply balance in Northern Ireland

- In 2016, sawmills in NI processed 0.60 million m<sup>3</sup> of roundwood (i.e. stakewood and sawlog), 0.32 million m<sup>3</sup> of which was imported (COFORD Connects Woodflow, 2016).
- Based on the demand survey, roundwood demand from sawmills (i.e. stakewood and sawlog) is predicted to grow to 0.70 million m<sup>3</sup> in 2020 and to remain at a very similar level, 0.71 million m<sup>3</sup>, in 2025 (Table 11).
- Over the same period, the forecast supply of stakewood and sawlog in NI decreases marginally from 0.43 million m<sup>3</sup> in 2020 to 0.41 million m<sup>3</sup> in 2025 (Table 11).
- As a result, the supply deficit for sawmills in NI is estimated to be 0.27 million m<sup>3</sup> by 2020 increasing to an estimated deficit of 0.30 million m<sup>3</sup> in 2025 (Table 11).

## Demand for wood energy in Northern Ireland

In 2016, 0.27 million m<sup>3</sup> of wood was used by the wood energy sector in NI (COFORD Connects Woodflow, 2016).

- The conservative scenario shows that from 2020 to 2025, the estimated demand for wood energy in NI increases from 1.16 million m<sup>3</sup> to 1.21 million m<sup>3</sup> (Table 12)
- Over the same period, the forecast supply of wood energy (from domestic sources) remains relatively constant at 0.50 million m<sup>3</sup> for 2020 and 2025 (Table 12).
  - Comprising pulpwood<sup>24</sup>: 35,000 m<sup>3</sup>; firewood and roundwood chipped in forest for wood energy<sup>25</sup>: 104,000 to 107,000 m<sup>3</sup>; harvesting residues<sup>26</sup>: 22,000 m<sup>3</sup> and PCRW<sup>27</sup>: 60,000 m<sup>3</sup>, sawmill residues: 308,000 to 314,000 m<sup>3</sup> and willow/short rotation coppice: 5,000 m<sup>3</sup>.
- As a result, in 2020, the supply deficit for wood for the conservative scenario for wood energy demand in NI is estimated to be 0.65 million m<sup>3</sup> increased to an estimated supply deficit of 0.71 million m<sup>3</sup> in 2025.
- The optimistic scenario shows that from 2020 to 2025, the estimated demand for wood energy increases from 1.35 million m<sup>3</sup> to 1.45 million m<sup>3</sup> (Table 12).
- Over the same period, the forecast supply of wood energy (from domestic sources) remains relatively constant at 0.47 million m<sup>3</sup> in 2020 and 0.48 million m<sup>3</sup> in 2025.
- As a result, in 2020, the supply deficit for wood energy is estimated to be 0.85 million m<sup>3</sup> increasing to an estimated supply deficit of 0.95 million m<sup>3</sup> in 2025.

<sup>23</sup> Total may differ due to rounding.

<sup>24</sup> Data source: Northern Ireland Forest Service and Table 4, All Ireland Roundwood Production Forecast (2016-2035):

<http://www.coford.ie/media/coford/content/publications/2016/RoundwoodProductionForecast20162035100117.PDF>

<sup>25</sup> Data source: COFORD Connects Woodflow Series + expected growth in demand over the period 2015-2025:

<http://www.coford.ie/publications/cofordconnects/>

<sup>26</sup> <http://www.coford.ie/media/coford/content/publications/2016/RoundwoodProductionForecast20162035100117.PDF>

<sup>27</sup> <http://www.coford.ie/media/coford/content/publications/2016/RoundwoodProductionForecast20162035100117.PDF>

PDF

## **Overall wood supply/demand position Northern Ireland**

Combing the supply/demand positions for each of the three sectors, in 2020 and 2025, the total wood supply shortfall in NI is estimated to be:

- In 2020, under the conservative demand scenario for wood energy, the total supply deficit in NI is estimated to be 0.92 million m<sup>3</sup>, increasing to an estimated supply deficit of 1.00 million m<sup>3</sup> in 2025 (Table 13).
- In 2020, under the optimistic demand scenario for wood energy, the total supply deficit in NI is estimated to be 1.12 million m<sup>3</sup> increasing to an estimated supply deficit of 1.25 million m<sup>3</sup> in 2025 (Table 13).

## **All Ireland**

The estimated supply and demand for wood on the island of Ireland in the period 2020 and 2025 is outlined below:

- In 2016, 3.75 million m<sup>3</sup> of roundwood was harvested on the island, comprising 0.91 million m<sup>3</sup> pulpwood; 0.26 million m<sup>3</sup> stakewood and 2.16 million m<sup>3</sup> sawlog and 0.42 million m<sup>3</sup> firewood/roundwood chipped in forest (COFORD Connects Woodflow, 2016).

## **Sawmill demand and supply on the island of Ireland**

The estimated supply and demand for roundwood (i.e. stakewood and sawlog) for the sawmill sector for the period 2020-2025 (Table 11) is:

- In 2020 and 2025, the estimated demand for roundwood from the sawmill sector on the island of Ireland is 3.60 million m<sup>3</sup> to 4.12 million m<sup>3</sup>, respectively.
- The forecast supply of stakewood and sawlog increases from 2.87 million m<sup>3</sup> in 2020 to 4.11 million m<sup>3</sup> in 2025.
- As a result a supply deficit for sawmilling of 0.73 million m<sup>3</sup> is forecast for 2020, with supply and demand estimated to be almost in balance in 2025.

## **Wood-based panel demand and supply on the island of Ireland**

From 2020 to 2025, the estimated demand for wood from the WBP sector increases from 1.78 million m<sup>3</sup> to 1.92 million m<sup>3</sup>. In 2020 and 2025, the demand for wood for process use from the wood-based panel (WBP) sector is assumed to be met in full, with a balanced supply/demand position for both years (Table 12).

## **Demand for wood energy on the island of Ireland**

In 2016, 1.85 million m<sup>3</sup> of wood was used as a feedstock for wood energy on the island of Ireland (COFORD Connects Woodflow, 2016).

Using the conservative and optimistic demand outlooks for wood energy (Table 12) the following balances emerge:

- The conservative demand scenario shows an estimated supply deficit of 2.05 million m<sup>3</sup> in 2020, increasing to 2.95 million m<sup>3</sup> in 2025 (Table 12).
- The optimistic scenario shows an estimated supply deficit of 2.73 million m<sup>3</sup> in 2020, increasing to 4.74 million m<sup>3</sup> in 2025 (Table 12).

## **Overall wood supply/demand position ROI**

Based on the scenario chosen, the overall expected wood supply shortfall on the island of Ireland ranges from 2.78 million m<sup>3</sup> in 2020 to 4.75 million m<sup>3</sup> in 2025 (Table 10).

Table 10: Summary of the estimated supply-demand position for wood on the island of Ireland (2020-2025) by sector and by demand scenario for wood energy. (Negative numbers are where demand is greater than supply.)

Sector	Conservative demand for wood energy		Optimistic demand for wood energy	
	2020	2025	2020	2025
	M m <sup>3</sup>			
Sawmills	-0.73	-0.01	-0.73	-0.01
WBP	0.00	0.00	0.00	0.00
Wood energy	-2.05	-2.95	-2.73	-4.74
Overall supply-demand position	-2.78	-2.96	-3.46	-4.75 <sup>28</sup>

Detailed calculations and overviews of the estimated supply and demand balances for the sawmill, WBP and wood energy sectors are presented in Tables 11-13.

<sup>28</sup> Differs from the 4.74 M m<sup>3</sup> in Table 13 due to rounding.

Table 11: Estimated wood supply-demand for the sawmill sector in the RoI, NI and the island of Ireland in 2020 and 2025.

Item <sup>29</sup>	2020						2025											
	RoI			NI			All island total			RoI			NI			All island total		
	St <sup>30</sup>	S	Total	St	S	Total	St	S	Total	St	S	Total	St	S	Total	St	S	Total
	000 m <sup>3</sup> OB																	
<b>Estimated roundwood supply</b>																		
Sawlog		2,206	2,206		340	340		2,546		3,359	3,359		330	330		3,689		3,689
Stakewood	235		235	87		87	337	322		337		84		84		421		421
Total	235	2,206	2,441	87	340	427	337	2,868		3,359	3,696	84	330	414		4,110		4,110
<b>Estimated roundwood demand</b>																		
Large sawmills	210	2,419	2,629	141	529	670	246	3,299		2,830	3,076	143	537	680		3,756		3,756
Small sawmills	211	61	272	26		26	256	298		73	329	32		32		361		361
Total	421	2,480	2,901	167	529	696	502	3,597		2,903	3,405	175	537	712		4,117		4,117
<b>Estimated supply-demand position</b>	-186	-274	-460	-80	-189	--269	-165	--729		456	291	-91	-207	-298		-7		-7

<sup>29</sup> Demand is defined as the demand for wood for process and energy use by sawmills and WBP mills + the demand for wood energy.

<sup>30</sup> S: sawlog, St: stakewood

Table 12: Estimated supply/demand for WBP manufacture and wood energy use for RoI, NI and the island of Ireland in 2020 and 2025. (Shaded rows have been carried forward from Table 7.)

Item	2020			2025		
	RoI	NI	Total	RoI	NI	Total
	<b>000 m<sup>3</sup> OB</b>					
Estimated supply of roundwood for WBP and wood energy	1,478	107	1,585	1,922	104	2,026
Harvesting residues (tip-7 cm and clearfell residues)	98	22	120	259	21	280
Post consumer recovered wood	300	60	360	300	60	360
Sawmill residues <sup>31</sup>	1,366	308	1,674	1,601	314	1,915
Short rotation willow coppice	20	5	25	20	5	25
<b>(1) Estimated total wood supply for WBP and wood energy</b>	<b>3,262</b>	<b>502</b>	<b>3,764</b>	<b>4,102</b>	<b>504</b>	<b>4,606</b>
<b>WBP</b>						
<b>(2) Demand</b>	<b>1,775</b>		<b>1,775</b>	<b>1,920</b>		<b>1,920</b>
<b>Energy wood</b>						
<b>(3=(1-2)) Net wood energy supply (WBP demand is met in full)</b>	<b>1,487</b>	<b>502</b>	<b>1,989</b>	<b>2,182</b>	<b>504</b>	<b>2,686</b>
<i>Conservative demand scenario</i>						
<b>(4) Demand</b>	<b>2,886</b>	<b>1,156</b>	<b>4,042</b>	<b>4,428</b>	<b>1,209</b>	<b>5,637</b>
<b>(4-3) Estimated demand - supply shortfall</b>	<b>1,399</b>	<b>654</b>	<b>2,053</b>	<b>2,246</b>	<b>705</b>	<b>2,951</b>
<i>Optimistic demand scenario</i>						
<b>(5) Demand</b>	<b>3,371</b>	<b>1,350</b>	<b>4,721</b>	<b>5,969</b>	<b>1,454</b>	<b>7,423</b>
<b>(5-3) Estimated demand - supply shortfall</b>	<b>1,884</b>	<b>848</b>	<b>2,732</b>	<b>3,787</b>	<b>950</b>	<b>4,737</b>

<sup>31</sup> Estimated production of sawmill residues are calculated using the historic production of sawmill residues (COFORD Connects Woodflow Series) multiplied by the expected growth in the demand for roundwood from sawmills over the period 2016-2020 and 2016-2025.

Table 13: Estimated overall supply - demand position on the island of Ireland; with conservative and optimistic demand scenarios for wood energy for RoI, NI and the island of Ireland in 2020 and 2025. (Negative numbers are where demand exceeds supply.)

Item	2020										2025				
	RoI			NI			All island total	RoI			NI		All island total		
	P+S	S	Total	P+S	S	Total		P+S	S	Total	P+S	S		Total	
	000 m <sup>3</sup> OB														
<b>Conservative demand scenario for wood energy</b>															
Estimated sawmill supply - demand position	-186	-274	-460	-80	-189	-269	-729	-165	456	291	-91	-207	-298	-7	
Estimated WBP supply - demand position	0		0				0	0		0				0	
Estimated wood supply - demand position for wood energy	-1,399		-1,399	-654		-654	-2,053	-2,246		-2,246	-734		-734	-2,980	
Overall supply - demand position <sup>32</sup>	-1,585	-274	-1,859	-734	-189	-923	-2,782	-2,411	456	-1,955	-796	-207	-1,003	-2,958	
<b>Optimistic demand scenario for wood energy</b>															
Estimated sawmill supply - demand position	-186	-274	-460	-80	-189	-269	-729	-165	456	291	-91	-207	-298	-7	
Estimated WBP supply - demand position	0		0				0	0		0				0	
Estimated supply - demand position	-1,884		-1,884	-848		-848	-2,732	-3,787		-3,787	-950		-950	-4,737	
Overall supply - demand position	-2,070	-274	-2,344	-928	-189	-1,117	-3,461	-3,952	456	-3,496	-1,041	-207	-1,248	-4,744	

<sup>32</sup> Total supply position is defined as the supply – demand for wood from the sawmill, WBP and wood energy sectors.



## Discussion

The deficit in the supply of wood on the island of Ireland is likely to significantly increase over the period up to 2025.

For the sawmilling sector, there is a predicted shortfall in supply of 0.46 million m<sup>3</sup> in the RoI in 2020 and 0.28 in NI, or over 0.7 million m<sup>3</sup> at an all Ireland level. By 2025, the prediction is that supply and demand will be more or less in equilibrium in this sector, based on the assumption of a maturing private forest estate providing increasing volumes of sawlog-sized material to the market, as outlined in the *All Ireland Roundwood Production Forecast 2016-2035*. However, bringing the forecasted sawlog production to market from the private sector in the RoI will be challenging. This requires continued and concerted action across government departments, agencies and companies, the maintenance of open markets and the enabling of the private sector and a commitment by local authorities in relation to the ongoing maintenance of the county road infrastructure.

On pricing the potential negative impacts of Brexit on the UK sawn timber market will require continued marketing investment and close scrutiny by the sector and by state bodies.

Against the backdrop of an increasing overall wood supply deficit, it is important that there is a balanced development of the island's timber resource to best meet the needs of both the wood processing and energy sectors. In particular, mobilising private sector supply is the key challenge if the forecasted increased demand for the sawmilling, WBP and wood energy sectors is to be met in the period up to 2025. This is because the increase in harvest is forecast to come almost exclusively from the private sector in the RoI (Phillips et al. 2016). There is good evidence based on harvest against forecast for the period 2011-2015 that the private sector has responded to increasing levels of roundwood demand. In addition, there are a number of private sector entities in the market place procuring and supplying roundwood for a range of end uses. Public sector involvement in mobilising wood from the private sector in the RoI is also to be welcomed. However, this needs to be carefully thought out, so as to ensure that there is space for the private sector to grow and develop.

In these contexts, the COFORD Wood Mobilisation and Production Forecasting Group has carried out an in depth analysis of the progress on the recommendations in the 2015 COFORD Report *Mobilising Ireland's Forest Resource* (COFORD Wood Mobilisation Group 2015). Over the past 3 years, much progress has been made in implementing the recommendations contained in this report, including:

- the implementation of recommendations on providing information to forest owners on felling age and related areas, including the specially commissioned Forest Service Felling Decision Tool<sup>33</sup>;
- the roundwood forecast covering the period 2016-2035 (Phillips et al. 2016);
- the new Forest Service online spatial forecast tool<sup>34</sup> and
- the availability in the public domain of wood price information through the Wood Price Quarterly<sup>35</sup> of the Irish Timber Growers Association (ITGA).

The Group has also noted the work of Teagasc in providing advice to growers regarding thinning, and the highly successful *Talking Timber*<sup>36</sup> events, which bring together growers and those buying roundwood.

<sup>33</sup> (<http://www.agriculture.gov.ie/forests/forests-service/forests-service-general-information/forests-statistics-and-mapping/felling-decision-tool/>)

<sup>34</sup> <http://www.agriculture.gov.ie/roundwood-production-forecasts-system/>)

<sup>35</sup> <http://www.itga.ie/public/WPQ-public.asp>

<sup>36</sup> <https://www.teagasc.ie/crops/forestry/news/2016/talking-timber-event-in-tralee-co-kerry.php>

However, significant challenges remain to mobilisation of the private resource, including the need to implement the Single Consent System for forest road entrances, the lack of which is believed by the sector to be having a serious impact on the mobilisation of timber from grant-aided plantations.

There is also the need for Local Authorities to invest in the local road network to facilitate wood transport to the end user.

These issues are treated in depth in the accompanying report *Mobilising Irelands Forest Resource, Meeting the challenges* published in 2018.

The wood-based panel sector and the provision of biomass for energy have been treated separately in the report on the assumption that Coillte will supply its panel-board mills with pulpwood before satisfying any external wood-based biomass demand for energy purposes. A further assumption is that the panel-board mills will be able to secure demand over and above the Coillte supply from the market, as is currently the case. The largest and most uncertain element of the supply demand dynamic is wood-based biomass for energy provision. Increases in demand are likely to be driven largely by policies and measures such as the Support Scheme for Renewable Heat and any changes to CHP supports. Oil and fossil fuel prices could also be an important driver, but they are of course highly volatile and uncertain. The UK BEIS 2016 FOSSIL FUEL PRICE ASSUMPTIONS foresees rising oil and gas prices over the period from 2016 to 2025. For oil, these increases are in the region of 40-50%. Such rises if they occur and if they are sustained are also likely to influence fuel use and decision making regarding investments in energy projects.

At a national level, the policy drivers on the renewables side are the National Mitigation Plan<sup>37</sup> and the EU renewable energy targets, and in particular the 12% target for renewable heat provision by 2020. (The current level of use is just over 7% and given the lead in time that target will not now be met).

On the biomass supply side, the key issues from the forest sector are to mobilise up to and beyond the supply estimates forecasted. Recent research undertaken on behalf of COFORD has shown that there is the potential to significantly increase the volume of forest-based biomass, which can be harvested from Irish forests. The COFORD report (Kent et al. 2011) estimates that there is the potential to recover 190% more biomass from first thinnings using whole-tree harvesting systems (including the harvesting of tree tops and small branches) than is currently harvested from traditional shortwood harvesting methods. Moreover, a significant advantage of the whole-tree approach is that it can produce woodchip at the forest site at prices ranging from €2.22-€4.36/GJ. These compare favourably with the price of €5.65-€8.64/GJ for shortwood harvesting combined with roadside chipping (2011 prices - Kent et al. 2011). More recent work, which has been carried out as part of the SIMWOOD project by Veon supports the conclusions from Kent et al. The research undertaken by Veon shows that there is a greater return to the grower when using Integrated Harvesting that involves recovery of tops and branches in addition to pulpwood. However, the recovery of biomass should only be undertaken on suitable sites where their removal does not lead to soil damage or nutrient deficiency (Ardao Rivera, 2017).

The adoption of integrated harvesting in conifers requires end users of scale of 30,000 m<sup>3</sup> solid volume per year. This matches the scale of demand for industrial-scale heat users and biomass CHP. This level of demand (for wood chipped in forest) scarcely exists in the Irish market. However, the advent of the Support Scheme for Renewable Heat and additional biomass-based CHP demand in the ROI may provide a sufficient level of demand to justify such investment.

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<sup>37</sup> <https://static.rasset.ie/documents/news/national-mitigation-plan.pdf>

Hence, and allied to the overall conservative nature of the roundwood production forecast there is the potential to cost effectively increase biomass harvest levels from Irish forests, and thereby to provide for a greater security of supply. However, even allowing for domestic harvest to significantly increase, it is likely that significant level of wood imports will be required over the period up to 2025 and beyond. The source and size of wood energy imports was outside the scope of this report.

Greater use of indigenous biomass will not only contribute to the achievement of renewable heat targets<sup>38</sup> but will also result in positive macroeconomic impacts and net employment in Ireland<sup>39</sup>. The benefits are maximised where more biomass is sourced locally, creating additional jobs in the forestry and agricultural sector via local sourcing of biomass. It is estimated that this could increase employment in rural Ireland by 5,500 jobs in 2020<sup>40</sup>.

It should also be noted that the potential impact of the European Commission's proposed new Directive on the promotion of the use of energy from renewable sources may reduce the availability of biomass imports and place greater pressure on the level of indigenous wood-biomass supply. But nevertheless substantial import volumes of imports will be required and group has not investigated - supplies etc.

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<sup>38</sup> [https://www.seai.ie/Publications/Statistics\\_Publications/Energy\\_Modelling\\_Group\\_Publications/Ireland%E2%80%99s-Energy-Targets-Progress-Ambition-and-Impacts.pdf](https://www.seai.ie/Publications/Statistics_Publications/Energy_Modelling_Group_Publications/Ireland%E2%80%99s-Energy-Targets-Progress-Ambition-and-Impacts.pdf)

<sup>39</sup> [http://www.seai.ie/Publications/Energy\\_Policy\\_Publications/Energy\\_Modelling\\_Group\\_Publications/A-Macroeconomic-Analysis-of-Bioenergy-Use-to-2020.75012.shortcut.pdf](http://www.seai.ie/Publications/Energy_Policy_Publications/Energy_Modelling_Group_Publications/A-Macroeconomic-Analysis-of-Bioenergy-Use-to-2020.75012.shortcut.pdf)

<sup>40</sup> [http://www.seai.ie/Publications/Energy\\_Policy\\_Publications/Energy\\_Modelling\\_Group\\_Publications/A-Macroeconomic-Analysis-of-Bioenergy-Use-to-2020.75012.shortcut.pdf](http://www.seai.ie/Publications/Energy_Policy_Publications/Energy_Modelling_Group_Publications/A-Macroeconomic-Analysis-of-Bioenergy-Use-to-2020.75012.shortcut.pdf)

## Conclusions

### Supply/demand wood balances for sawlog and stakes, wood-based panels, and wood energy

#### 1. Sawlog and stakes

According to the 2016 COFORD Connects Woodflow, 2.75 million m<sup>3</sup> of roundwood (i.e. stakewood and sawlog) was processed by the sawmill sector on the island of Ireland in 2016<sup>41</sup>.

Estimated roundwood demand from the sawmill sector is forecast to increase to 3.60 million m<sup>3</sup> in 2020 and to 4.12 million m<sup>3</sup> by 2025. Over the same period, the estimated supply of sawlog and stakewood is forecast to increase to 2.90 million m<sup>3</sup> in 2020 and to 4.11 million m<sup>3</sup> in 2025. As a result, a supply deficit for sawmill roundwood of some 0.73 million m<sup>3</sup> is forecast for 2020, by 2025, supply and demand for sawmill roundwood use are estimated to be largely in balance. This is largely due to the forecasted growth in roundwood supply from the private forest sector in the Republic of Ireland.

#### 2. Wood-based panels

The COFORD Connects Woodflow estimates that in 2016 that wood-based panel (WBP) manufacturing on the island of Ireland utilised 1.40 million m<sup>3</sup> of wood for process use. The estimated demand for wood for process use by WBPs increases to 1.78 million m<sup>3</sup> in 2020 and to 1.92 million m<sup>3</sup> in 2025. It is assumed that the demand for wood for process use by the WBP sector will be met in full by indigenous supply.

#### 3. Wood energy

The COFORD Connects Woodflow estimates that in 2016 that 1.89 million m<sup>3</sup> of wood was used as a feedstock for heat and power generation on the island of Ireland. Conservative and optimistic demand scenarios are presented for wood energy demand. Using the conservative demand scenario, the demand for wood energy is estimated to be 4.04 million m<sup>3</sup> in 2020, rising to 5.64 million m<sup>3</sup> in 2025. Under the optimistic scenario, the estimated demand for wood energy is 4.72 million m<sup>3</sup> in 2020, increasing to 7.42 million m<sup>3</sup> in 2025. Forecasted wood energy supply in 2020 and 2025 is estimated to be 1.99 million m<sup>3</sup> and 2.69 million m<sup>3</sup>. Under the conservative demand scenario, this results in an estimated supply deficit of 2.05 million m<sup>3</sup> in 2020 increasing to an estimated supply deficit of 2.95 million m<sup>3</sup> by 2025. The corresponding figures under the optimistic demand scenario are 2.73 million m<sup>3</sup> in 2020, increasing to 4.74 million m<sup>3</sup> by 2025.

There are number of critical issues at play in the wood energy supply/demand area. First, from a security of supply perspective and from the macro economic impact, there is good evidence that the policy concentration should be on meeting wood energy demand, as far as economically feasible, from indigenous supply. There is also evidence to show that the intensity of harvest can be sustainably increased well above forecasted levels by the use of integrated harvesting systems that recover proportionately more biomass. Such levels of intensity of harvesting have also been shown to provide biomass at considerably lower cost. However, despite these policy drivers, it is also very likely that satisfying demand will entail a substantial increase in wood energy imports, the source and amount of which are beyond the scope of this report.

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<sup>41</sup> Includes imported roundwood.

## Wider issues arising in the wood supply/demand context<sup>42</sup>

### 4. **Addressing sawmill, WBP and wood energy demands are contingent on infrastructure investment and addressing barriers to wood movement**

The prediction that by and large growth in sawmill and wood-based panel demand can be met on the island of Ireland by 2025 is based on an increase in state investment in forest and country roads, as well as a continued and sharp focus on the reduction and elimination of other barriers to wood mobilisation as identified in the 2015 COFORD Mobilisation report and the accompanying review report *Mobilising Irelands Forest Resource, Meeting the challenges*.

### 5. **Potential synergies in wood product assortment supply/demand**

Rather than seeing pulpwood and wood energy demand as competing for the same material and possibly for sawlog, the view is that these uses can be complementary. Early thinning will bring forward sawlog sized material in a shorter period of time, and will improve returns to growers and to the State. However, the level of any renewable energy supports should be set at a level sufficient to stimulate harvest and early thinning, and not at a level that would lead to widespread diversion of wood from board manufacture.

### 6. **Brexit**

Finally, the implications of Brexit on wood-based panel and sawnwood demand, both of which are mostly export-led, could be serious.

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<sup>42</sup> Includes imported roundwood.

## Appendix 1

### Energy demand conversions to roundwood and basic density

#### 1.1 What is the energy content of wood?

The energy content of wood depends mainly on the moisture content (MC). Bone-dry wood of any species has about the same calorific value of ca 19 GJ/oven dry tonne. The following formula is used to calculate the actual calorific value of wood<sup>43</sup>:

$$y \text{ GJ/tonne} = 19.2 - (0.2164 * x \text{ MC}) \quad (1)$$

Note: MC is the moisture content in percent of total weight.

#### 1.2 Energy to roundwood conversions

The moisture content was assumed to be 58.6% on wet weight basis, using data provided by Coillte.

Substituting the moisture content into equation (1)

gives 6.52 GJ/tonne.

Each tonne at 58.6% moisture content is equivalent to<sup>44</sup> 1.14 m<sup>3</sup>. Therefore the energy content of a cubic metre was taken as 6.52/1.14 =5.72 GJ/ m<sup>3</sup>.

#### 1.3 Basic density

The basic density of Sitka spruce<sup>45</sup> was taken as 0.363 kg/m<sup>3</sup> based on the wood properties database held at NUIG Galway.

<sup>43</sup> <http://www.woodenergy.ie/frequentlyaskedquestions/> .

<sup>44</sup> Based on an analysis of conversion factors undertaken by Coillte over the period 2012-2016 inclusive.

<sup>45</sup> <http://www.nuigalway.ie/our-research/people/engineering-and-informatics/annetteharte/>

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