

Wood fibre availability and demand in Britain 2007 to 2025

Prepared For

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ConFor
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UKFPA
UK Forest Products Association

**WOOD
PANEL
INDUSTRIES
FEDERATION**



Foreword »

For many years a clear message has been broadcast from the UK forestry sector to politicians and to the wider public that production from Britain's forests is increasing. Potential production is indeed set to increase, however the information behind the 'headlines' has to be carefully considered and understood, so that the subject of future availability and production can be put into context given the rapidly changing dynamics in the demand for timber products and the finite resource available.

In recent decades there has been a significant expansion of wood processing capacity in the UK, encompassing the production of sawn timber, wood based panel products and paper products. At the same time, there has been the development of the recovered wood supply chain, with the wood panel sector being a major consumer, alongside other markets for wood fibre of this type. More recently, the wood energy market has emerged. Significant volumes of British grown timber and recovered wood are being used for heat and/or power purposes and there is increasing interest in far greater utilisation of wood fibre, in various forms, sourced from the UK and overseas, by large scale electricity generation plants.

This report provides a picture of wood fibre supply and demand in Great Britain for the next 15 years. The development and expansion of the wood fuel market and its potential demand during this period, especially from large scale energy and/or heat and power plants, could have a very significant impact on existing wood supply and utilisation patterns and the future of existing domestic timber processors.

Production forecasts show that coniferous roundwood production in Britain is expected to increase until about 2020, with peak production of about 11.45 million tonnes per annum; thereafter production declines. Other types of wood fibre are also available in Britain, though their availability, as defined in the report, is similarly forecast to peak around 2019, giving a combined total of just over 20 million tonnes per annum, and thereafter declining.

It is vitally important that current and potential future users of British grown wood and other wood fibre available in Great Britain, including recovered wood, fully understand that wood fibre supply and demand is currently very finely balanced overall and that the projections outlined in this report show that in some sectors, supply and demand may already be, or is anticipated to become, unbalanced in the relatively short term.

If new large users of British grown wood and other wood fibre enter the marketplace, supported by subsidy, then it can only be at the expense of existing users, impacting negatively

and disproportionately on sustainability, employment, carbon sequestration, and mitigation of climate change. It is of considerable importance to society that the economic, social and environmental benefits provided by our sustainably managed forests are maximised.

This independent report provides a valuable insight into the availability of a range of wood fibre types and the supply and demand balance in Great Britain during the period 2010 to 2025. It will be of value to both current and potential users of British grown timber and other types of wood fibre in Great Britain and should provide policy makers and legislators with a clear understanding of the dynamics, threats and opportunities that exist within the UK forestry sector.

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Units

The moisture content of wood fibre in the form of logs, forest residues, SRC and recovered wood can vary quite widely due to a range of factors that include where and how long the material is stored, the time of year and on whether the wood fibre is in the form of logs, recovered wood or wood pellets. All tonnes used in this report are on an “as received by customer” basis. The alternative would have been to express all quantities on an oven dry basis or in Megawatts (MW), after assuming various conversion factors. While technically more correct, the report may have been less easy to understand for many people.

Conversion factors

Coniferous Roundwood: 1 cu m over bark standing = 0.82 tonne on an “as received basis”

Coniferous Log Volume: 1 cu m = 1 tonne “as received”

Abbreviations

BIS: Department of Business, Innovation & Skills

Cu m: cubic metres

DECC: Department of Energy & Climate Change

Defra: Department for Environment, Food & Rural affairs

FC: Forestry Commission

FI: Forest Industry

o.b.: Over bark

MW: Megawatt

MWh: Megawatt Hour

Ofgem: Office of the Gas and Electricity Markets

ROC: Renewable Obligation Certificate

SEPA: Scottish Environmental Protection Agency

SRC: Short rotation coppice

SRF: Short Rotation Forestry

SRW: Small Roundwood. Logs with a top diameter up to 16cms

t.d.: Top diameter

WID: Waste Incineration Directive

WRA: Wood Recyclers Association

Summary

Demand for wood fibre is forecast to increase dramatically in Britain in the next 15 years. The principal reasons behind this rise are Government policies and incentives which encourage the use of wood as a source of renewable energy. Resulting imbalances between potential availability and forecast demand are projected across the major wood fibre sources in Britain. Such developments could result in significant supply and price pressures which would have major consequences for existing wood processing industries and for the future shape of the biomass energy sector in Britain.

This study into the potential availability and demand for wood fibre in Britain was commissioned by The Confederation of Forest Industries (ConFor), the UK Forest Products Association (UKFPA) and the Wood Panel Industries Federation (WPIF) and has been funded by 20 leading companies involved in wood utilisation and woodland management in Britain.

The need for the assessment has arisen primarily because the forest products industry has plans to continue to develop and because there have also been an increasing number of announcements from companies indicating their interest in building more wood fibre fired energy plants in Britain that range in size from small up to 400MW. The plans for developing wood energy plants appear to be largely in response to Government financial incentives (Renewable Obligation Certificates) that are designed to encourage a move to generating more of Britain's energy from renewable sources because of concerns about climate change. The purpose of this study is to provide both the forest and wood energy industries with a comprehensive and up to date assessment of the types and quantities of wood fibre that are potentially available and the scale of the potential demand from both industries over the next 15 years.

The information in this report covers the activities of 93 companies covering 139 existing or proposed plants who have declared an interest either officially, or unofficially, in using or supplying wood fibre in Britain. There are 33 companies that are operating, or have plans to operate, 63 wood energy plants and of these 16 larger scale commercial wood energy plants are operating at the present time. The overall survey response rate was 87% (93% in the forest sector and 79% in the wood energy sector). Where companies have not supplied information directly, estimates of wood fibre requirements have been made by industry sources or by using publicly announced information to bring the coverage up to 100%. There are at least 5 other larger scale wood energy proposals that we are aware of, but the companies concerned did not wish to provide further information about them and no allowance has been made for them in the results presented in this report. This would suggest that the potential demand for wood fibre may be potentially greater than the findings have indicated and no allowance has been made for the relatively small demand at present for wood fibre for heating domestic or small scale industrial buildings in Britain. Demand for the latter uses could grow significantly depending on the incentives offer under the government's proposed Renewable Heat Incentive

(RHI) which is now out for consultation. If implemented, the RHI will provide an incentive payment (tariff) for a range of renewable heating technologies (including wood-fired systems) to support renewable heating at all scales, including households, businesses, offices, public sector buildings and industrial processes in large factories. The RHI is intended to be launched in April 2011 and the government have committed that it will remain open for new projects until at least 2020. This could put further pressure on the potential availability of wood fibre in Britain and no allowance has been made for this in the findings in this report.

The potential availability and demand for wood fibre in Britain is shaped by past and present policies, strategies and incentives initiated by a number of Government departments and organisations. No one department has overall responsibility for the availability and use of wood fibre in Britain.

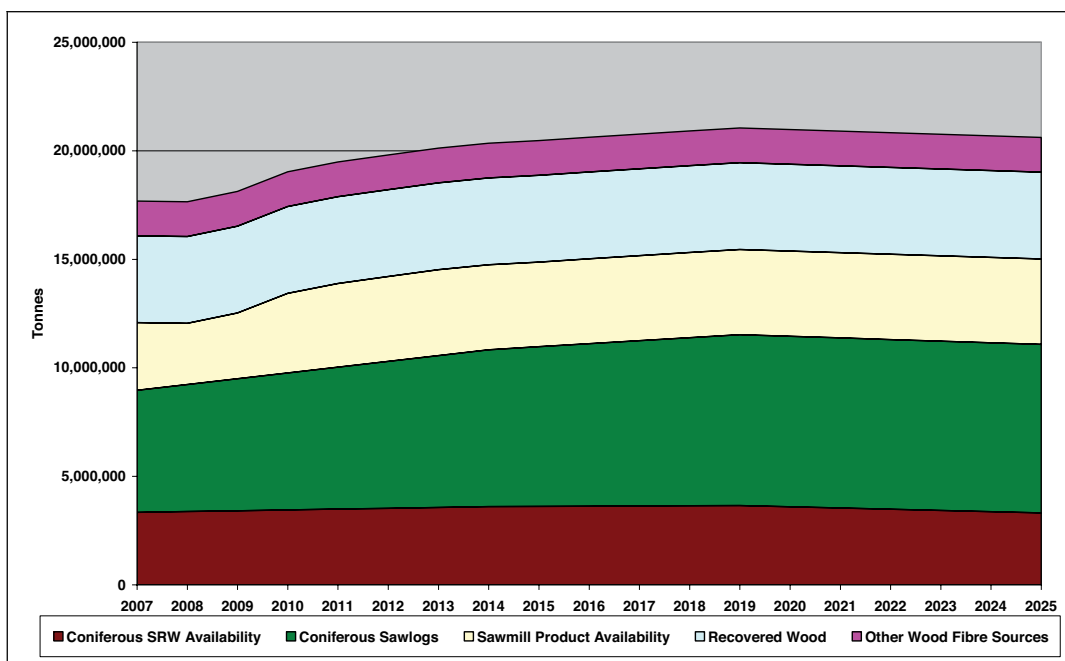
The key issue that is expected to influence how the wood processing and wood energy industries develop in practice is the availability of longer term (7 to 10 years) wood fibre supply contracts. This will be particularly important for companies planning to build new wood energy plants as they are likely to need these to secure the funding to build the plant.

Forecast potential wood fibre availability

The biological availability of British sourced wood fibre is forecast to increase up to about 2019 when it reaches just over 20 million tonnes per annum and then it is forecast to start decreasing.

The forecast potential availability of wood fibre sourced in Britain is shown in Chart A.

Chart A: Forecast Potential Availability of British Sourced Wood Fibre 2007 – 2025



Potential availability of British sourced wood fibre is forecast to increase up to about 2019 when it reaches almost 20 million tonnes per annum and then it is forecast to start decreasing. Coniferous roundwood is the largest potential source of wood fibre and of this total sawlogs make up the largest proportion. The average quantity of coniferous SRW (logs of 7 – 16 cms t.d.) potentially available annually is forecast to remain fairly constant up to 2020 and then it is forecast to start decreasing. The potential annual average availability of coniferous sawlogs (logs > 16 cms t.d.) is forecast to rise over the next 10 years but then it too is forecast to start declining. These estimates of potential availability are of the quantities that are potentially available biologically and take no account of any cost, technical or planning constraints, or of the management objectives of private woodland owners. Actual potential commercial production of coniferous roundwood may therefore be

significantly less than the SRW and sawlog potential availability figures shown in chart A.

The potential annual availability of sawmill products in the forms of chips, slabs, sawdust and bark mirrors the potential annual availability of sawlogs as would be expected and represents on average some 40% of the quantity of sawlogs potentially available.

Based on the most recent estimate by WRAP the quantities of recovered wood fibre have been assumed to remain constant at 4 million tonnes per annum after making a deduction for recovered wood that is heavily contaminated and needs to be disposed of under special conditions. The quantities of recovered wood that could be potentially available could increase slightly as the economy grows and as greater use is made of wood and wood products because they are renewable natural products.

The quantities of 'Other Wood Fibre Sources' that are shown in chart A as being potentially available comprise 50,000 tonnes per annum of broadleaved wood fibre, 1 million tonnes per annum of short rotation coppice (SRC), 300,000 tonnes per annum of coniferous forest residues, and 200,000 tonnes per annum of arboricultural arisings. There are significantly more quantities of broadleaved wood fibre, arboricultural arisings and SRC potentially available, but at present these wood fibre sources have no well established supply chains that allow them to be considered as being potentially available for long term commercial wood fuel supply contracts for securing the necessary funding for new commercial wood energy plants. Supply chains for these three other wood fibre sources may develop further over time and could potentially provide up to about 4 million tonnes per annum of wood fibre.

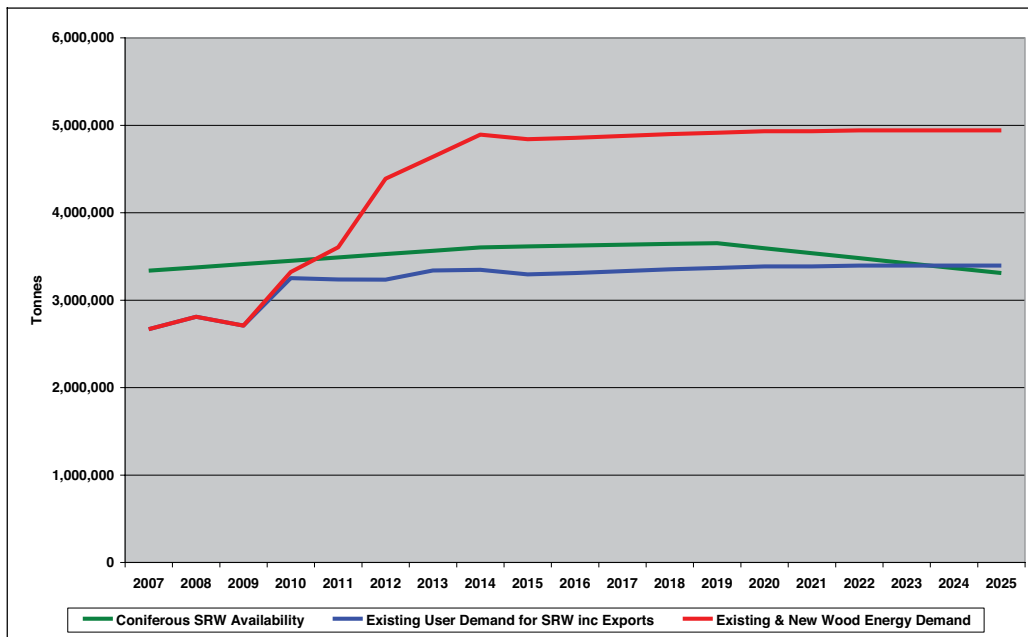
Wood fibre potential availability & demand balances

Total potential availability of wood fibre is forecast to exceed potential demand up to 2012 at which point demand will start exceeding potential availability as it is forecast to more than double to 50 million tonnes per annum in the following 5 years up to 2017. Most of the additional demand is forecast to be for wood energy. Additional demand for wood fibre, including recovered wood, for wood energy generation alone could rise to 27 million tonnes per annum based on current and known proposals. While much of this demand may be met by imports, up to 2.7 million tonnes per annum could be sourced from Britain. This could result in displacing wood resources away from existing processing industries unless demand can be met from other biomass sources.

Coniferous Roundwood

The potential availability and demand balance for coniferous small roundwood (SRW) is shown in chart B.

Chart B: Coniferous SRW Potential Availability & Demand Balance in Britain 2007 – 2025

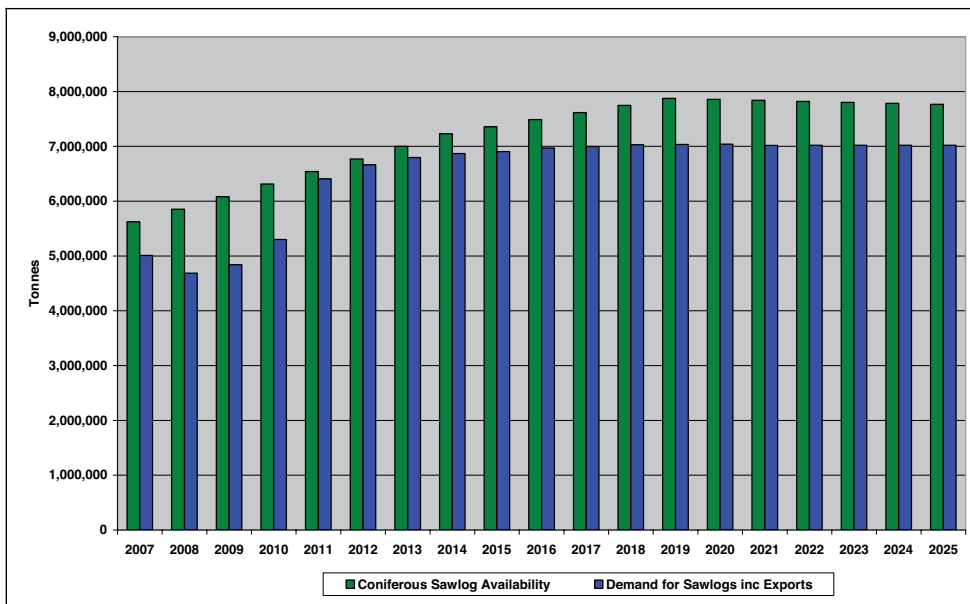


The chart shows that the potential annual availability of coniferous SRW (7 - 16 cm t.d.) just exceeds the forecast demand from existing users in Britain up to about 2024, but at that point potential availability is forecast to start falling so annual demand from existing users will exceed availability. Existing users include companies that export just under 0.5 million tonnes per annum of SRW. There are already indications that with new wood energy developments being implemented, potential demand for coniferous SRW will exceed its

potential availability this year. Demand will continue to increase until about 2020 and at that point demand may potentially be 1.7 million tonnes per annum in excess of potential annual availability of coniferous SRW in Britain. Even if all coniferous SRW exports cease over this period, demand would still be over 1 million tonnes per annum in excess of potential annual availability.

The situation for coniferous sawlogs over the period to 2015 is shown in chart C.

Chart C: Coniferous Sawlog Potential Availability & Demand Balance in Britain 2007 – 2025



The chart shows that the annual demand for sawlogs (16 cm + t.d.) fell in 2008 and 2009 reflecting the difficulties with the economy and the reduced activity in the building and construction industries, but demand is forecast to rise strongly before settling at about 7 million tonnes per annum. Potential availability

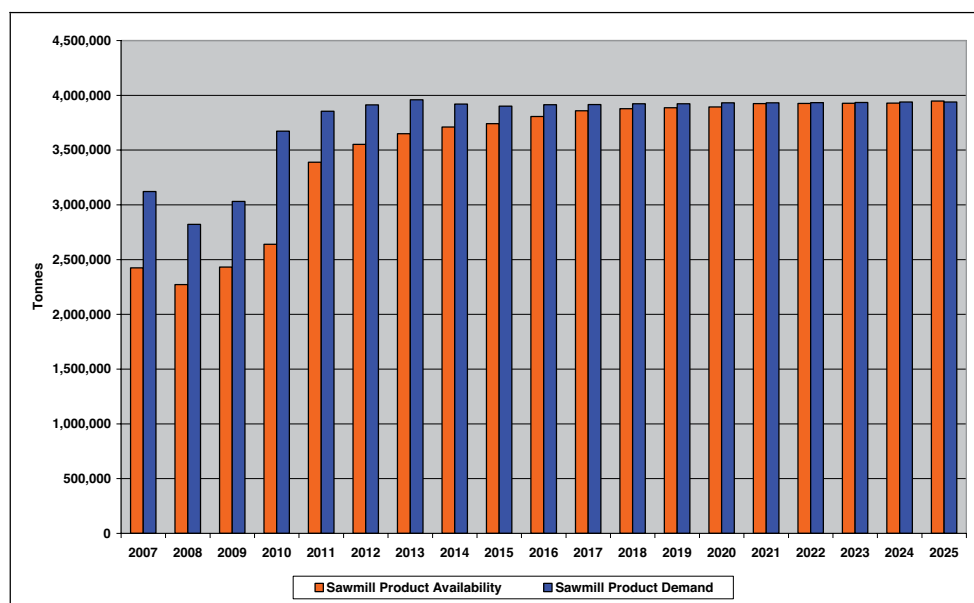
of sawlogs is forecast to remain just above demand, allowing for exports of sawlogs to Ireland, although the margin between the two is not large.

The excess annual demand for SRW over potential availability if all the planned new

wood energy developments proceed (chart B) could potentially be satisfied by purchasing sawlogs. That would have a potentially serious consequential displacement impact of depriving the sawmilling industry of raw materials.

Sawmill Products

The potential availability and demand balance for coniferous sawmill products comprising chips, slab wood, sawdust and bark is shown in chart D.

Chart D: Coniferous Sawmill Products Potential Availability & Demand Balance in Britain 2007 – 2025

The potential demand for coniferous sawmill products has been, and is expected to continue to exceed their potential availability. The reason for this present difference is not clear but it may be because companies would like to use more sawmill products than they are presently doing, but lack of availability at a competitive price is preventing them doing this. Some users may also have a degree of flexibility in their wood fibre requirements and are using other wood fibre sources to plug the gap.

There will be an increase in demand for coniferous sawmill products from 2010 if all the proposed wood energy plants proceed and this is included in demand figures in the chart, but this will only add about 170,000 tonnes per annum to the overall demand. The gap between potential availability and demand for sawmill products can be expected to close slightly over time as the sawmilling industry expands through increasing its share of the UK market for sawn timber, but there is no doubt that the market

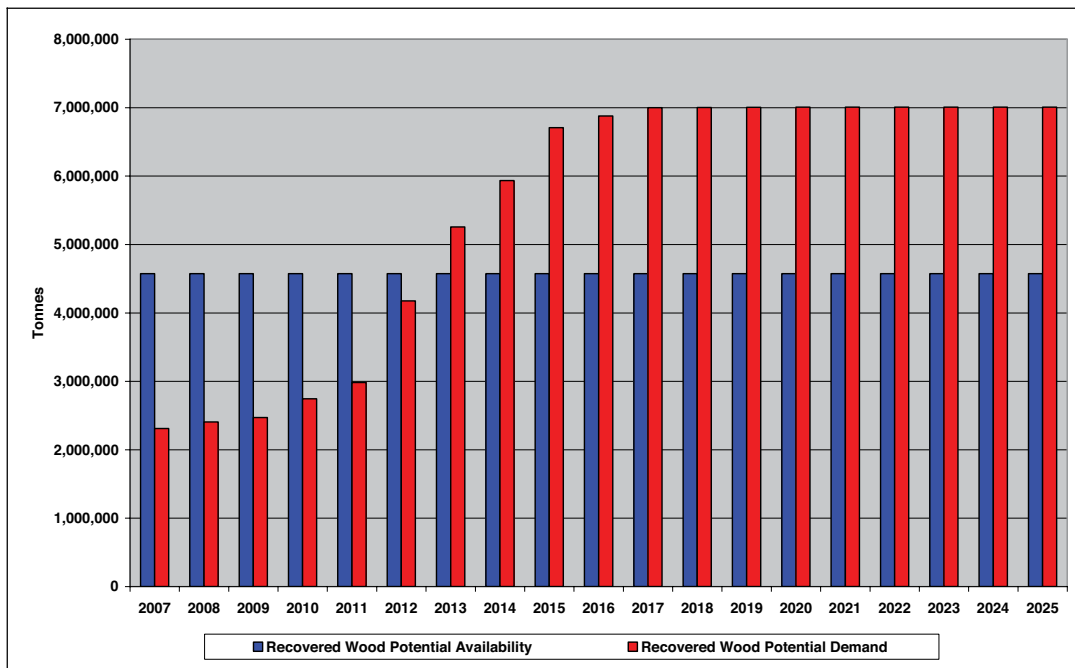
for sawmill products is already very tight and is likely to remain that way. Any new proposals for using coniferous sawmill products as a fuel for wood energy plants not included in this study, or for increased use of coniferous sawmill products by existing wood processing or wood energy plants, will only result in demand further exceeding potential annual availability.

Coniferous Forest Residues

The harvesting of coniferous forest residues is likely to increase significantly over the next five years. The total amount could reach about 300,000 tonnes per annum by 2014 which will be a useful new potential additional source of wood fibre for wood energy plants, but the potential of sites to provide further wood fibre for wood energy from brash and stumps will be limited in practice by environmental constraints such as ground damage, soil carbon loss, loss of soil fertility and acidification.

Recovered Wood

The potential availability and demand for recovered wood in Britain is shown in chart E and the potential availability is the latest estimate made by WRAP in 2009.

Chart E: Potential Availability & Demand Balance for Recovered Wood in Britain 2007 – 2025

The demand for recovered wood has been increasing sharply. This trend will continue if all the new wood energy plants being planned become operational, and by 2013 potential annual demand will exceed potential availability, even assuming that none is used for co-firing. By 2017 potential demand for recovered wood at 7 million tonnes per annum is forecast to be almost 36% above potential availability of 4.5 million tonnes per annum.

Short Rotation Coppice

Some existing energy plants have indicated that they will take SRC material if it is available e.g. E.ON at Lockerbie, Wilton 10 and Drax. None of the existing or planned energy plants with generating capacity of 5MW or more included in this survey are expecting to depend on SRC crops as a base load fuel source over the next 15 years.

Arboricultural Arisings

As a result of the increased demand for wood fibre for generating energy, companies are expecting to increase their use of arboricultural arisings from their present level of just over 120,000 tonnes per annum to slightly less than 180,000 tonnes annually in 2009 and continue at that level before dropping back down again to present levels in 2016. This is a potentially significant additional source of wood fibre for some energy plants, but arboricultural arisings supply chains tend to be costly and complex because of the need to aggregate small quantities of material from a wide range of geographically dispersed sites.

Broadleaved Woodlands

Only two of the planned larger wood energy plants in England have made specific provision to use broadleaved wood fibre as one of their main potential fibre sources, but others have indicated that they might take the material if it was available. At this stage the projected quantity is about 50,000 tonnes per annum. This is significantly below the quantity of broadleaved wood fibre that is potentially available, but there are few larger scale commercial supply chains in place now because of the absence of large scale hardwood processing plants in England, although these could potentially be developed again quite quickly under suitably attractive market conditions.

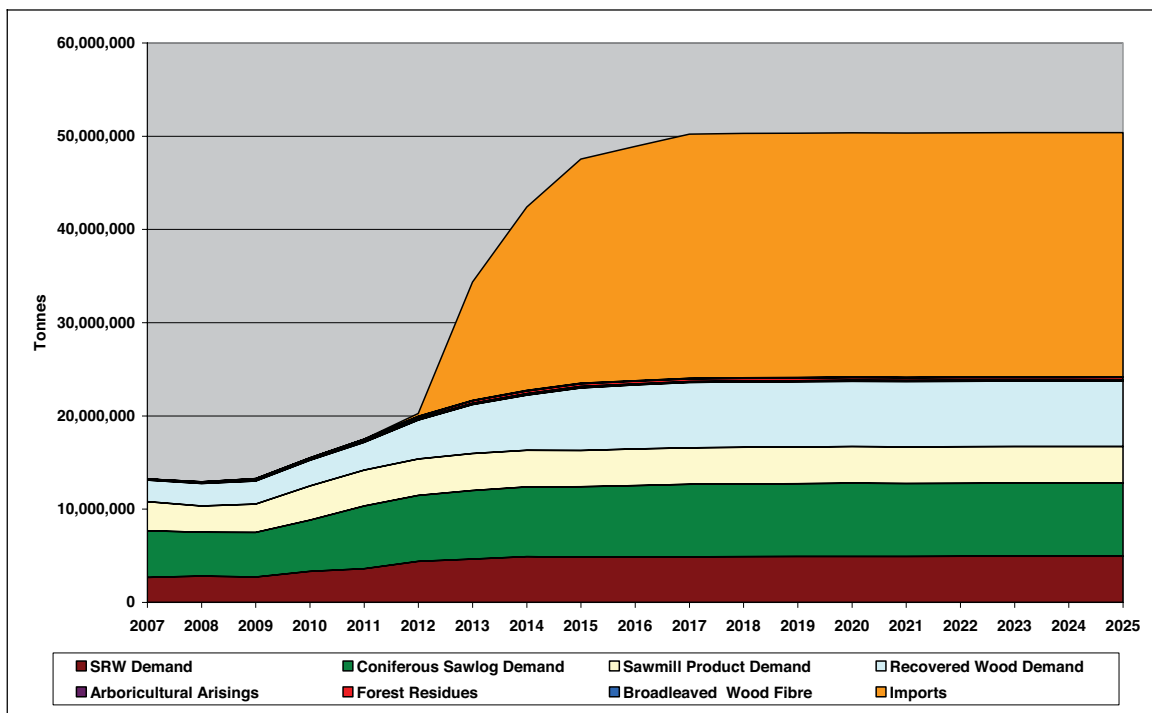
Imports

If all the planned wood energy plants are built, Britain could start importing wood chips and pellets for new wood energy plants in 2012 and the quantity could rapidly rise to about 27 million tonnes of wood fibre per annum. If this quantity could be secured in the form of long term supply contracts, it would imply an almost doubling of the present world trade in wood chips and pellets. Presently it is estimated that up to about 150,000 tonnes per annum of British wood fibre is being used for co-firing.

The major factor in determining the scale of future use of wood fibre, whether British sourced or imported, is likely to be the requirements and incentives offered under the Renewables Obligation. It is understood that co-firing may be only marginally attractive at present, but if this changed and only 10% of supplies were sourced from Britain, it could further increase demand for wood fibre by up to 3 million tonnes per annum.

Overall total demand for wood fibre of all types in Britain over the period 2007 to 2025 in Britain is shown in chart F.

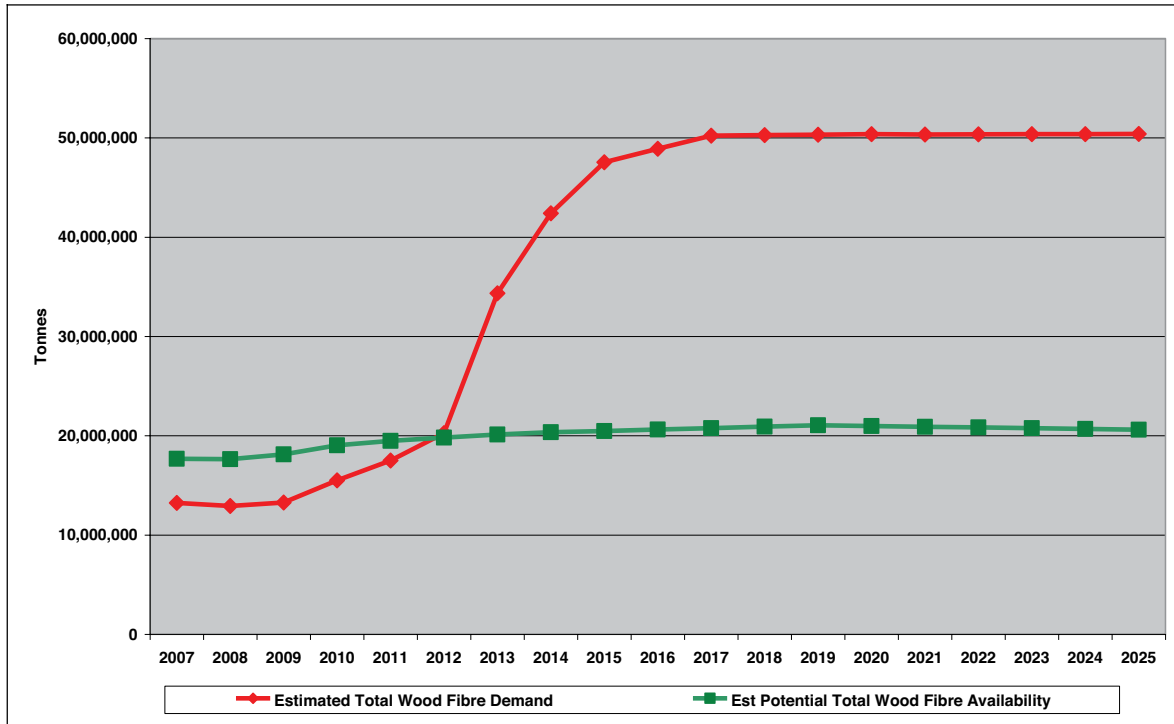
Chart F: Forecast Total Demand for Wood Fibre in Britain by Type 2007 – 2025



The main feature of the chart is the planned level of imports by the wood energy companies amounting to almost 27 million tonnes per annum of wood chips and wood pellets with a number of companies indicating an interest in sourcing up to 10% or more of their supplies from Britain where possible. The overall balance

between total potential availability and forecast total demand in Britain for wood fibre based on present plans of companies in the forest and wood energy sectors and excluding any increase in the use of wood fibre for co-firing, is shown in chart G.

Chart G: Forecast Total Potential Availability & Forecast Total Demand for Wood Fibre in Britain 2007 – 2025



Conclusions

The situation is complex and subject to continuous change, but even if a small proportion of the new energy plants become operational, this study shows that it would result in a very fine, and potentially sensitive balance developing between the availability and demand for SRW grown in Britain, sawmill products in the form of chips, slab wood, sawdust and bark derived from British grown wood, and recovered wood. It could also mean the beginning of significant wood biomass imports for the first time which could very

rapidly increase to almost 27 million tonnes per annum. This total would exceed the potential availability of British sourced wood fibre and almost equal the present size of the global wood biomass trade. The Government’s Renewable Heat Incentive scheme that is out to consultation at present could further increase demand for wood fibre depending on the tariffs that are set and no allowance has been made for this potential increase in demand for wood fibre in this report.

The forecast tightness of the balance between the potential availability and demand for different types of wood fibre in Britain, if a significant number of new wood energy plants proceed, implies that supply chains are going to be subject to significant pressure, prices are likely to rise and this in turn will have important consequences for the existing and potential new users of wood fibre and the future shape of the wood processing and wood energy industries in Britain.

01 Introduction

1.1. This independent report into the wood fibre supply and demand in England, Scotland & Wales was commissioned to assess the potential scale of wood fibre availability and demand in Britain because of perceived changes in the balance between the two. Previous regional assessments identified that changes were taking place but they did not provide a complete picture of what was happening in Britain overall or within the three countries. The most significant influence on the supply demand balance has been the emergence of a rapidly developing wood fired energy industry. This report examines the possible balance between wood fibre availability and demand in Britain over the next 15 years and in doing so identifies some of the main factors that are likely to influence that balance and how wood fibre may be sourced and used in Britain in the future.

1.2. Historically the term “wood fibre” tended to be used mainly when referring to virgin fibre derived in one form or another from logs harvested from forests or woodlands, but over the last decade, attention has been given to the possibility of obtaining more wood fibre than arises from conventional management and harvesting of existing woodlands e.g. forest residues and stumps, woodlands managed in less traditional ways e.g. short rotation forestry (SRF), from planting and managing crops in different ways outside woodlands e.g. coppicing on land previously used for agriculture (SRC), from collecting more parts of trees that are pruned or felled and in re-using more wood

and wood products that would otherwise have been burnt or put into landfill when they were no longer needed. These changes have evolved mainly as a result of public interest in the environment and the influence of an increasing range of related Government policies centred broadly on delivering sustainable economic, social and environmental development. What was once a relatively simple wood fibre market is now developing, and is expected to continue to develop, into an increasingly complex and inter-linked set of different markets, which could include the importation of virgin biomass in the form of wood chips and pellets for the first time.

1.3. Wood fibre comes in a wide variety of forms and it is not possible to use all types of wood fibre in every use for a variety of physical, technical manufacturing or process reasons. For most commercial end uses it is desirable to have continuous supplies of wood fibre available in as uniform a form as possible. In some processes different types of wood fibre can be mixed, particularly if the variation is known from the outset in designing the processing or final end use of the wood fibre. Introducing wood fibre subsequently in different forms is not always possible. Wood fibre can also be used or mixed for certain end uses but previous treatments or uses may restrict or prevent these possibilities.

1.4. There are separate sections in the rest of the report on the potential availability and demand for the following sources of wood fibre in Britain:

Coniferous roundwood
Coniferous sawmill products
Forest residues
Recovered wood

Short rotation coppice
 Arboricultural arisings
 Broadleaved wood fibre
 Imports of wood fibre & substitutes

1.5. The report examines the potential availability of these fibre sources in relation to the demand from the existing wood processing industry and wood energy plants and in relation to the possible additional future wood fibre requirements of the forest industry and the numerous wood energy plants that are in the planning phase. For the purposes of this report wood pellet plants and wood fired energy plants that produce heat and / or electricity have all been categorised under the general heading of wood energy plants. The methodology that has been used in undertaking this study is explained in annex 1 of this report.

1.6. This study has been commissioned by the Confederation of Forest Industries (ConFor), the Wood Panel Industries Federation (WPIF) and the UK Forest Products Association (UKFPA). It has been funded by 20 leading forest sector based companies in the UK, whose names are listed on page 13, and it also has had the support of the Forestry Commission.

Confidentiality & presentation of results in this report

1.7. The report covers 139 existing or planned developments in the wood processing and energy sectors by 93 companies. It does not cover the present or possible future use of wood fibre for small scale domestic and industrial heating schemes. In the case of the few companies in the forest industry that refused or did not provide information, it has been possible

to obtain estimates through other industry sources or in the case of wood energy plants to use published information or local sources so that the coverage is complete. The report has also benefitted from the confidential views and observations very kindly provided by a number of these companies. An undertaking was given to them all that any information provided

for this study would only be presented once aggregated so that commercially confidential information about any individual business could not be identified. Where necessary we have adjusted boundaries or restricted details to ensure this happens.

Impact of prices

1.8. The wood fibre market is very dynamic and it therefore responds fairly quickly to changes in wood fibre availability and demand through the price mechanism. This report presents an essentially static assessment of future potential availability of wood fibre and demand that has been shaped by the economic conditions and assessments of the future situation that existed during 2009. For example, if the value of Sterling changes adversely to other currencies, or a new market opens up in Great Britain where the user is prepared to pay significantly more for roundwood or sawmill products, then, say, the present exports of logs to Ireland

and Scandinavia could cease which would make available a slightly greater volume of roundwood for utilisation in Great Britain. Relative changes in the prices of different types of wood fibre may also result in their utilisation patterns changing where this is technically possible.

1.9. Some wood processing and wood energy plants are already using, for example, a mix of coniferous roundwood and sawmill products as well as recycled wood. Other wood energy plants are planning to use arboricultural arisings and forest residues as well as recovered wood. We have used the percentages of the different wood fibre mixes that companies have indicated. In practice the mix of wood fibre used may well change depending on the availability of the different fibre sources and their costs at any particular point in time. Total plant capacity figures may not therefore match expected coniferous roundwood usage.

Acknowledgements

1.10. The strategic and operational value of this report depended on obtaining comprehensive information on the present and future demand and production of coniferous roundwood and sawmill products from existing businesses in the forest sector, and from companies already in or planning to go into wood fired energy production. The response to our request for information has been outstanding and we would like to thank all the businesses for their help and co-operation which we have greatly appreciated.

1.11. We would especially like to thank Stuart Goodall (ConFor), Alistair Kerr (WPIF) and David Sulman (UKFPA) for their support throughout the study and for their subsequent comments on the draft of the final report. We have also benefitted from the comments of the wider Steering Group comprising companies that have funded the study and from feedback received from them on the initial draft. A list of the companies is given on the following page.

Steering Group Members

A W Jenkinson Forest Products	Mr Richard Palmer
Arch Timber Protection	Ms Janet Brown
BSW Timber Plc	Mr Andrew Smith
Egger (UK) Ltd & Egger Forestry Products	Mr John Paterson
ETC Sawmills Ltd	Mr Philip Wilkinson
Euroforest Ltd	Mr Tony Willis
Howie Forest Products Ltd	Mr Hamish MacLeod
Iggesund Paperboard (Workington) Ltd	Mr Gavin Davidson
James Callander & Son Ltd	Mr Philip Higginbotham
John Gordon & Son Ltd	Mr Ronald Gordon
James Jones & Sons Ltd	Mr T Bruce-Jones
Kronospan Ltd	Mr G Adkins
Munro Sawmills Ltd	Mr Philip Blake
Norbord Ltd	Mr George Webb
Powell Forestry Ltd	Mr Alan Powell
Scottish Woodlands Ltd	Mr Colin Mann
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Taylormade Timber Products Ltd	Ms Jilly Wentworth
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02 Policies & commercial issues influencing British wood fibre use

2.1. This section looks at the policies and commercial issues that have been, and are influencing how wood fibre is, and will be, used in Britain.

Policy influences

2.2. Commercial interests in different types of wood fibre determine their actual availability and demand, but many government policies, strategies, regulations and incentives help to shape the demand for different types of wood fibre and the overall business environment in Britain. In particular, the indirect subsidies available to electricity generators via the Renewables Obligation (RO) have created demand for wood by electricity generators which wasn't there prior to the RO. EU policies and legislation also have an important part in shaping some UK policies. At present there is no one government department that has overall responsibility for wood fibre markets in Britain so the markets are developing in response to the past and present policies, strategies, regulations and incentives provided by a variety of government departments. Perhaps the most important issue is in deciding what pattern and scale of wood fibre use will provide Britain with the greatest sustainable economic benefits in the medium to long term and whether any changes are required to existing policies to achieve them. The initial part of this section briefly highlights some of the most important influences and where responsibilities lie at present.

Wood fibre availability

2.3. Land Use. Any increase in the woodland area will involve changes in land use whether it involves planting more woodlands or using agricultural land for growing short rotation coppice, miscanthus or other biomass crops. Responsibility for this mainly lies with Defra, the Forestry Commission, Natural England and the Scottish Parliament and the Welsh Assembly.

2.4. Woodland Management & Roundwood Harvesting. Regulatory responsibility for how woodlands are managed and levels of roundwood harvesting lies with the Forestry Commission. The Forestry Commission is also responsible for directly managing some 27% of Britain's woodland area.

2.5. Supply of Post Consumer/Post Industry Reclaimed Wood Fibre. Wood fibre has been recovered for many years for use in the wood processing industry to produce, for example, particleboard. Much greater attention is now being given to increasing the quantity of wood fibre being recovered and to reducing the amount of wood going to landfill. Responsibility for this lies with Defra and the Scottish Parliament and the Welsh Assembly.

Wood fibre demand

2.6. Development of Markets and the Wood Processing Sector in Britain. The Forestry Commission historically took responsibility for the development of markets and primary wood utilisation in Britain, but this no longer appears to be the case. Other departments, such as Defra and BIS, have responsibility for the use of wood in secondary markets such as ensuring that sustainable products with low embodied energy, like wood, are used in construction e.g. Strategy for Sustainable Construction and the Code for Sustainable Homes.

2.7. Development of Renewable Energy in Britain. Renewable energy derived from wind, wave power and biomass is being encouraged by the Government's energy policies led by the Department of Energy & Climate Change (DECC) and the Scottish Government. The major driving force is the financial incentives offered under the Renewables Obligation Order 2009 in the form of Renewable Obligation Certificates. The Forestry Commission is supporting DECC in encouraging the use of biomass in the form of roundwood and sawmill products for generating renewable heat.

2.8. New incentives for encouraging the use of wood as a source of renewable heat are being proposed under the government's proposed Renewable Heat Incentive (RHI). If implemented, the RHI will provide an incentive payment (tariff) for a range of renewable heating technologies (including wood-fired systems) to support renewable heating at all scales, including households, businesses, offices, public sector buildings and industrial processes in large factories. The RHI is intended to be launched in April 2011 and the government have made a commitment that it will remain open for new projects until at least 2020. This could put further pressure on the potential availability of wood fibre in Britain and no allowance has been made for this in the findings given in this report.

2.9. One of the challenges in having a number of policies and departments that can directly or indirectly influence the use of wood fibre in Britain is that it can be difficult to obtain an overall assessment of what is happening and what the overall longer term results might be. It is hoped that this report will make a useful contribution to being able to do this.

Commercial issues in developing new energy plants

2.10. One of the major challenges throughout the study has been to assess how closely the potential availability and demand for wood fibre sourced in Britain is likely to be to its actual supply and demand. This cannot of course be predicted with any certainty. Where wood fibre is being used by existing wood processing or wood energy plants there seems to be a reasonably strong possibility that these plants will continue to need wood fibre over the next 15 years or so. It also appears reasonable, and practical, to expect companies to invest in new equipment and improve the efficiency of their plants and as a result their wood fibre requirements may increase gradually over the next 15 years. Some owners may also wish to close certain mills and end production while others may wish to invest in new ones.

2.11. The estimates of the wood fibre requirements for the existing forest products plants used in this study are based on confidential survey returns made by the companies and owners of 93% of the plants operating in England, Scotland and Wales at the present time. They are therefore about as certain as it is possible to be in making any predictions of the future. It is very much more difficult to predict the likely aggregate demand for British sourced wood fibre over the next fifteen years for new wood energy plants that are still at the planning stage. This is because they may not get built for a variety of reasons, such as failing to get planning approval or to obtain an agreement under Section 36 of the Electricity Act or because the sourcing of their wood fibre requirements has not been decided or agreed yet.

2.12. Some of the most important issues in determining whether a new plant gets built are securing the following:

- » Finance
- » Required / target profitability level
- » Contracted wood fibre supplies
- » Acceptable levels of risk both technically and financially
- » Contracted purchasers for electricity, heat or wood products

2.13. One of the key conditions attached to most project finance of the type required to build energy plants or any processing plants is to have contracts in place for supplies to the plant, and also for the plant's outputs, for periods that normally extend for 7 to 10 years or more. This obviously reduces the project finance risk for funders. The need to have a secured 7 to 10 year contract in place for all, or a very large majority of the wood fibre required to operate a plant before funding can be secured, is likely to shape the size of plant, where it is located, the type of wood fibre it uses and where the fibre is sourced from. **This project finance requirement for 7 to 10 year supply contracts will probably be the largest single influence on how the wood energy market develops in Britain in the future.**

Size of plant

2.14. The sizes of wood energy plants that are being planned at present range in size from small domestic and industrial boilers producing less than 1MW up to 300MW or more with the power being generated used for producing heat, heat and power or electricity alone. Wood fibre requirements for some of these very large wood energy plants that are in the planning stage may require up to more than 4 million tonnes of wood fibre per year. If plants like these, and considerably smaller ones, are to secure the necessary funding they will need to have 7 to 10 year contracts in place for their wood fibre supplies which are acceptable to a bank. Some increase in the total availability of British sourced wood fibre can be expected over the next 10 years as the following sections show, but the ability to secure a 7 – 10 year "bankable" contract for large quantities of wood fibre in excess of much more than 500,000 tonnes per annum at the most, sourced in Britain, is very unlikely to be possible given the size of Britain's forest resources, even if it was divided up into 3 or 4 separate contracts covering different wood fibre types to reduce their individual sizes and reduce the overall risk.

Imported wood fibre & its influence on British wood fibre availability & demand

2.15. Most of the medium to very large sized wood energy plants that have been announced publicly are expecting to import most of their wood fibre, in the form of wood chips or pellets, from overseas. Some of the smaller to medium sized wood energy plants up to about 50MW in size are also looking to source at least some of the wood fibre in the form of wood chips or pellets overseas with the rest being made up of different types of British sourced wood fibre. This is because these companies perceive there to be much greater potential for sourcing wood chips or pellets on long term contracts in much larger quantities from areas such as North and South America and the Baltic States than is possible in Britain because of the scale of the forest resources and the forest industries in these countries (see section 10).

2.16. Although most of the companies planning to develop much larger wood energy plants expect to import most of their fibre needs on long term contracts, they still expect, or would like, to use up to about 10% of UK sourced wood fibre if possible for various understandable reasons. **Assuming this wood fibre sourced from Britain only accounted for about 10% of each of the very large planned energy plants wood fibre needs, this could still account for up to 2.7 million tonnes per annum which is a large quantity of wood fibre relative to the quantity of UK sourced wood fibre that is available. If this wood fibre was bought in Britain on a short term, or spot market basis, then it is likely to have a major impact on wood supply chains, other businesses and on the volatility of wood fibre prices.**

2.17. Generally Britain has not imported wood fibre in any significant quantities, although it has imported a variety of wood and wood products over almost two centuries. If wood fired energy companies are able to secure these contracts overseas, and one or more energy plants are built that use, or mainly use, imported wood fibre, then Britain will join the international trade in wood chips and pellets for the first time. **This would have a major impact on the availability and pricing of wood fibre in Britain and is likely to bring about a fundamental shift in the structure of the forest sector and the pricing of wood fibre. The full implications are hard to predict at this stage.**

Location of plants

2.18. Where large wood fired energy companies expect to import some or all of their wood fibre under 7 to 10 year contracts, most of the companies will wish to minimise the delivered in cost of wood chips or pellets at these plants. As the wood fibre will need to be transported in ships, the best way of minimising the handling costs of it is to locate the wood energy plants at a port or beside a navigable waterway so that the wood fibre can be off loaded directly from a ship into the plant. New smaller wood energy plants have less need to be located near the coast or waterways of Britain.

Size & ownership of wood fibre supply chains in Britain

2.19. The ability of companies involved in the different wood fibre supply chains to enter into 7 to 10 year wood fibre supply contracts is determined by the degree of control that they have, or they perceive they have, over the wood fibre they have access to. The relatively fragmented nature of the supply chains for each of the different types of wood fibre in Britain is mainly because of the small size of the country, and the forest sector, which means that there are only a very few companies that are in a commercial position where they can enter long term supply contracts for any significant quantities of wood fibre. For example, there are only about 50 companies

in Britain that are sawing coniferous logs that require over 3,000 tonnes of logs per annum. A few companies, such as the major sawmilling companies, the sawmill product handling companies, roundwood harvesting and marketing companies, and the Forestry Commission can potentially offer, and have entered supply contracts for larger quantities for some types of wood fibre as they perceive the risks involved in entering longer term supply contracts still leaves them with enough headroom to keep the risks of defaulting on the supply contract to an acceptable level.

2.20. Supply chains do exist, although they may not be easily visible to those not involved with them. A number of wood energy companies have already entered longer term wood fibre purchasing contracts so the opportunity for other companies to enter new ones becomes increasingly difficult. Companies have only been able to enter long term supply contracts because of the scale of their operations which have been achieved by aggregating a very large number of periodic and often small annual amounts of wood fibre supplies from a very wide range of sources either through purchasing the fibre, or marketing it on behalf of others. Within the forest industry much often depends on personal and commercial contacts rather than through entering medium or long term contractual purchasing arrangements. Therefore the size of any new wood energy plants that are established, based on British sourced wood fibre, will probably need to be relatively small because of the inability of most companies to offer long term wood fibre supply contracts of any size because if they do not themselves own the wood fibre supplies and therefore face increased contractual risks. In the sections that follow on the availability of different types of wood fibre, the nature and size of the supply chains for each are identified.

Achieving economies of scale in wood fibre supply

2.21. A number of companies operating, or are planning small to medium sized wood energy plants, recognised, or are recognising, that it is impossible for them to enter the size and length of supply contract they need based on a single type of wood fibre. The alternative is to use, or plan to use, one or more different types of wood fibre, and therefore to build up the total contracted fibre supply required by entering smaller 7 to 10 year contracts for different types of wood fibre. This is potentially much easier, but it also increases the complexity of a plant's physical operations and administrative arrangements. It also has to be allowed for prior to constructing the plant and prior to specifying the type of boiler required. Offsetting some of the increased complexity of this type of multiple contract arrangement is the possibility of controlling costs to some extent at the margin by varying the mix of fibre type used depending on the cost of the different fibre types that are prevailing at any one time. Such flexibility in the use of different types of wood fibre is not available in most cases in the wood processing industry.

Co-firing of biomass in existing coal-fired energy plants

2.22. Co-firing is a complex subject and can involve a variety of different types of biomass other than wood fibre (see section 10) and it is therefore beyond the scope of this study. About 14 power companies were using biomass from a variety of sources for co-firing in 2006 and 2007, but only about 280,000 tonnes out of an average of 1.1 million tonnes per annum comprised wood and wood residues in the period 2005 to 2007 (IEA Bioenergy Task40 – June 2009.). One company is co-firing with British sourced wood fibre at present and the quantities have been included in this study. In 2009 another company increased its wood fibre use to 400,000 tonnes per annum and it is presently installing new equipment that will mean that it can use the equivalent of 3 million tonnes annually of which a high proportion is likely to be imported pellets. These amounts appear very large at first sight, but most power plants that are co-firing are dealing with purchasing large quantities of coal, often from around the world, and their main interest in buying British sourced wood fibre would be to top up contracted quantities from overseas sources if the price is attractive and the size of contracted quantity is a relatively large one. If a company's entry into the spot market resulted in a significant increase in the price of that particular type of wood fibre, it may not be an attractive commercial proposition.

2.23. Changes were made in 2009 under the Renewables Obligation Order 2009 to the financial support given to companies that co-fire with biomass. The amount of ROCs a company can claim has now been reduced from an original figure of 2 ROCs per MWh down to 0.5 of a ROC per MWh. It is understood that this has made the use of biomass for co-firing a much more marginal financial activity for power companies. Much depends on the price at which the biomass / wood fibre can be purchased at. Other ways of using biomass for energy production are eligible for different levels of ROCs up to a level of 2 ROCs per MWh.

03 Coniferous roundwood potential availability & forecast demand in Britain

3.1. This section provides information on the potential availability and demand for coniferous wood fibre in Britain from 2007 to 2025.

3.2. Detailed information on the forecast of coniferous roundwood availability is given in section 2 of the annex to this report. Detailed information by zones within England and Scotland is also provided and it shows that there is considerable movement of roundwood geographically between zones and countries. This section therefore draws together all this information to provide an overall picture of the potential availability of coniferous roundwood in Britain.

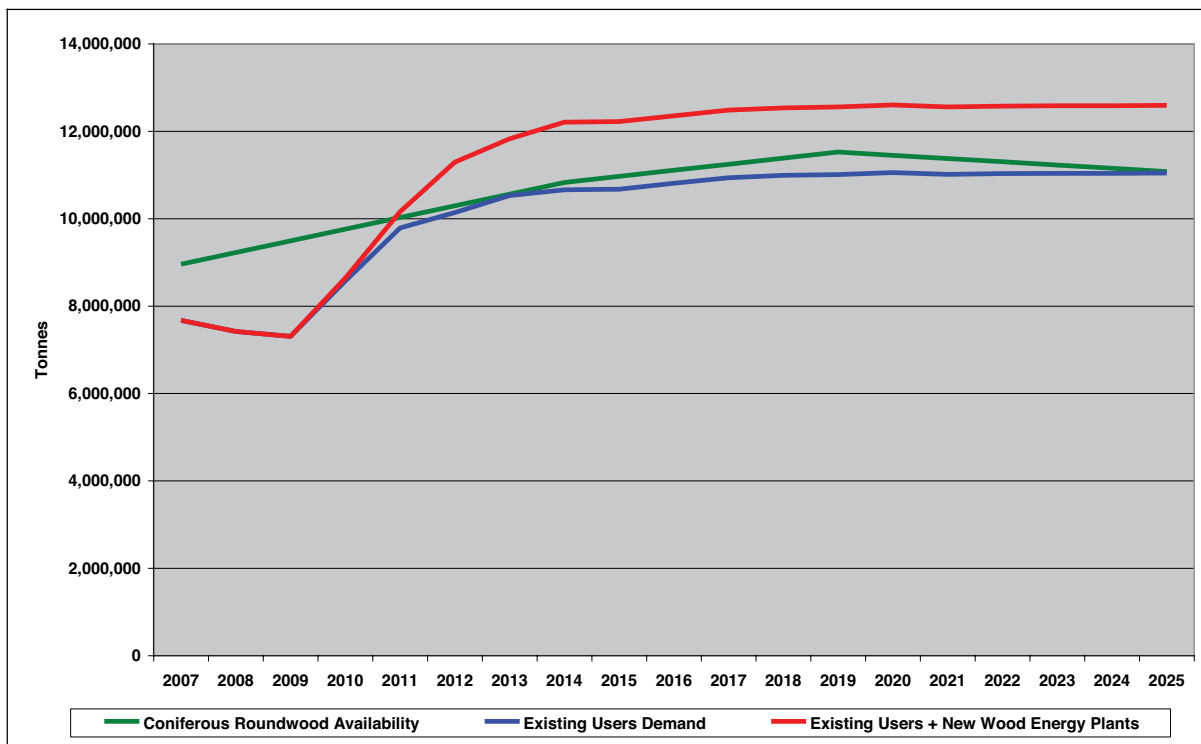
3.3. The forecast demand is based on information collected from companies as part of this study. Most of the demand originates in Britain, but there are relatively small but significant export markets for roundwood. Over the last 20 years or so there has been a small but varying quantity of coniferous SRW exported from Scotland to Scandinavia for pulp and paper making, because of its excellent fibre quality, and in the last few years, small quantities of coniferous SRW has been

exported to mainland Europe. Over the last five years coniferous sawlogs have been exported to Ireland from Scotland on a regular basis and small quantities of high quality hardwood logs have been exported to mainland Europe over many years. More detailed information on coniferous roundwood exports that are included in the demand figures is given towards the end of this section.

Coniferous roundwood availability & demand balance

3.4. The potential availability and demand balance for coniferous roundwood in Britain is shown in chart 3.1.

Chart 3.1: Coniferous roundwood - Total forecast potential availability & demand in Britain to 2025



3.5. The chart shows that total potential availability of coniferous roundwood is forecast to grow until about 2020 and after that it starts to fall slightly. At present the potential availability of coniferous roundwood in England, Scotland and Wales exceeds the

demand of existing users, but by about 2011 and 2012 the overall demand for coniferous roundwood by existing users will almost equal forecast potential availability. From 2012 the total combined demand for coniferous roundwood of the existing users and the

proposed new energy plants exceeds the potential availability of coniferous roundwood and that difference grows until it reaches a forecast deficit of about 1 million tonnes per annum.

3.6. The situation is different in all three countries as charts 3.2, 3.3 and 3.4 show. These charts take no account of the amounts of roundwood transferred between countries, and zones within countries but this is identified in sections 3 to 9 in the annex to this report. It should be noted in comparing the three charts that they are presented on different scales.

Chart 3.2 England: Forecast potential availability & demand for coniferous roundwood to 2025

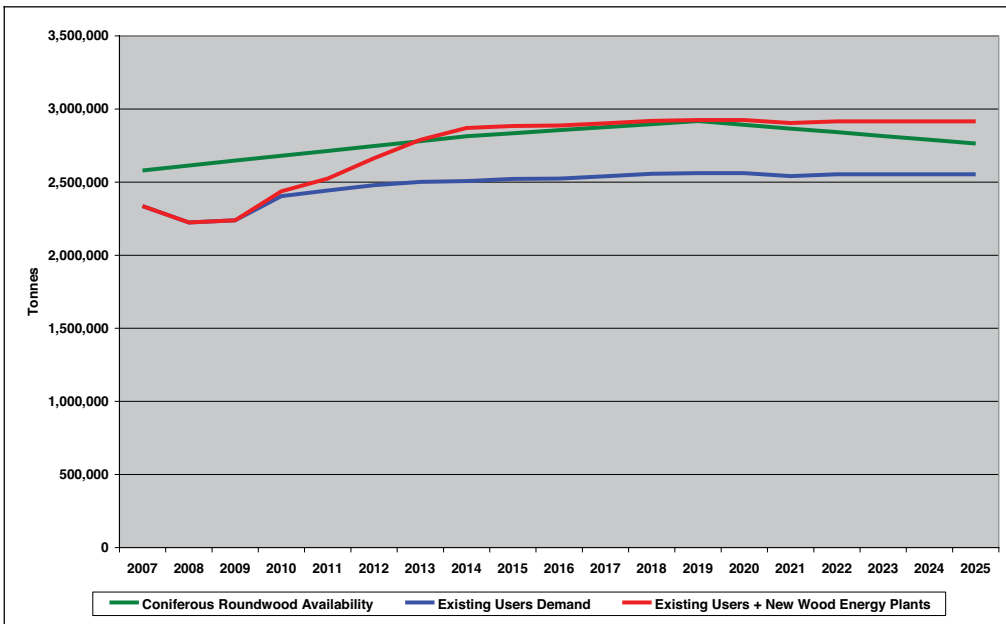


Chart 3.3 Scotland: Forecast potential availability & demand for coniferous roundwood to 2025

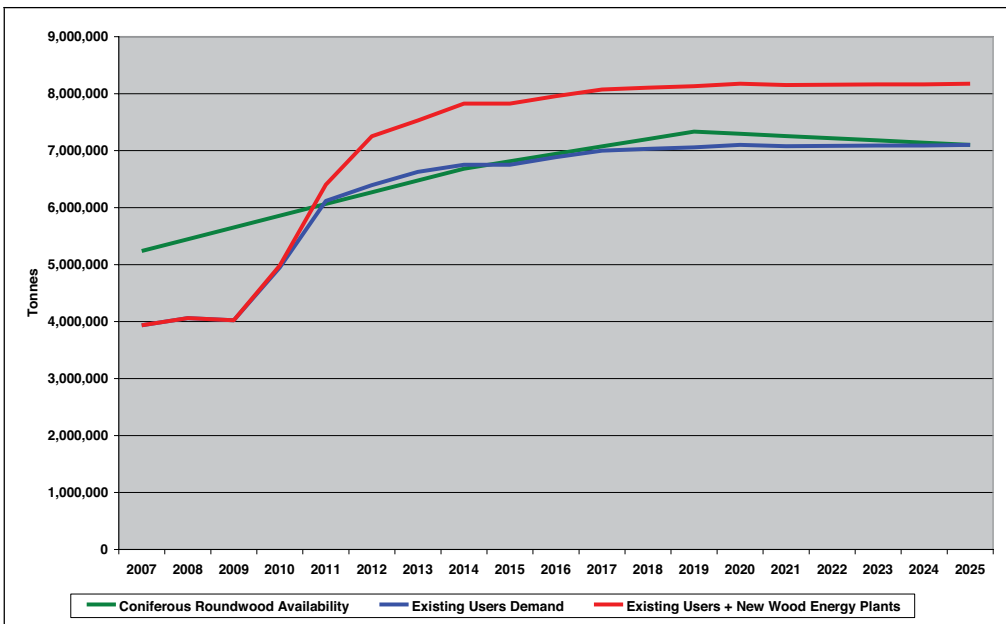
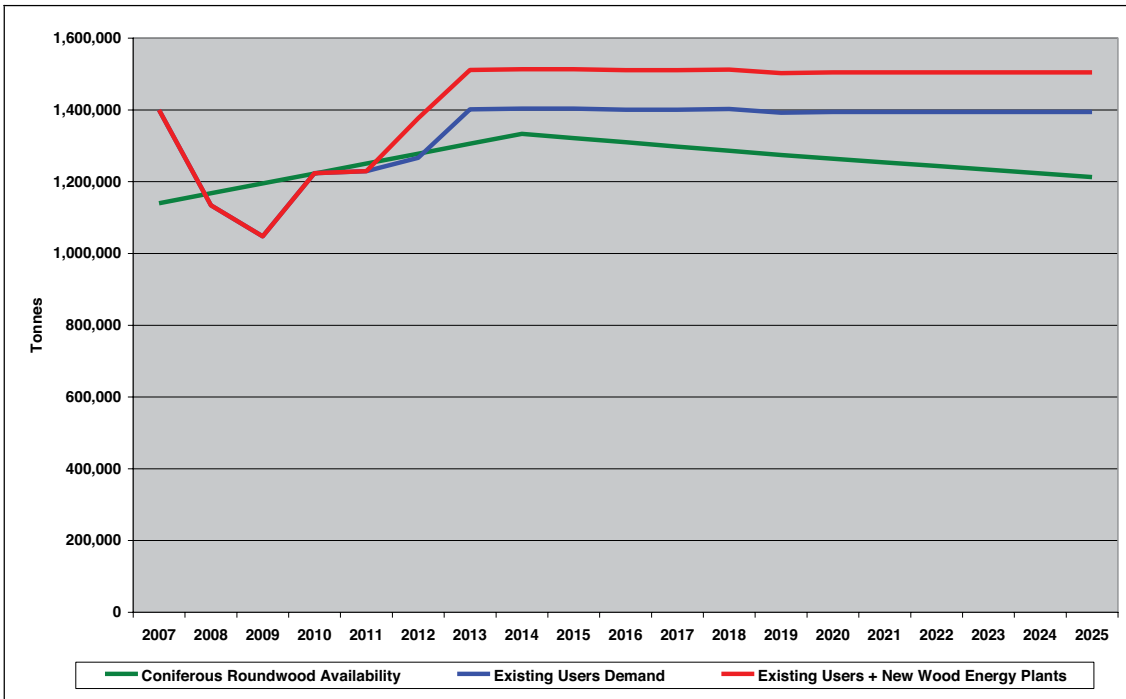


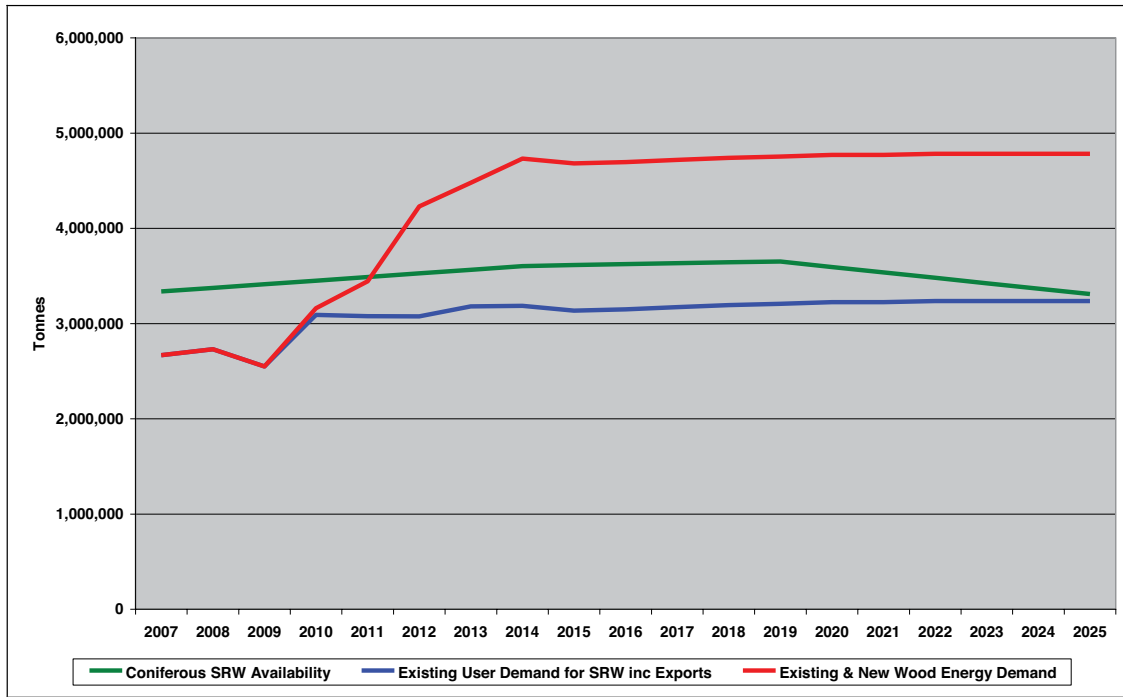
Chart 3.4 Wales: Forecast Potential Availability & Demand for Coniferous Roundwood to 2025



Potential availability & demand for SRW & sawlogs

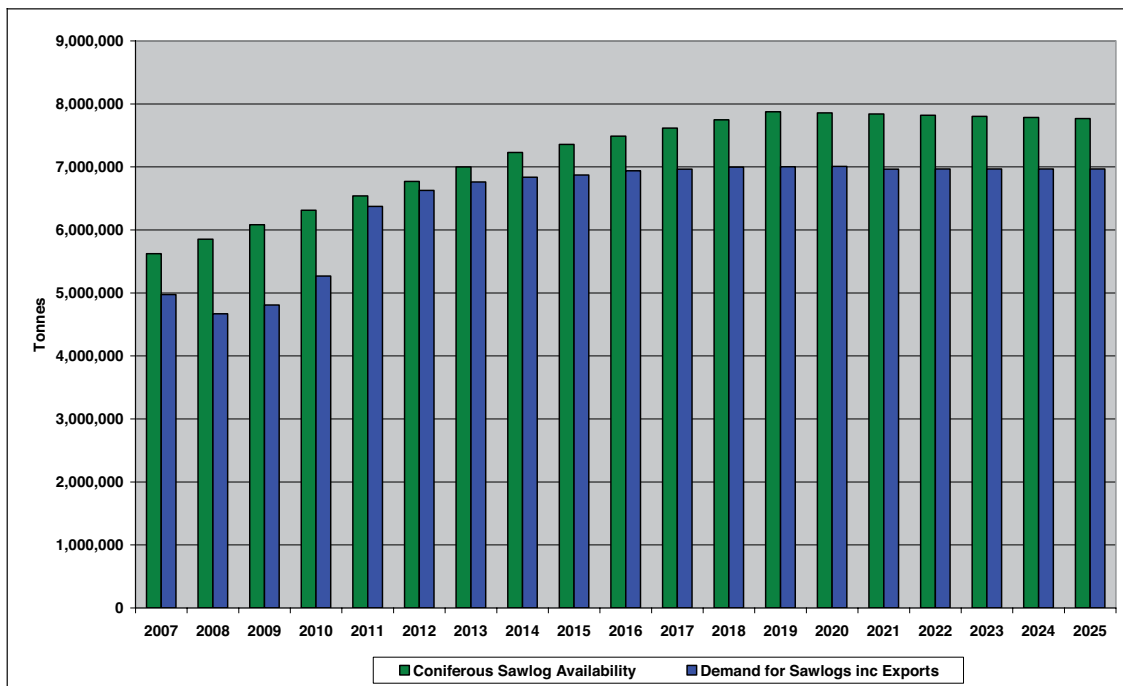
3.7. Coniferous roundwood can be broadly divided into Small Roundwood (SRW) comprising logs with a top diameter of less than 16cm (and often referred to as ‘small diameter roundwood’) and sawlogs which have a top diameter of 16cms or more. The availability and demand for coniferous SRW in Britain up to 2025 are shown in charts 3.5.

Chart 3.5: Potential Availability & Demand for Coniferous SRW in Britain to 2025



3.8. This shows that the potential availability of coniferous SRW exceeds the total combined demand for SRW by the existing users in the forest industry, the established wood energy plants and after This shows that the potential availability of coniferous SRW exceeds the total combined demand for SRW by the existing users in the forest industry, the established wood energy plants and after

Chart 3.6: Potential Availability & Demand for Coniferous Sawlogs in Britain to 2025



3.9. This shows that potential availability of coniferous sawlog exceeds the demand for sawlogs from the sawmilling industry over the period to 2025, but the two become very close from 2011 to 2016, but after that potential availability increases to almost 900,000 tonnes per annum before starting to narrow again.

3.10. The overall conclusion is that after a long period when the potential availability of coniferous roundwood significantly exceeded

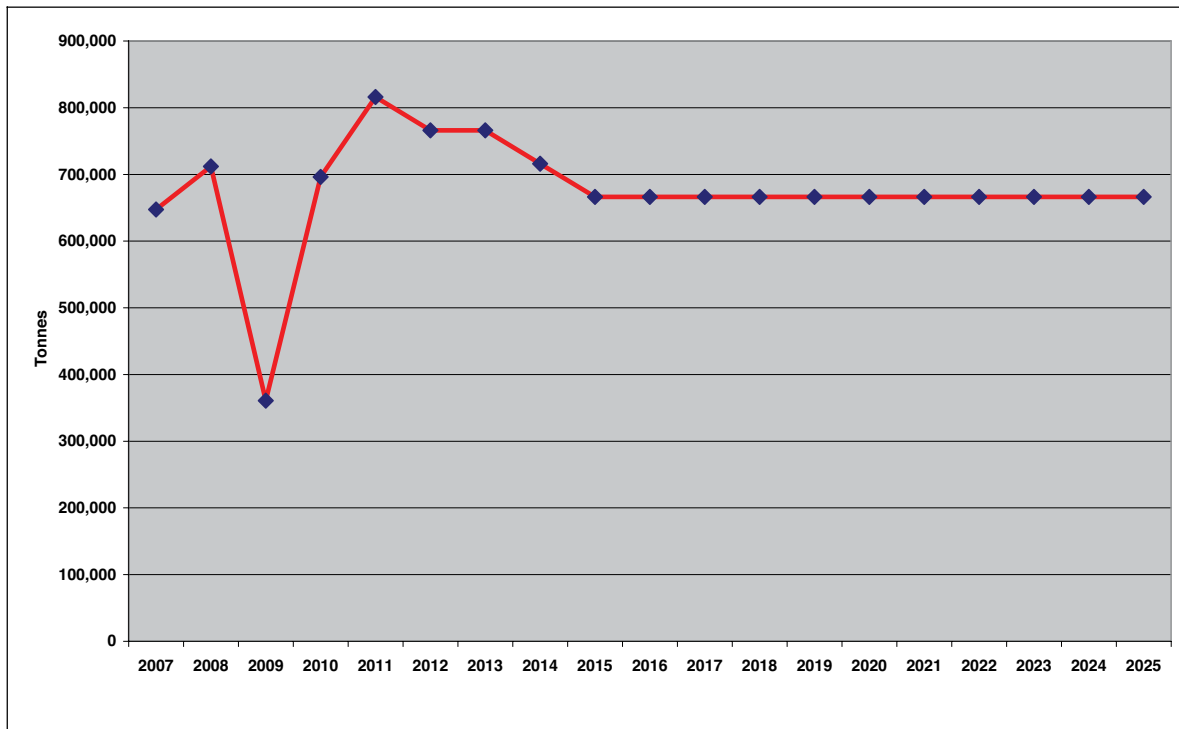
forest industry demand, the situation is now changing and Britain is reaching a position where potential availability and demand for coniferous roundwood are going to remain close. Although the potential demand for coniferous sawlogs in Britain appears likely to remain slightly less than their potential availability, the difference is not large. Of more significance is the fact that the potential demand for SRW appears likely to significantly

exceed potential availability if all the planned wood energy developments take place. This additional demand could potentially be satisfied by purchasing sawlogs but that would have the potentially serious consequential displacement impact of depriving the sawmilling industry of raw materials.

Coniferous roundwood exports

3.11. There are seven companies that have exported, or plan, to export logs from Britain over the next 15 years and the information that they have provided has been aggregated and is shown in chart 3.7. These quantities have been included in the graphs previously presented in this section as 'existing usage' as the companies involved are all well established in the forest sector.

Chart 3.7: Quantity of Coniferous Roundwood that has been Exported, or is Expected to be Exported, from Britain 2007 - 2025



Coniferous roundwood supply chains

3.14. The size of roundwood contracts is determined by many factors, but the most important ones are the size and ownership of woodlands in Britain. The largest individual owner of woodlands in Britain is the state with a total area of 753,000 ha and whose numerous woods are managed by the Forestry Commission. The total area of woodlands managed by Forestry Commission England is 201,000 ha (72.6% coniferous), by Forestry Commission Scotland is 447,000 ha (93.5% coniferous) and by Forestry Commission Wales is 105,000 ha (86.6% coniferous).

3.15. There are just over 2 million ha of woodlands in Britain that are not managed by the Forestry Commission and the vast majority of these are in private ownership. Of this total coniferous woodlands amount to about 908,000 ha (45.4% of the total). (see also section 9 covering broadleaves). Although the total looks significant there are only a very few large owners of woodlands in the private sector whose holdings might amount to about 20,000 ha. The majority of the other woodland owners own less than 200 hectares with many owning only 1 to 2 ha. Management of these woodlands is usually contracted out to professional woodland management companies or land agency firms.

3.16. It has been estimated that in England perhaps 50% of the woodlands are unmanaged or under managed and that there is an annual increment of up to 4 million tonnes that is not harvested annually. Many of these unmanaged or under-managed woodlands are broadleaved or small coniferous woodlands or shelterbelts.

3.17. The multiplicity of woodland owners makes it difficult to develop large long term supply contracts of any size for the production of roundwood from these woodlands. This is made more complicated by the variety of objectives that woodland owners have in owning woodlands since a significant proportion of those owning small woodlands do not have commercial timber production as a primary objective. The harvesting of all trees is subject to the approval of the Forestry Commission and must be carried on in accordance with the UK Woodland Assurance Standard (UKWAS) if it is to be certified as coming from sustainably managed woodland. The need to take into account the landscape impacts can mean that the sizes and locations of areas where trees are harvested are restricted.

3.18. The maximum size of roundwood sale contract that might be offered could be about 100,000 tonnes per annum spread over 3 to 5 years, but the majority tend to range from 10,000 down to 100 tonnes in any one contract. In the case of the Forestry Commission in Scotland contracts are usually for 5 years with an option to renew for a further 5 years, or in a few cases for a further two 5 year periods. At present about two thirds of Forest Enterprise Scotland's production is subject to contracts and they are unlikely to enter long term contracts for additional volumes above the present contracted total, but existing contracts will be re-offered as they come to an end. The maximum size of fuel wood contract that Forest Commission Scotland offers is 75,000 tonnes per annum. At present FC Scotland is understood to be unable to offer further longer term supply contracts for wood fuel.

3.19. Few woodland owners have the capacity or equipment to harvest and market their own trees when it comes to thinning or felling their trees. These operations are usually left to the woodland managers to organise. Some woodland management companies have the capacity to harvest timber, but others don't and they will then often offer timber for sale on the open market in individual lots. The woodland management companies that harvest and market timber often provide this as a service on behalf of clients and therefore they do not own the timber. Some independent harvesting and marketing companies may purchase the timber while standing in a wood and then get subcontractors to fell and transport the trees to the particular end user the company has agreed to supply to. In the case of the Forestry Commission about half of their timber is sold standing on the open market and the other half is felled and extracted by their own staff, or contractors working for them, and is sold at roadside. At least three large wood processing companies have their own timber harvesting operations which secures a proportion of their roundwood timber requirements.

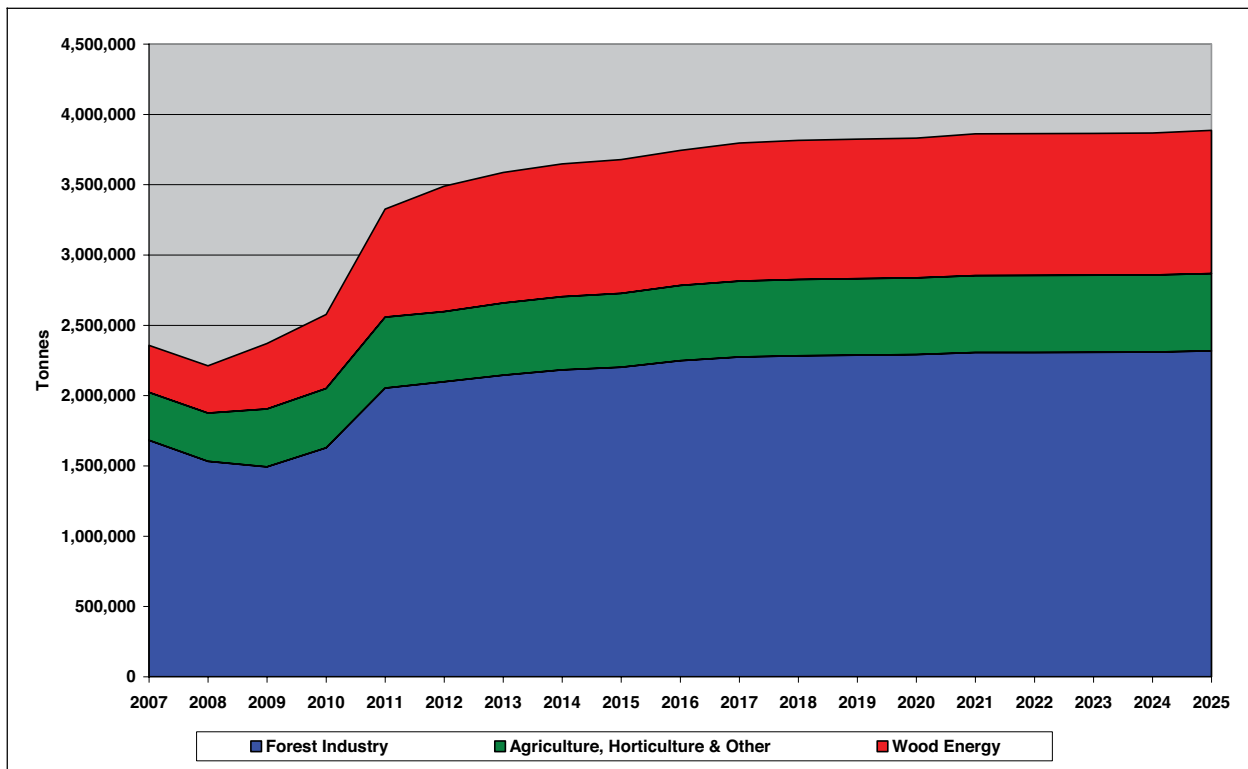
3.20. Given the fragmented, small size and intermittent nature of most timber sales in the private sector in the UK and the number of contracts that presently exist, it is not easy for any company to enter new large long term contractual arrangements to supply roundwood to wood processing or energy companies.

04 Coniferous sawmill products potential availability & forecast demand in Britain

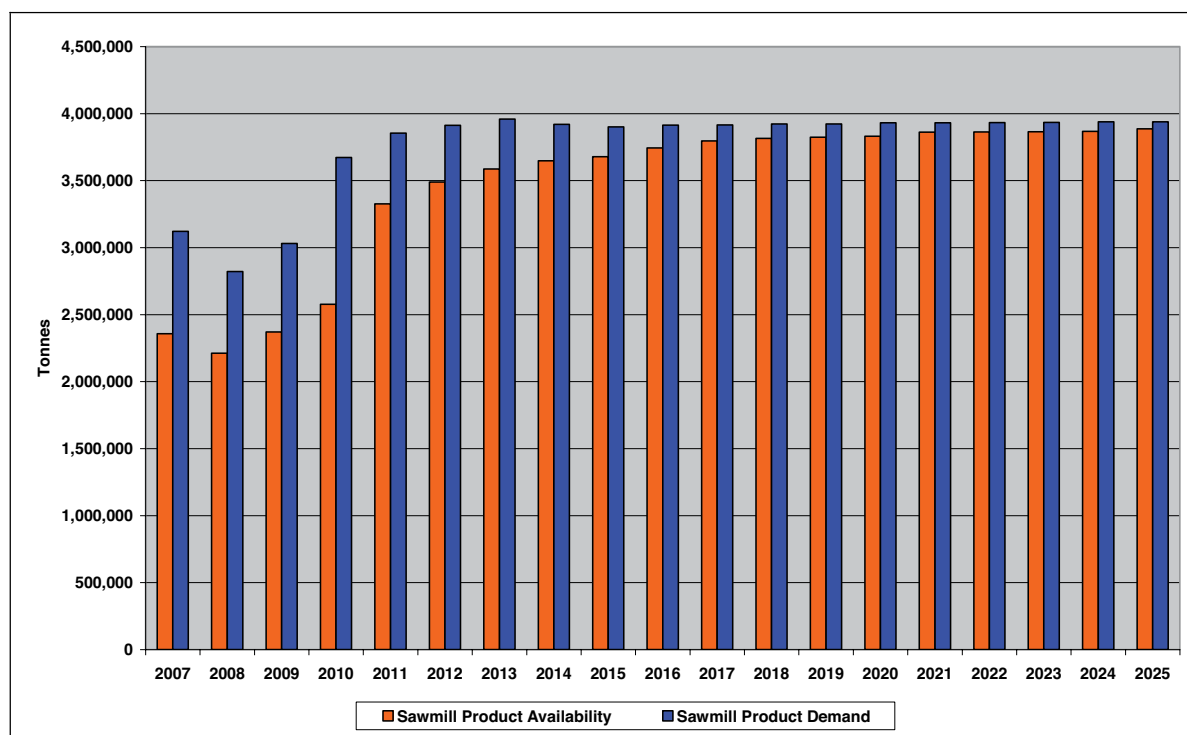
4.1. Sawmills processing coniferous logs produce sawn timber, wood chips, sawdust, pin chips, shavings, slab wood and bark. For the purposes of this report the term “coniferous sawmill products” or “sawmill products” relates to all the products except sawn timber. The largest consumers of sawmill products are the wood based panel and paper industries.

4.2. The present uses and expected future uses of sawmill products in Britain are shown in chart 4.1. These uses include a very small quantity that is exported. The situation within each county, and the zones within those countries, has been analysed and the results are given in the annex to this report.

Chart 4.1: Present and Expected Future Uses of Coniferous Sawmill Products in Britain to 2025



4.3. It is not possible to provide a zonal analysis of demand as this would be commercially sensitive in some zones. The estimated demand for coniferous sawmill products and the actual and expected future demand for them is shown in chart 4.2.

Chart 4.2: Potential Availability of Coniferous Sawmill Products and their Demand in Britain to 2025

4.4. The chart suggests that the demand for coniferous sawmill products has exceeded, and is expected to continue to exceed their availability, but the gap may close over time as the sawmill industry expands through increasing its share of the UK market for sawn

timber. The reason for this present difference is not clear but it may be because companies would like to use more sawmill products than they are presently doing, but lack of availability at a competitive price is preventing them doing this. Some users may also have a degree of

flexibility in their wood fibre requirements and are using other wood fibre sources to plug the gap. There is no doubt that the market for sawmill products is already very tight and is likely to remain that way.

Coniferous sawmill product supply chains

4.5. Nationally the supply chains for coniferous sawmill products are logistically complex as sawmills and end users are geographically spread throughout Britain. There are several

large companies that buy and / or transport coniferous sawmill products on behalf of their clients. There are a large number of supply contracts in place for sawmill products and,

although new contracts can always be entered into, the opportunities for securing large new supply chain contracts are likely to be limited.

05 Coniferous forest residues

5.1. The emergence of wood fibre as a potential fuel for the generation of electricity and heat is opening up a new market for forest residues comprising ‘brash’ and tree stumps. This section looks at the present use of coniferous forest residues and their potential availability and possible demand over the next 15 years. Broadleaved forest residues are covered in section 9.

5.2. Until the last few years the normal forestry practice when coniferous woodlands and forests were felled was to utilise all the stems of the trees down to about a top diameter (t.d.) of 7cm, provided the trees were live and their stems were reasonably straight. The tops of the trees, branches, foliage and poor quality stems, collectively known as ‘brash’, were usually left in the woodlands and forests. This is still often what happens but, following recent large scale trials undertaken by commercial

companies in the UK in conjunction with the Forest Commission, there is now the commercial possibility of harvesting ‘brash’ after clearfelling.

5.3. The wood fibre in tree stumps is also a potential source of wood fibre for fuel for the larger boilers. Stump extraction is carried out overseas, particularly in Scandinavia, and to a limited extent in Thetford Forest in Norfolk where the soils are light and the sites flat. It is potentially more costly to utilise tree stumps as

a wood fuel than ‘brash’ for a variety of reasons, such as the need to remove all soil off them and to install more powerful chipping machines, but if wood fibre prices rise sufficiently, stumps could provide an additional source of utilisable wood fibre on some sites.

Coniferous forest residue wood fibre availability

5.4. Forest ‘brash’ and stumps are only utilisable after trees have been felled on reaching maturity or their final felling age. The potential and actual availability of this type of material depends on a number of factors of which the most significant are identified below:

5.5. The quantity of potentially harvestable forest residue will vary from site to site depending on the tree species. For example, forest ‘brash’ as a rough rule of thumb can amount to the equivalent of a third of the

standing volume of a tree, but in the case of Scots pine only one sixth. Also important are tree growth rates; the age when the trees are felled; the ‘brash’ mat required for use by harvesting equipment to minimise damage to the soil; what silvicultural treatment the trees have received and environmental standards. It therefore makes it very difficult to provide an average figure for forecasting potential yield. Industry sources suggest that ‘brash’ can yield up to 75-100 tonnes of wood fibre per ha and tree stumps about the same amount.

5.6. The potential availability of forest ‘brash’ will depend on the size of the annual felling programme. A good indication of the present size and geographical location of the felling programme in Britain can be gained from the area of woodland that has been restocked annually with conifers. Re-stocking figures for 31st March 2005 to 2009 are given in table 5.1 below for England, Scotland and Wales.

Chart 5.1: Area Re-stocked with Conifers in England, Scotland and Wales (Hectares)

Year to 31/03	England	Scotland	Wales	Total
2005	2,000	8,800	1,300	12,100
2006	2,100	7,800	1,800	11,700
2007	1,800	10,600	2,100	14,500
2008	2,000	10,800	1,500	14,300
2009	1,700	8,200	1,400	11,300

Source: Forestry Commission, 2009

5.7. The maximum average annual felling programme in the period to 2025 is forecast to reach about 6.5 million cubic metres per annum in Scotland, 2.7 million cu metres in England and 1.3 million cubic metres per annum in Wales. If 400 cu metres per ha of conifer roundwood are harvested on average this implies that the maximum area felled in any one year is about 20,000 ha after converting from standing to felled volume. This will be the maximum potential area from which brash or stumps might be harvested annually in Britain.

5.8. The figures in the table also show that the greatest potential for harvesting coniferous 'brash' and stumps occurs in Scotland where most of the coniferous crops are felled.

5.9. Assuming a maximum potential area of clearfelling of 20,000 ha per annum and a maximum quantity of coniferous brash that might be harvested from a site of 100 tonnes per ha then the **maximum potential** production is about 2 million tonnes per annum in total in England, Scotland and Wales ignoring any environmental constraints.

5.10. The Forestry Commission's Woodfuel Resource web site (www.eforestry.gov.uk/woodfuel) forecasts a potential maximum average annual availability of a much smaller quantity of forest residues in Britain after more detailed research. In Scotland the potential maximum availability is forecast to be 180,660 oven dry tonnes (361,320 tonnes as delivered) of coniferous forest 'brash' (poor quality stems, tops of stems, branches and foliage) over the period 2010 - 2025 based on the year 2000 coniferous roundwood availability forecast. The equivalent figure for England is

105,347 oven dry tonnes (210,694 tonnes as delivered) per annum, for Wales it is 56,442 oven dry tonnes (112,884 tonnes as delivered). This gives potential forest 'brash' availability in England, Scotland and Wales of about 684,898 tonnes as delivered per annum ignoring any environmental constraints.

Environmental Issues & Actual Availability

5.11. Forest Research has recently produced two publications which provide guidance on site selection and good practice for brash removal (Guidance on Site Selection for Brash Removal, May 2009) and stump harvesting (Stump Harvesting: Interim Guidance on Site Selection and Good Practice, April 2009). Both publications highlight a number of important environmental issues that Forest Research has categorised into the following:

- » Ground damage
- » Soil carbon loss
- » Soil fertility
- » Acidification

5.12. These issues can be particularly sensitive in upland areas where most of the managed coniferous woodlands have been planted. There the topography can be steep and the soils are often peat or peaty gleys and consequently environmental issues often make them unsuitable for brash and stump removal. As a result the contribution that forest residues can actually make to the supply of wood fibre in Britain compared with its potential availability is very much more limited than at first sight, although good site planning, management and harvesting practices can mitigate the impact that brash harvesting and stump extraction can have on some sites.

5.13. The research guidance also suggests that the removal of both brash and tree stumps from the same site is unlikely to be acceptable.

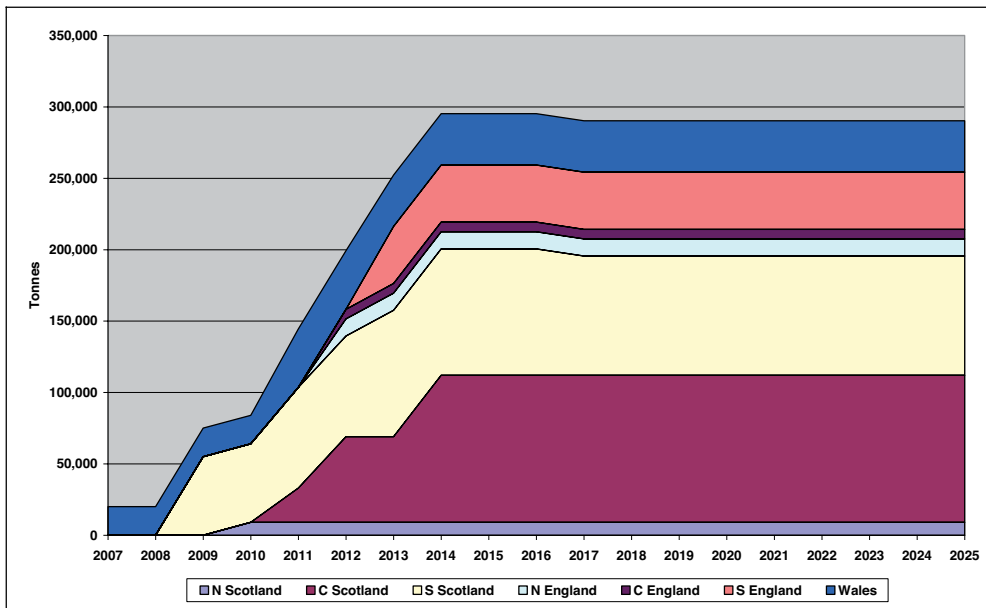
5.14. Some sites are also a long way geographically from where energy plants might be sited, so actual production may not make financial sense after allowing for transport costs. Detailed research would be needed to calculate the likely actual availability of forest 'brash', but it is likely to be only about 75% or less of the potential availability e.g. 500,000 tonnes per annum or less in practice over the longer term.

5.15. Practically there is the additional operational difficulty, particularly in the upland areas of Britain, that residue harvesting may only be carried out on certain sites, or parts of sites, if the environmental guidelines are followed. This will then either mean moving equipment around between sites or having equipment lying idle.

Forecast use of forest residues

4.5. The information provided by energy companies on their expected use of forest residues is shown in chart 5.1 for England, Scotland and Wales. The zones on which the graph is based relate to the geographical locations where the plants are expected to be built and not to the geographical locations from where the forest residues might be obtained.

Chart 5.1: Estimated Use of Forest Residues & Stumps by Wood Energy Companies in England, Scotland & Wales



5.17. The graph indicates that the harvesting of coniferous forest residues is likely to increase significantly over the next five years. The total could reach about 300,000 tonnes per annum by 2014 which will be a useful new additional source of wood fibre for wood energy plants, but the potential of sites to provide further wood fibre for wood energy from brush and stumps will be limited in practice by environmental constraints such as ground damage, soil carbon loss, loss of soil fertility and acidification.. This level of usage would suggest that forest residues may be collected on 3,000 hectares a year if the quantities were the maximum possible at, say, 100 tonnes / ha. If the average quantities were 50 tonnes / ha then residues might be collected on up to 6,000 ha per annum or about 50% of all coniferous sites where trees are being harvested because they have reached their felling age.

Residue harvesting capacity & supply chains

5.18. A supply chain does potentially exist for forest residues as it can be built onto the existing coniferous roundwood supply chain contracting base.

5.19. Forest residues or brush is either collected using specialised baling machines or through secondary extraction with forwarders travelling backwards over brush mats. The choice of method will often be determined by the type of wood fired boiler that has been, or is to be installed, as some boilers are unable to accept green needles because the chlorine in green needles can cause corrosion in the pipes and boiler. Stump extraction is most usually carried out with a purpose built stump harvesting head mounted on a tracked excavator.

5.20. Forest residue harvesting and stump extraction require investment in new or additional equipment for contractors. Baling machines can cost up to £250,000 each. Although the forwarders used to bring brush to road side can be the same as those used in roundwood extraction, this method requires investment in new chipping machines; transport equipment and transport infrastructure. Much of the planned use of forest residues is linked to existing energy plants and harvesting companies. New energy plants wanting supply contracts will have to work with existing management and harvesting companies and contractors and to offer them longer term contracts

as independent harvesting contractors will find it difficult to borrow money to purchase appropriate equipment. At present only a few companies have the right machines, the operational capacity and the operators who have the expertise or experience in residue and stump harvesting.

06 Recovered wood

6.1. The wood based panel industry in the UK has recycled reclaimed post consumer, and a small quantity of pre-consumer wood to produce particleboards for well over a decade and this reclaimed wood now accounts for a very high percentage of the fibre used to make particle board. Reclaimed wood is also recycled into a number of other uses such as animal bedding products, and landscaping and horticultural products. Over the last five years or so a new market for recovered wood has opened up as a potential source of fuel for wood energy plants.

6.2. The re-using of recovered wood comes under different pieces of legislation at present, such as the European Waste Framework Directive, and there have also been a number of court cases which have centred on the definition of 'waste'. At the present time recovered wood is defined as 'waste' and therefore comes under the Waste Management Regulations. Progress

is now being made in reaching some commonly agreed definitions on what is meant by 'waste' and developing protocols for its verification. These are critically important because they will ultimately determine how much wood is available for re-using and how it is subsequently used. The issue is primarily a legal and administrative one and is deemed to be outside

the scope of this study. The issues are mainly the responsibilities of the Environment Agency (EA) and the Scottish Environment Protection Agency (SEPA) and Ofgem when it comes to using biomass for electricity production.

Potential availability of recovered wood in Britain

6.3. There have been a number of studies that have attempted to estimate the quantity of wood that could be recovered in the UK annually. The results of these studies are summarised in a report published in August 2009 by WRAP called the 'Wood Waste Market in the UK' and they are shown, along with the most recent estimate in table 6.1.

Table 6.1: Estimates of the Size of the Wood Waste Market in the UK (million tonnes as delivered)

Source of Wood Waste	Author of Report & publication year				
	WRAP Publ: 2009	ERM/DTI Publ: 2006/7	WRAP/MEL Publ: 2005	BRE/Hurley Publ: 2004	TRADA Publ: 2002
Municipal	0.6	1.1	1.1	0.8	2.5
Industrial / Commercial	1.6	3.5	4.5	3.3	1.8
Construction/ Demolition / Remodelling	2.3	2.9	5.0	3.3	0.9
Total	4.5	7.5	10.6	7.4	5.2

Source: WRAP, 2009

6.4. The results in the table show that:

- » Estimates of the size of the waste wood market vary quite considerably indicating that there are considerable uncertainties about the true size of the market because of the lack of accurate information about the quantity of material going into the different waste streams.
- » The most recent estimate of the size of the wood waste market by Pöyry Forest Industry Consulting for WRAP in 2009, suggests that it is considerably smaller than previous estimates indicated. The reason suggested for the difference with earlier studies is the poor quality of the data on waste generated by construction and demolition activities.
- » The size of the waste wood market will vary depending on future levels of economic activity, the rates of landfill taxes and any future legislation concerned with waste.

6.5. For the purposes of this study the most recent estimate of the maximum size of the waste wood market at 4.5 million tonnes per annum will be adopted as it would appear

to be the most prudent course of action until more reliable estimates of the size of the market become available.

6.6. The WRAP report provided a regional analysis of the estimated wood waste streams and these results are shown in table 6.2.

Table 6.2: Regional Analysis of Wood Waste Streams in Britain (thousand tonnes)

Region / Country ¹	Packaging	Industrial	Construction	Demolition	Municipal	Total
ENGLAND						
North East	36.7	14.5	50.4	45.6	26.9	174.1
North West	125.3	49.5	134.2	110.9	123.0	542.9
Yorkshire & Humber	103.3	40.8	108.7	91.9	69.4	414.1
East Midlands	101.8	40.3	80.8	73.9	26.1	332.9
West Midlands	126.6	50.0	95.1	92.8	54.8	419.4
Eastern	121.8	48.1	96.1	135.1	46.1	447.2
London	123.4	48.8	180.9	158.3	23.4	534.8
South East	162.7	64.3	150.8	190.7	57.6	626.0
South West	106.0	41.9	96.4	101.2	69.1	414.6
ENGLAND	1,007.6	398.4	993.4	1,003	506.3	3,906.0
SCOTLAND	76.3	30.2	107.4	87.9	28.3	330.1
WALES	49.6	19.6	45.1	35.0	55.4	204.7
BRITAIN	1,133.5	448.2	1,145.9	1,123.2	590.0	4,440.8
%	25.5	10.1	25.8	25.3	13.3	100.0

Source: WRAP, 2009 **Footnote:** ¹ WRAP report regional boundaries do not coincide precisely with the zonal boundaries used in this report.

6.7. The majority of the waste is estimated to originate in England with only 6.8% and 4.6% originating in Scotland and Wales respectively. Within England the figures show that most waste originates in the North West and South East of England and London. The geographical availability of the potentially recoverable wood could be an important factor for companies when deciding on where to locate new wood energy plants if they are planning to use a significant quantity of recovered wood for fuel.

Types of recovered wood

6.8. The 2009 WRAP report provided an estimate of the overall size of the market for waste wood and categorised the material by waste streams, but it did not provide any estimates of the grades of material that are available and that might be suitable for different end uses.

Potential availability of recovered wood

6.9. The quantity of recovered wood that is potentially available depends on:

- » How much of the total estimated quantity of recovered wood can realistically be recovered and sorted into grades at an economic price.
- » The end use that is being considered as only certain grades of recovered wood are suitable for particular uses.

6.10. One of the major issues in recovering and re-using wood and wood products is the presence of physical or chemical contaminants in, on or attached to the wood. Wood and wood products that are discarded can often contain nails and screws and pieces of metal and have other materials attached to them. They can also have surface coatings of paints, glues and other types of coatings. In addition they can be mixed in with all sorts of other materials such as glass, plastics and rubber.

Some of the wood may also have been chemically treated. Although all this material is potentially available one of the major challenges is to collect this material and then to sort the material out which may often need to be done by hand where the waste streams are mixed up. Actual availability may therefore be less than the estimated size of the market as it may not be economical to sort small quantities of materials into appropriate grades.

Suitability of Recovered Wood for End Uses

6.11. The quality of the recovered wood in the different waste streams varies and different end uses can utilise different types and qualities. There is significant value adding potential in using recovered wood for agricultural and horticultural purposes and for that reason these uses are able to attract the best quality recovered wood that mostly comes from the packaging industry. The wood processing industry is using recovered wood

from all the wood waste streams. However as agricultural and horticultural uses have a significantly greater ability to pay for recovered wood than wood processing operations, it means that the maximum potential availability of recovered wood from the packaging waste stream for use in wood processing operations is only about 40 per cent of total potential availability. Of the other four waste streams potentially available for wood processing operations, industry sources estimate that that

this varies between 30% and 60% depending on the waste stream because of contamination or segregation issues. All recovered wood is potentially available for wood energy plants and co-generation, provided the plant is WID compliant. Table 6.3 shows the maximum potential availability of recovered wood from each waste stream for the different potential end uses.

Table 6.3: Potential Annual Availability of Recovered Wood to Different End Uses by Waste Streams

End use	Acceptable Types of Wood Waste Stream	Potential Availability from Waste Stream ('000 tonnes)	Assumed % of Waste Stream Potentially Available	Estimated Total Availability for End Use ('000 tonnes)
Horticultural & agricultural use	Packaging	1,169.9	100	1,169.9
Wood processing operations	Packaging	1,169.9 ⁽¹⁾	40	2,324.21
	Industrial	462.5	60	
	Construction Demolition	1,184.5	60	
	Municipal	1,137.4	60	
Wood energy plants & co-generation assuming WID compliant	Packaging	618.7	30	4,572.9
	Industrial	1,169.9	100	
	Construction Demolition	462.5		
	Municipal	1,184.5		

Source: WRAP, 2009

Footnote: ⁽¹⁾ All the packaging waste stream is potentially available for wood processing operations but because the value adding in horticultural and agricultural uses is so much greater than in wood processing operations only 40% can be realistically considered available for wood processing operations.

6.12. Responsibility for collecting and disposing of municipal and some industrial wastes lies with councils. They often contract out this responsibility waste management companies which range in size from very large companies, such as Viridor, Sita, Biffa, Shanks and Veolia to relatively small ones. One alternative to sending municipal waste to landfill is to incinerate it. At present there are thought to be about 22 incinerators operating in Britain and over 70 larger ones

are being planned. Some much smaller plants are already operating and more are planned. One company has planning approval for a number of small plants that will require a total of approximately 300,000 tonnes per annum of municipal recovered wood. It is understood that most, if not all, of the plants being planned for solid municipal waste are likely to generate electricity, heat or both. It appears possible that some of the wood in the other waste streams could be used in the energy

plants that are principally using municipal solid waste which might reduce overall potential availability for stand-alone energy plants, or at least increase competition for this type of material. Much will depend on the terms of the Renewable Obligations Certificates that Ofgem provides these incinerators with in relation to the grades and quantities of recoverable wood that these plants are allowed to use.

Estimated quantities of recovered wood used

6.13. The quantities of recovered wood that that has been used since 2007 and is expected to be used for wood processing and in wood energy plants up to 2025 have been obtained from companies contributing to this study. The amount of recovered wood that is used for agricultural and horticultural purposes has been estimated by the Wood Recyclers Association and their estimates are shown in table 6.4.

Table 6.4: Quantity of Recovered Wood used for Agricultural & Horticultural Purposes in Britain in 2007 & 2008

End use	2007	2008
	Tonnes	
Animal / poultry bedding	290,000	350,000
Equine surfaces	56,000	73,000
Mulches, soil conditioners & composting	75,000	95,000
Pathways & coverings	15,000	17,000
Total	436,000	535,000

Source: WRA, 2009

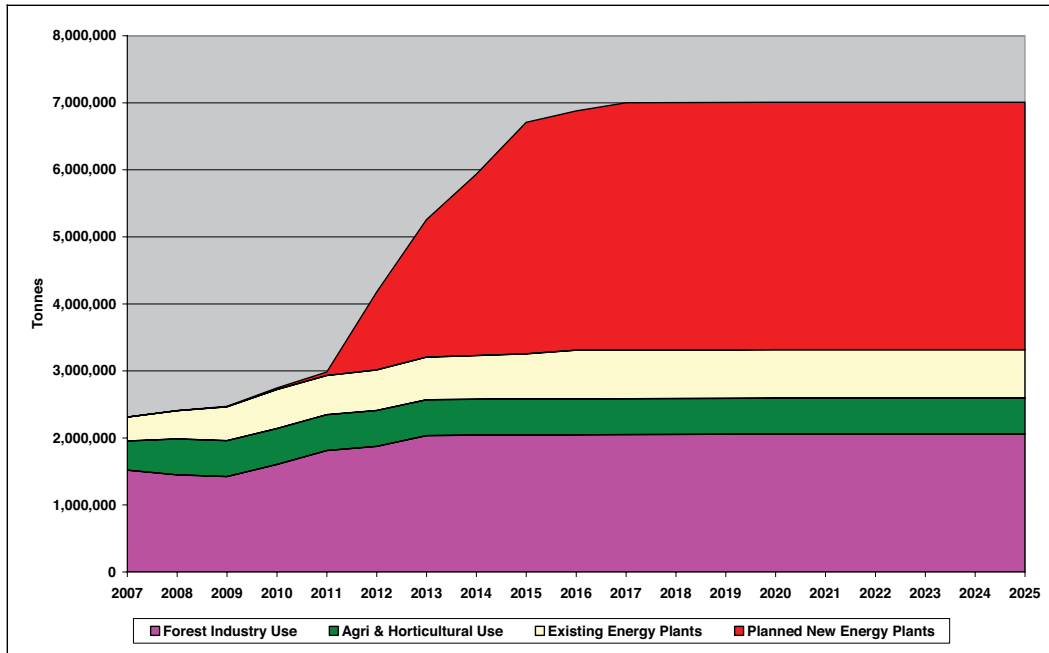
6.14. Responsibility for collecting and disposing of municipal and some industrial wastes lies with councils. They often contract out this responsibility waste management companies which range in size from very large companies, such as Viridor, Sita, Biffa, Shanks and Veolia to relatively small ones. One alternative to sending municipal waste to landfill is to incinerate it. At present there are thought to be about 22 incinerators operating in Britain and over 70 larger ones are being planned. Some much smaller plants are already operating and more are planned. One company has planning approval for a number of small plants that will require a total of approximately 300,000 tonnes per annum

of municipal recovered wood. It is understood that most, if not all, of the plants being planned for solid municipal waste are likely to generate electricity, heat or both. It appears possible that some of the wood in the other waste streams could be used in the energy plants that are principally using municipal solid waste which might reduce overall potential availability for stand-alone energy plants, or at least increase competition for this type of material. Much will depend on the terms of the Renewable Obligations Certificates that Ofgem provides these incinerators with in relation to the grades and quantities of recoverable wood that these plants are allowed to use.

6.15. It is understood that some WRA members are exporting small quantities of the lower grades of recovered wood to the continent, but we have not been able to establish the quantities involved.

6.16. The available information on the uses of recovered fibre in Britain from 2007 to 2025, excluding any that might be used for co-firing, is shown in Chart 6.1.

Chart 6.1: Estimated usage of recovered wood in Britain by end use from 2007 to 2025 excluding any used for co-firing

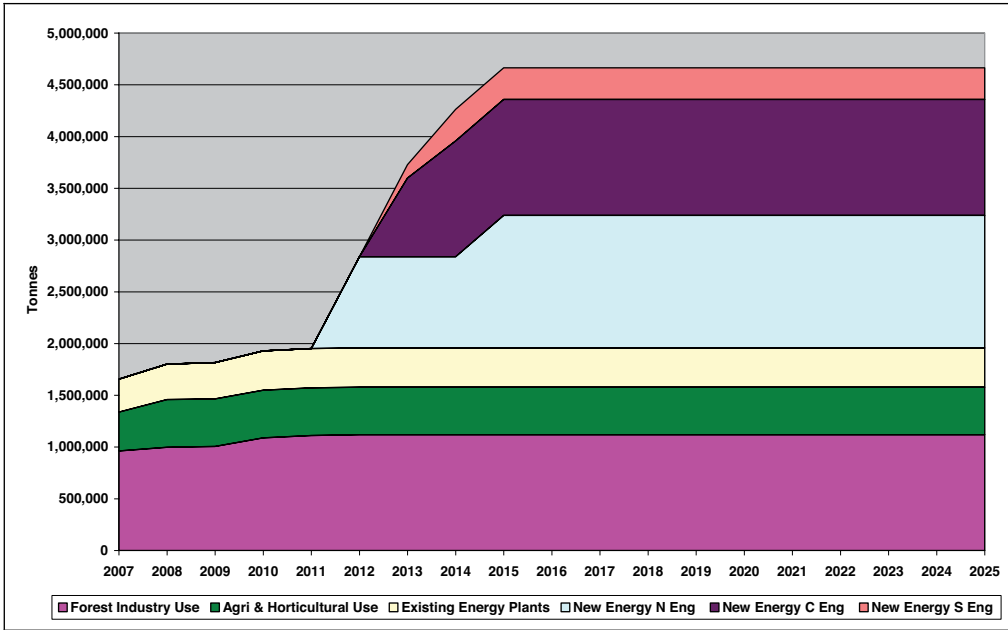


6.17. Present use of recovered wood in Britain is just over 2 million tonnes per annum and demand from existing users is expected to rise to just over 3 million tonnes per annum by 2015. If all the planned new wood energy plants get built the demand for recovered wood

would rise to almost 7 million tonnes per annum by 2015 and remain at about that level. This projected demand of 7.0 million tonnes per annum excludes any recovered wood that might be used for co-firing at some stage in the future.

6.18. The projected use of recovered wood varies between England, Scotland and Wales. The situation in England is shown in chart 6.2.

Chart 6.2: Projected usage of, & demand for recovered wood in England by zones 2007 to 2025, excluding any used for co-firing

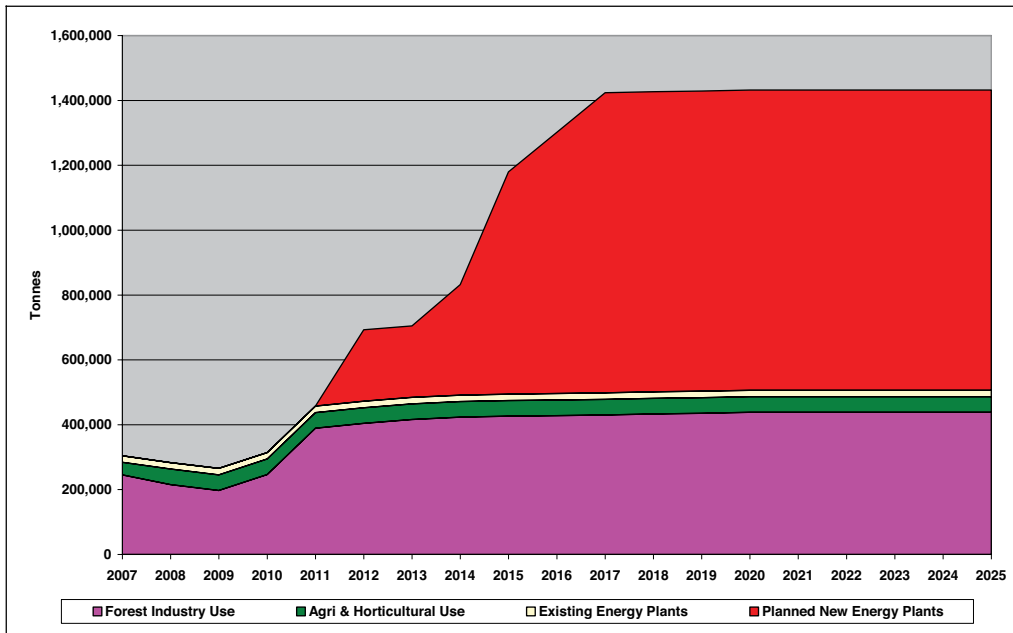


6.19. Any assessment about the size of demand for recovered wood in a particular zone needs to be undertaken with caution since at least one plant is very close to a zonal boundary. The impact of this plant’s location is to boost projected usage of recovered wood in Central England and reduce the projected

usage in the South England zone. The WRAP report estimates the amount of recovered wood in England could be about 3.4 million tonnes per annum, excluding recovered wood from municipal waste streams and the chart shows the projected demand could reach about 4.1 million tonnes per annum.

6.20. The projected demand for recovered wood in Scotland is shown in chart 6.3. Zones have not been shown for reasons of commercial confidentiality as some zones have only one or two companies who have provided data.

Chart 6.3: Projected Usage of, & demand for recovered wood in Scotland 2007 to 2025, excluding any used for co-firing



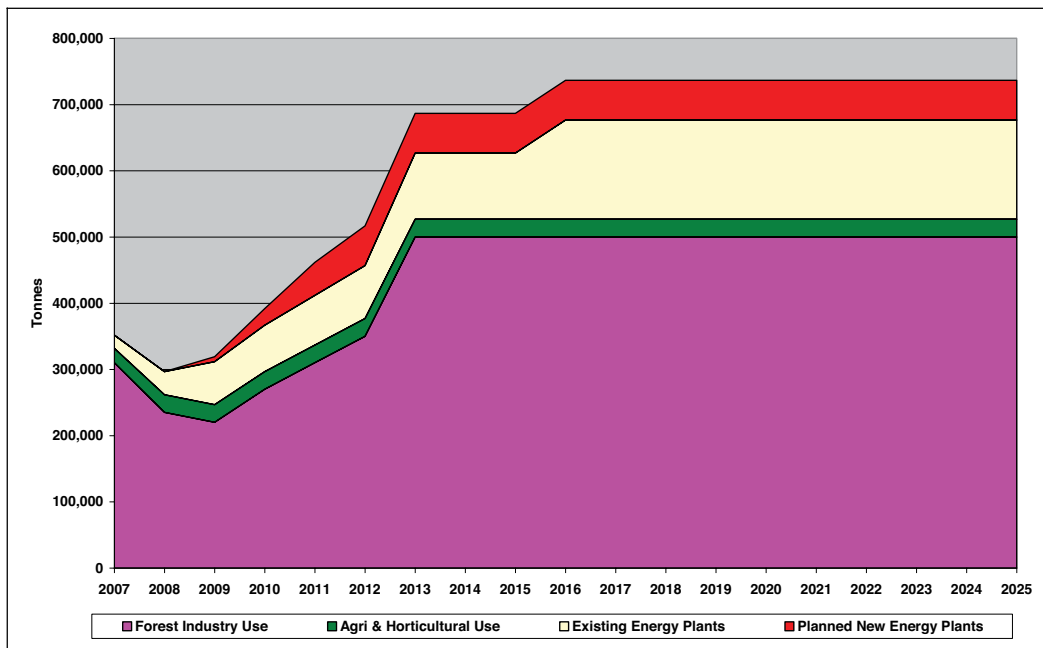
6.21. Almost all the projected increase in demand for recovered wood is expected to take place in Central Scotland. The WRAP report projected potential availability of recovered wood of approximately 300,000 tonnes per annum for the whole of Scotland, excluding the municipal waste stream. The present usage of

recovered wood already exceeds its estimated potential availability in Scotland by almost 50% per annum. The projected demand is expected to increase to just over 1.4 million tonnes per annum by 2017 if all the proposed energy plants are built. One way of overcoming the shortfall in Scotland will be to transport

recovered wood from England where there is a potentially available surplus to demand, or to import supplies from overseas.

6.22. The situation in Wales is shown in chart 6.4.

Chart 6.4: Projected usage of ,& demand for recovered wood in Wales 2007 to 2025, excluding any use for co-firing

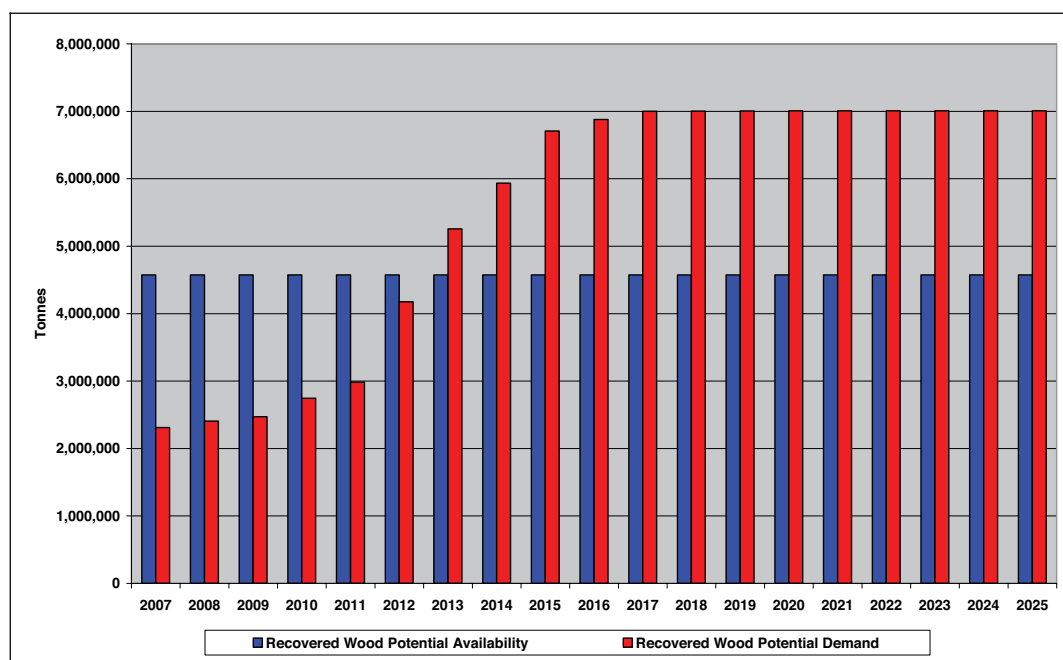


6.23. The WRAP report estimates that the potential availability of recovered wood in Wales is approximately 150,000 tonnes per annum, excluding recovered wood from the municipal waste stream. This is already less than half the present demand of the forest industry in Wales and their planned use of

recovered wood is expected to rise to almost 500,000 tonnes per annum by 2016. One solution will be to continue to draw increasing quantities of recovered wood from England, as might also happen in Scotland, or to import supplies.

6.24. The overall balance between potential availability and demand for recovered wood in Britain is shown in chart 6.5.

Chart 6.5: Possible balance between potential availability & use of, and demand for recovered wood in Britain 2007 to 2025, excluding co-firing



6.25. The chart shows the demand for recovered wood has been increasing sharply. This trend will continue if all the new wood energy plants being planned become operational, and by 2011 / 2012 potential demand will exceed potential availability even assuming that none is used for co-firing. In the longer term potential demand is expected to reach almost 7 million tonnes per annum compared with the potential maximum availability of about 4 million tonnes per annum. Potential demand at that stage would therefore be almost double potential availability. The

major unknown is whether the estimated potential availability of 4.5 million tonnes per annum of recovered wood can be realised as recovered wood that can be delivered under contract to the companies seeking supplies, given the diversity of supply chains, the need to sort materials and the varied treatments that recovered wood has received.

6.26. Given the complexities of recovering and sorting wood out of the waste streams in Britain, and the size of the increase in demand expected over a five year period starting in

2011, a considerable number of changes will need to take place very rapidly in the wood recovery sector if actual supplies are to match those that are potentially available. This seems unlikely given the present relative simplicity of the recovered wood supply chains.

Recovered wood supply chains

6.27. Supply chain contracts can vary in size, and normally range in size between 20,000 and 50,000 tonnes per annum, but can be up to a maximum of 100,000 tonnes per annum.

07 Short rotation coppice

7.1. Short rotation coppice (SRC) is a potential source of fuel for generating heat and power but is otherwise of little use to the existing wood processing industry. This section therefore looks at SRC as a potential source of fuel for new bio-energy plants or for co-firing in existing coal fired electricity generating plants. The ability of a wood fired boiler to use SRC as a source of fuel will depend on the equipment and type of boiler that has been installed.

7.2. This report does not consider the potential availability of wood fibre from Short Rotation Forestry (SRF) i.e. trees grown at closer initial planting distances and cut after about 20 years or so, because SRF is still at the stage of trials. In the longer term it may well have potential based on overseas experience.

7.3. This section identifies what the potential area of SRC could be, what area of SRC crops has been established, what some of the constraints are for expanding this area and what the potential demand might be for SRC material over the next 15 years.

Potential areas available for SRC crops

7.4. Various studies have been undertaken in the past which have indicated that there is a considerable area of land that could be used for growing SRC. For example a study by Andersen, Towers and Smith in 2005 identified that there are between 170,000 and 520,000 ha of land in Scotland alone that is suitable for growing SRC and a further 1.2 to 1.3 million ha are moderately suitable (Andersen R. S., Towers W. and Smith P. (2005). Assessing the Potential for Biomass Energy to Contribute to Scotland's Renewables Energy Needs. Biomass and Bioenergy 29:73-82). There is therefore considerable potential for SRC in Britain.

Actual area of SRC crops

7.4. There is no single definitive source of information held by any Government department or organisation on the total area of SRC that has been planted in England, Scotland and Wales so it makes it very difficult to assess the total areas. The three largest companies that are actively involved in establishing and managing SRC in England and Scotland are: Coppice Resources Ltd, Renewable Energy Growers Ltd and Renewable Fuels Ltd. Based on confidential information kindly provided by the three companies in 2005/06, it was estimated at that time that there were approximately 2,130 ha of SRC established in England and 150 ha in Scotland. The majority of the SRC in England was in Yorkshire, Nottinghamshire and Lincolnshire and it was established in anticipation of supplying the Arbre wood fired power station (now closed) and the Cottam, Drax and West Burton coal-fired power stations. Informal enquiries suggest that there has not been any major planting of SRC since 2005/06 and that the total area in Britain is unlikely to exceed 5,000 ha now with almost all the areas in England, some in Scotland and almost none in Wales other than trials.

7.6. The reasons that there has been little interest in planting SRC are thought to include:

- » Grants. Various grants have been offered to land owners to encourage them to plant SRC over the last 10 years or so, but the area of SRC crops that have been planted suggests that they have not been sufficiently large to making SRC growing financially attractive compared with alternative land uses. Grants have also been subject to quite frequent changes in their levels and their administrative arrangements. At present the Forestry Commission and Natural England handle grants for establishing energy crops in England on behalf of Defra.
- » Attitudes & Perceptions of Farmers. SRC is a new use of farm land, and wood energy is a potential new market. Farmers are naturally cautious about taking up new opportunities but a large number of farmers will have to change their attitudes and perceptions to SRC, and firmer market prices for SRC will need to be established, if there is to be a significant increase in the area of SRC planted in Britain.

- » Competition from Biofuels. SRC is not the only crop that can be grown by farmers to supply the 'green' energy market. There are various other options such as wheat, sugar beet and oilseed rape which can be converted into biofuels. Growing these crops may be more attractive to farmers than SRC since they can be grown on farmers' better land using their existing machinery and farmers will not need to acquire many, if any, new skills.
- » Alternative Wood Energy Crops. The major alternative to SRC is Miscanthus (Elephant Grass) which seems to be attracting greater interest particularly in England where four DEFRA funded Miscanthus producer groups have been set up. For example the Drax power station announced in 2006 that it might be using Miscanthus to fill between 7 and 9% of its fuel requirements by 2009. (Financial Times 13th September 2006). This does not of course preclude it from also using SRC material. These alternatives may prove more attractive options to SRC for a number of farmers because their production may require fewer changes to their existing practices.

- » An Established Market & Market Prices. Larger numbers of farmers may not consider growing SRC until they can be sure there is a well established market for the material and they know what price they will receive for it. It is only then that they can identify the financial returns they can expect and can compare it with other land use options.

7.7. For the above reasons it appears unlikely that there will be a major increase in planting additional areas of SRC in the short term, unless there is a significant increase in the level of grants, or fuelwood prices rise.

Potential availability of SRC

7.8. If the total area of established SRC crops in Britain is about 5,000 ha and the mean annual increment of SRC is assumed to be 20 'green' tonnes (10 dry tonnes) per hectare per annum then the mean annual increment of the existing SRC crops could be up to 100,000 'green' tonnes per annum on a sustainable basis. The availability profile of this SRC material in England, Scotland and Wales cannot be projected with any accuracy because the planting dates for these crops in the different countries is not known but the majority will be in England.

7.9. As it normally takes about 3 years from the time of planting until the material is ready for harvesting, SRC cannot make any significant additional large scale contribution to wood fibre availability for at least 3 or 4 years. There would also need to be a rapid increase in the area of SRC crops that are planted as it would require at least 50,000 hectares to produce about a million tonnes of wood fibre per year. This area should ideally all be planted close to the wood energy plant rather than being geographically spread out throughout Britain; otherwise transport costs could be prohibitive. Such a rapid change in land

use over a relatively small geographical area may also not be easily accepted by local people.

7.10. Although growers of SRC may be spread out geographically, Renewable Energy Growers Ltd is a not-for-profit organisation that claims to represent most of the SRC growers in England. It may therefore be able to offer slightly larger and longer SRC supply contracts to one or more energy plants. Amounts are still likely to be relatively small compared with the overall potential demand for wood fibre over the next 15 years.

Potential demand for SRC

7.11. Some existing energy plants have indicated that they will take SRC material if it is available e.g. E.ON at Lockerbie, Wilton 10 and Drax, but none of the existing or planned energy plants with generating capacity of 5MW or more included in this survey are expecting to

depend on SRC crops as a base load source of fuel over the next 15 years.

7.12. The contribution that SRC crops can make to the availability of wood fibre in Britain in the future will depend on whether there is any

significant expansion in the area of SRC planted in Britain and the subsequent development of the supply chain infrastructure.

08 Arboricultural arisings

8.1. Arboricultural arisings is defined for the purposes of this report as material that becomes available as a result of tree surgery in, for example, parks, streets, school grounds and private gardens and from site clearance for building, construction and road developments. This section looks at the potential annual availability of arboricultural arisings and makes an estimate of their use for energy production based on the findings of this study.

8.2. This material is suitable for wood energy production using appropriately designed boilers, but is not suitable for panelboard production.

Sources & uses for arboricultural arisings

8.3. The main catchments for arboricultural arisings are the urban areas such as the Central Belt of Scotland, Manchester, Liverpool, Newcastle, Birmingham and London. The responsibility for managing civic amenity sites is often sub-contracted out by Councils to waste management or environmental service companies.

8.4. Historically most arboricultural arisings were sent to landfill sites or were chipped and spread around the site. Arboricultural contractors were frequently required to dispose of the arisings that came about from their tree surgery work as a condition of being awarded a contract. Many therefore developed local markets in order to minimise the cost of transporting material.

Stems and the larger branches were often used to supply a local household firewood market. Smaller material was often converted to a mulch or used for surfacing paths. Some is now being used as a fuel for energy production.

Estimated potential availability

8.5. A detailed estimate of the potential annual availability of wood fibre biomass from arboricultural arisings was made by McKay, H (2003), based on a survey of arboricultural companies, tree officers and

local authorities, and the results England, Scotland and Wales are given in table 8.1. The report gave estimates in oven dry tonnes per annum, but the figures in the table have been doubled to bring them to an equivalent green

tonnes to make them more comparable with roundwood and forest residue volumes given elsewhere in this report.

Table 8.1: Estimated Potential Availability of Arboricultural Arisings in England, Scotland & Wales in 2003 in tonnes per annum

Country	Arboricultural Contractor Arisings	Collected Arisings	Utility Work Arisings	Total
England	890,050	319,670	22,400	1,232,120
Scotland	32,292	25,742	11,400	69,434
Wales	22,000	12,012	5,400	39,412
Total	944,342	357,424	39,200	1,340,966

Source: McKay, H. 2003. Woodfuel Resource in Britain

8.6. Overall the potential availability of arboricultural arisings relative to potential wood fibre demand for wood energy is relatively small. The table also shows the relatively small quantities of arboricultural arisings that are estimated to be potentially available in Scotland and Wales relative to England.

8.7. No forecasts were made as to how these quantities might change in the future. The quantities in table 8.1 are not thought likely to change much in the period to 2025, but they may increase slightly over time as more trees are planted in urban areas, legislation influencing the use of this material becomes

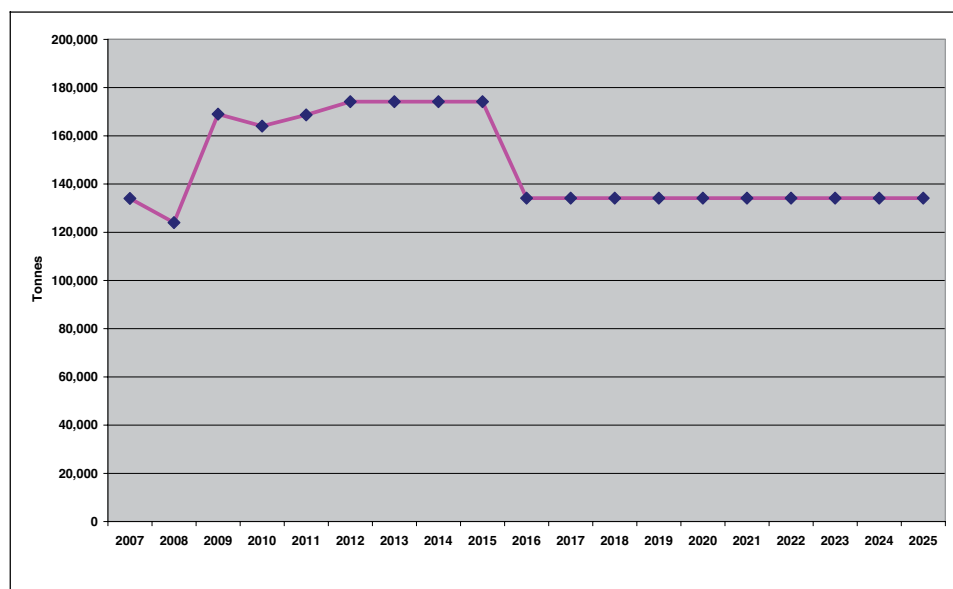
tighter and it attracts higher prices as a potential wood fuel. Wood fuel boilers will need to be designed to take this material.

Present & forecast demand

8.8. There are no official statistics on the quantity of arboricultural arisings that are used in England, Scotland and Wales, but the Forestry Commission are presently funding a study to try and get a better estimate of potential availability and the end uses of arboricultural arisings.

8.9. The estimated quantities of arboricultural arisings that are being used, or are being planned as a fuel for energy production, are shown in chart 8.1 for England, Scotland and Wales. The quantities have been aggregated to give a total for Britain to ensure the anonymity of the plants concerned as they are relatively few at present.

Chart 8.1: Estimated quantity of arboricultural arisings that are being used or plan to be used for wood energy production in Britain. 2007 – 2025



8.10. The chart shows that as a result of the increased demand for wood fibre for generating energy companies are expecting to increase their use of arboricultural arisings from their present level of just over 120,000 tonnes per annum to slightly less than 180,000 tonnes annually in 2009 and continue at that level before dropping back down again to present levels in 2016. This is a significant additional source of wood fibre for wood energy plants.

Arboricultural arisings supply chains

8.11. The major challenge in the utilisation of arboricultural arisings is bringing them together into sufficiently large quantities to make them economically viable to collect and transport. This can be appreciated from the fact that there were an estimated 2,174 arboricultural contractors in Britain in 2003 as well as numerous civic amenity sites, material from households and skips.

8.12. Sites are slowly being developed where the material can be disposed of and waste management companies and Councils are developing supply chains particularly in the larger urban areas.

8.13. Given the estimated potential availability of arboricultural arisings and the diversity of sources, the potential sizes of supply contracts are likely to be relatively small at present for those companies looking for supply contracts

to start new energy plants, particularly when considering the transport costs of moving quantities of material over long distances to a single energy plant. For companies that are already operating energy plants this material can be added to the fuel mix as supplies develop as the supply chains are likely to develop over time, provided their plant is designed to take this material.

09 Broadleaved wood fibre

9.1. Broadleaved woodlands account for approximately 43 % of the woodland area of Britain and this section looks at the potential availability and demand for broadleaved wood fibre from these woodlands.

9.2. The distribution and ownership of broadleaved woodlands in England, Scotland and Wales is shown in table 9.1.

Table 9.1: Areas of Broadleaved Woodlands in England, Scotland & Wales in 2009 (ha)

Country	Forestry Commission	Other Owners	Total
England	55,000	709,000	764,000
Scotland	29,000	271,000	300,000
Wales	14,000	114,000	128,000
Total	98,000	1,094,000	1,192,000

Source: Forestry Commission, 2009

9.3. The figures in the table show that most of the broadleaved woodlands in Britain are not managed by the Forestry Commission. Most of the woodlands are privately owned, individually small, scattered throughout the countryside and in a variety of ownerships.

9.4. In the 1950s most of Britain's broadleaved woodlands were actively managed and roundwood production was considerably greater than it is today. There were a number of larger hardwood mills as well as numerous small ones. Since then the number and size of the hardwood sawmills has dropped considerably

with most now being small, or very small, and widely scattered throughout the country. In 2006 the St Regis paper mill at Sudbrook near Chepstow closed and this was the last large bulk market for small and poor quality broadleaved roundwood in Britain. It had been taking in about 200,000 tonnes per year.

Potential availability

9.5. Given the significant area of broadleaved woodlands in Britain, particularly in England, broadleaved wood fibre appears to have considerable potential for being utilised by the wood energy plants as many of the trees are of poor quality.

9.6. There are no quinquennial forecasts of roundwood production similar to the ones made for conifers made by the Forestry Commission. There is also relatively little published information about the broadleaved woodlands such as their estimated present volume of standing timber. The most recent

estimate is shown in table 9.2 for woodlands in excess of 2 ha. The figures in the report were given on a dry weight basis and these have been doubled to bring them to a more comparable basis with other potential sources of wood fibre from British woodlands.

Table 9.2: Estimated Average Annual Potential Availability of Broadleaved Stem wood and Forest Biomass 2007 – 2021 (tonnes)

Country	Forest Biomass excluding Stumps	Stem wood <18cm t.d.	Stem wood >18cm t.d.	Total
England	499,716	345,516	1,181,584	2,026,816
Scotland	217,744	70,986	206,888	495,618
Wales	167,698	31,950	115,490	315,138
Total	885,158	448,452	1,503,962	2,837,572

Source: Forestry Commission, 2009

9.7. As would be expected the potential availability reflects the relative size of broadleaved woodlands in each country. The major unknown is the quality of the stem wood. If the stem wood is over 18 cm t.d. and the quality is poor then there will not be many, if any, uses for it and it may therefore only be suitable as a wood fibre source for energy production.

9.8. Potential annual average availability of broadleaved wood fibre from woodlands in Britain may lie between about 885,000 and 1,300,000 tonnes in the period 2007 – 2021, excluding any stem wood over 18 cm t.d. Some of the stem wood over 18 cm t.d. will not be of a higher enough quality for sawing into other uses so the quantity of wood fibre potentially available could be around 1,500,000 tonnes per annum or even more.

9.9. Almost all the work on stump extraction has been done with conifers because the stumps are easier to handle and commercial operations are simpler to organise on the appropriate sites. The areas of broadleaved woodland felled rather than thinned can be gauged from re-stocking figures. Forestry Commission data shows that on average approximately 1,000 ha per year were re-stocked with broadleaves annually in England, 1,500 ha in Scotland and 800 ha in Wales over the period 2005 to 2009, although some of these areas might have been stocked previously with conifers.

Estimated roundwood production

9.10. There are no official individual country statistics on broadleaved / hardwood roundwood production for England, Scotland and Wales. Estimated production of broadleaves in Britain for the year ending 31st March 2004 to 2008 are given in table 9.2.

Table 9.2: Estimated Production of Broadleaved Roundwood in Britain 2004 – 2008 (tonnes)

Year to 31st March	Forestry Commission	Other Owners	Total
2004	113,000	399,000	513,000
2005	101,000	492,000	593,000
2006	45,000	392,000	438,000
2007	40,000	400,000	440,000
2008	43,000	389,000	432,000

Source: Forestry Commission, 2009

9.12. Actual production of broadleaved roundwood is thought to be only about 10 – 20% of its potential availability. There are a number of reasons for this.

9.13. Owners have a wide variety of objectives in owning and managing their woodlands and commercial roundwood production is usually only one of several and it often receives a relatively low priority.

9.14. In addition the felling of trees in broadleaved woodlands is subject to a number of constraints because the woodlands are recognised by the Forestry Commission and planning authorities as making an important contribution to the landscape and biodiversity. Many broadleaved woodland owners also value their woodlands for their

visual appearance; for the sporting activities they offer or for their conservation value. In addition there are numerous other technical and economic constraints to any commercial timber production because the woodlands are often relatively small and scattered; access difficult or impossible; and the stem form and timber quality poor. Most of the better quality timber is found on the bigger estates where the woodlands are larger and where they have been well managed over many years. For these reasons present identifiable roundwood production is relatively small, and is primarily driven by the market for hardwood sawlogs.

9.15. One major unknown is the quantity of wood that is presently used as firewood in Britain for predominantly domestic heating purposes. This is because many of the

individuals cutting firewood do this as an informal business or for their own domestic use and it can involve windblown trees or arisings from arboricultural operations. Some estimates suggest the size of the market could already be well over 200,000 tonnes per annum and could be as much as 1 million tonnes per annum.

9.16. Any increase in officially recognised commercial hardwood roundwood production is likely to be driven by: higher prices for hardwood sawlogs; technical developments that will allow poorer quality material to be used economically through reprocessing; or the development of new markets for poorer quality sawn timber. There is no evidence at present of either development happening in the near future.

Forecast demand for wood energy

9.17. Only two of the planned energy plants in England have made specific provision to use broadleaved wood fibre as one of their main potential fibre sources, but others have indicated that they might take the material if it was available. At this stage the projected quantity is about 50,000 tonnes per annum. This is significantly below the quantity of broadleaved wood fibre that is potentially available, but there are no supply chains in place any longer for supplying large scale hardwood processing plants in England, although these could be potentially developed again.

Broadleaved fibre supply chains

9.18. The supply chains for broadleaved wood fibre in Britain now tend to be small and scattered and focused on local markets that are often related to firewood production if there are no local sawmills. The small scale of the operations largely reflects the:

» small size and scattered geographical distribution of many broadleaved woodlands

» constraints that exist on felling trees for landscape or environmental reasons.

» need to use motor manual felling methods and more specialised extraction equipment because of the large size that broadleaved trees can grow to. Where the trees are smaller, the methods and machines can be similar to those used for conifers.

» absence of any large scale markets for broadleaved roundwood in Britain at present.

9.19. It will therefore be difficult to obtain large long term supply contracts for broadleaved wood fibre in advance of building a new wood energy plant because the larger scale formal commercial supply chains in England were seriously weakened when the St Regis paper mill closed. However if larger scale wood energy plants are built that have the design and capacity to take broadleaved wood chips, and offer sufficiently attractive prices, then the broadleaved wood supply chains are likely to be built up again quite quickly.

10 Imported wood fibre & substitutes

10.1. Britain has long been part of the international trade in wood and wood products that has involved mainly processed products such as sawn timber, pulp and paper and panel board products. Log imports have occurred from time to time when there have been surpluses in continental Europe following major storm damage. This section looks at the available information on the potential imports of wood chips and pellets for planned new energy plants.

10.2. The global trade of wood chips is estimated to have reached 29 million tonnes in 2008, but to have fallen to about 21.5 million tonnes in 2009 (Wood Resources International, 2009). Japan has been a major destination for wood chips where their pulp mills import 53% of globally traded hardwood chips and 15% of softwood chips. Other Asian countries that import chips include China, Taiwan and South Korea. Nordic countries are reported as importing 14% of traded chips in 2009. Australia is the largest exporter of chips providing about 4 - 6 million tonnes of hardwood chips per annum. Some other countries providing supplies of chips are South Africa, Vietnam and Uruguay (Wood Resources International, 2009).

10.3. Total global production capacity for wood pellets was estimated to be about 9 million tonnes in 2007 with a further 1 million tonnes capacity being added in 2008. Of this total about 60% of the production capacity was in Europe, 24% in North America and the rest in China, Japan and New Zealand. In Canada there is significant production capacity in British Columbia and additional capacity along the eastern seaboard. Production capacity is growing rapidly in the south eastern USA in response to demand from Europe. (Wood Pellet Association of Canada). Capacity in North America was reported to have increased to just under 6 million tonnes by 2009 and of this capacity about a third is located in the south of the USA (Wood Resources International, 2009). A high percentage of the production in British Columbia is exported to Belgium, Netherlands and Sweden. This trade is likely to be heavily influenced by freight rates and the states of the economies, forest sectors and wood energy markets of the exporting countries.

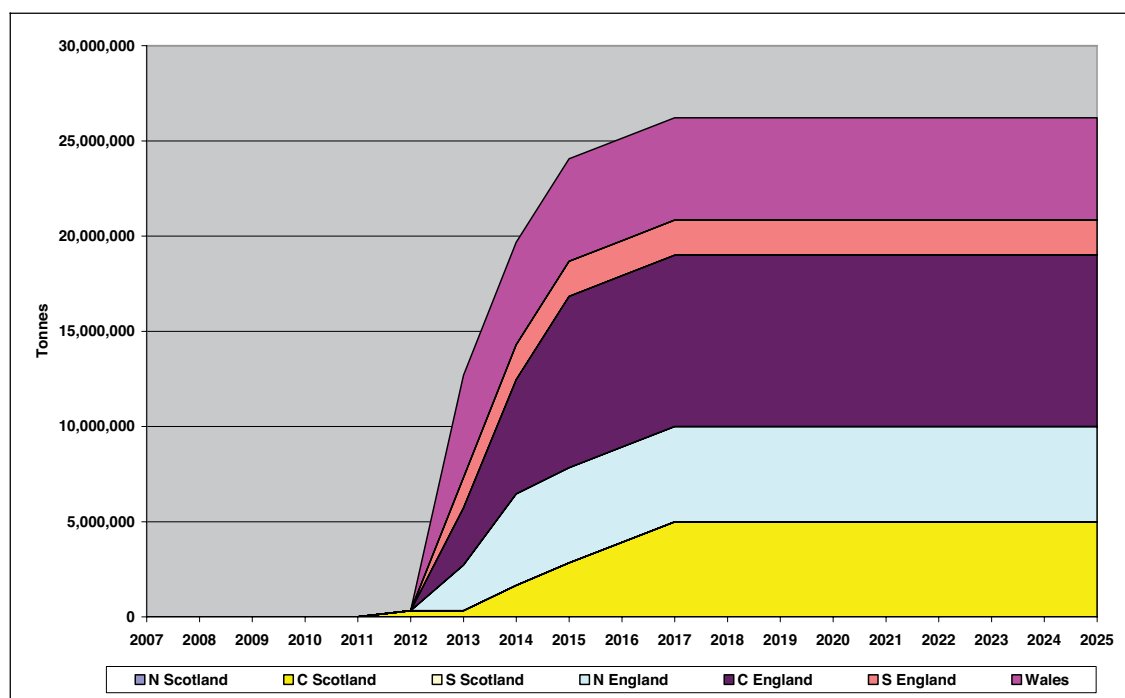
10.4. Global demand for coniferous wood fibre was estimated to be nearly 12 million tonnes in 2008 with Europe and North America accounting for 97% of the demand (Pöyry Forest Industry Consulting, 2009). There is a high demand for wood fibre in Europe from the wood processing industry and wood pellet manufacturers, especially in Central Europe and countries such as Germany, Austria and Belgium. There has also been a rapidly developing market for wood pellets for domestic heating and industrial uses. These developments are influencing and will continue to influence what happens to the forest and wood energy industries in Britain.

Planned imports of virgin biomass for new wood energy plants

10.5. There are no wood fired energy plants or wood processing plants operating in Britain at present that are dependent on imported biomass in the form of chips or wood pellets, but a number of companies are planning to develop large wood fired energy plants that will use imported chips, pellets or both. This is because they perceive there to be potential opportunities overseas for securing large long term contracts for the supply of wood chips and pellets they need to secure the necessary project finance. Such opportunities for large long term contracts for wood fibre do not exist in the UK.

10.6. The estimated aggregate potential quantity of imported virgin wood fibre that is expected to be imported into Britain, if all the wood energy plants being planned, enter production is shown in chart 10.1. The forecasted quantities given in the chart may well be an underestimate as imports are expected to be a combination of wood pellets and wood chips and in developing the chart no distinction between the two has been made although their moisture contents can vary quite significantly.

Chart 10.1: Estimated total imports of wood chips and pellets into Britain if all the wood energy plants being planned are built



10.7. These figures show that Britain could start importing wood chips and pellets for new energy plants in 2012 and the quantity could rapidly rise to about 27 million tonnes per annum if all the planned wood energy plants are built. If this quantity could be secured in the form of long term supply contracts, it would imply an almost doubling of the present world trade in wood chips and pellets. The sourcing of large long term supply contracts overseas will therefore present a major challenge to wood energy plants. Some appreciation of the situation can be gained by RWE Innogy's recent announcement that they plan to build the world's largest wood pellet factory in Georgia, USA which will produce 750,000 tonnes of pellets per annum for export to their existing power plants at Amer in the Netherlands

10.8. No assessment of the feasibility of securing these imported supplies at an appropriate price is made in this study as the impact on wood fibre sourced in Britain will be very small, at least in the short term, provided all the supplies are sourced overseas. The economics of importing of wood chips and pellets will be influenced by transport costs and these in turn will depend on transport infrastructure in the exporting countries, their port facilities, back load availability for ships, fire and micro-biological hazards from chips and wood pellets on board ships and the need for modifications to take account of this, and the density of the material being transported. Transport costs between Vancouver and Rotterdam were, for example, about \$100 / tonne in 2007 according to the Wood Pellet Association of Canada. Torrefaction technology may in due course open up new opportunities for transporting wood fibre globally in a more uniform and stable form.

10.9. If the imported wood fibre needs to be sourced from woods that are registered as being sustainably managed under one of the certification schemes then this is likely to reduce the potentially available supplies quite significantly.

10.10. One practical issue that will have to be addressed if a virgin biomass import trade starts is bio-security. This might restrict the ability of companies to source virgin biomass from certain regions of the world.

Imports of biomass for co-firing

10.11. With the introduction of ROCs, co-firing became potentially attractive commercially in coal fired power stations producing electricity. These credits were only available on 10% of electricity that was generated from renewable sources. The co-firing activity by major coal-fired power stations in 2006 and 2007 is shown in table 10.1.

Table 10.1: Co-firing Activity by Major Generators in Britain 2006 & 2007

Company	Co-firing (GWh)	
	2006	2007
Drax Power Station	154	187
EDF – Eggborough Power Station	162	182
EDF - Cottam	98	90
EDF – West Burton	48	112
E.ON - Ironbridge	29	8
E.ON - Kingsnorth	222	286
E.ON - Ratcliffe	0	0
RWE - Aberthawe	82	21
RWE - Didcot A	126	134
RWE - Tilbury	61	18
Iberdrola - Longannet	155	119
Iberdrola - Cockerzie	51	72
Scottish & Southern Ferrybridge	379	396
Scottish & Southern Fiddler's Ferry	329	265

Source: Centre for Environmental Policy. IEA Task Force 40 Report 2009 based on figures from the Renewable Energy Foundation.

10.12. The types of feedstock used in co-firing are shown in table 10.2.

Table 10.1: Co-firing Activity by Major Generators in Britain 2006 & 2007

	2005	2006	2007
Palm Oil	2,829	36,697	6,414
Palm residues	446,828	480,043	253,090
Olive residues	283,222	99,829	225,640
Shea residues	5,420	4,781	25,617
Wood & wood residues	285,923	206,804	280,457
<i>of which wood pellet</i>	<i>163,961</i>	<i>79,148</i>	<i>152,287</i>
Cereal residues & co-products	124,484	152,457	154,098
SRC & Miscanthus	4,306	2,439	9,396
Tall oil	120,129	59,735	50,060
Tallow	119,828	0	0
Sewage sludge	21,059	0	80,852
Total	1,414,028	1,042,784	1,085,624

Source: Centre for Environmental Policy. IEA Task Force 40 Report 2009 based on figures provided by DECC.

10.13. It is understood that the majority of the feedstock was imported and of the total amount used about 25% or less comprised wood residues. Presently it is estimated that up to about 150,000 tonnes per annum of British wood fibre is being used for co-firing. The major factor in determining the scale of future use of wood fibre whether British sourced, or imported, is likely to be the requirements and incentives offered under the Renewables Obligation Order. It is understood that the activity may be only marginally attractive at present, but this could change.

11 Conclusions

11.1. Wood fibre is mainly used in Britain in the forest products sector and for generating energy in the form of electricity and / or heat. The conclusions in this final section of the report on the potential availability and demand for wood fibre in Britain from 2007 to 2025 are based on information that has been directly supplied by almost 87 % of the 139 companies that have declared an interest either officially, or unofficially, in using or supplying wood fibre in Britain. Information on the operations of companies not contributing to the survey has been obtained from other industry sources or from published or unpublished information sources. There are at least 5 other larger scale wood energy proposals that we are aware of, but the companies concerned did not wish to provide further information about them and we have not made any provision for this in the results of this study. This suggests that the potential demand for wood fibre may be potentially greater than the findings have indicated as the present demand for the domestic use of wood fibre for heating has not been allowed for nor has the potential impact on the demand for wood fibre if the Renewable Heat Initiative is implemented.

11.2. As the survey response rate was so high, and data relating to the operations of companies not responding has been identified through indirect means and has been included, the information given in this report can be regarded as a complete and very accurate picture of wood fibre availability and demand in Britain up to 2025 based on the information presently available.

11.3. The principal sources of wood fibre in Britain are potentially coniferous roundwood, forest residues, coniferous sawmill products, recovered wood, short rotation coppice, broadleaved wood fibre and imports from overseas.

11.4. The quantities of wood fibre given in this report as being used in 2007, 2008 and 2009 are actual or best estimates of actual use, or production in those years. The quantities of wood fibre that are given as being available from 2010 onwards are quantities that are “potentially” available which means they are the maximum quantities of commercially suitable wood fibre that are theoretically available. Whether these quantities are “commercially” available will depend on a whole range of different factors such as cost, and technical and planning issues. The actual “commercial” availability may therefore be significantly less than the “potential” availability of a wood fibre source. Where this is the case the supply: demand position will be closer or more serious than indicated in the report.

11.5. The present availability and demand for wood fibre is shaped by a number of different past and present Government policies, strategies, incentives and regulations involving several Government departments. Given the interconnectivity of wood fibre markets, there is a need for a clear overview and policy co-ordination to achieve the maximum public benefits for wood fibre use in Britain over the long term.

11.6. The main conclusions that can be drawn from the findings of this study are:

Present situation

- » The demand for British sourced wood fibre of all types has been rising rapidly in recent years.
- » British sourced wood fibre is being used successfully for a variety of different uses in the forest products sector and for generating heat and electricity using very small to very large wood fuelled boilers. All these end uses fit in well with Government policies aimed at achieving sustainable economic, social and environmental development and the fact that trees and wood fibre are a renewable natural resource.

- » After a long period when the potential availability of wood fibre in Britain tended to exceed demand, the balance between the two has tightened to the present situation where there are significant pressure points. As a result attempts are now being made to develop and use sources of wood fibre other than coniferous ones and to improve supply chain efficiencies.
- » The change in the balance between potential availability and demand in the last few years has mainly come about because of a significant increase in the demand for wood fibre for generating energy, principally in response to the Government’s Climate Change policies and associated incentives such as ROCs.

Future prospects

» Between now and 2025 the wood processing industry is expecting demand for wood fibre in the form of roundwood, sawmill products and recovered wood to continue to grow fairly steadily using wood fibre supplies sourced in Britain. Although the sizes of the markets for wood fibre in the agricultural and horticultural sectors are relatively small, some growth may occur, although no allowance has been made for this in the results presented in this report. A large number of companies are planning to develop new wood energy plants in Britain, particularly over the next 5 years, and, if successful, it would result in an unprecedented and dramatic cumulative increase in demand for wood fibre in Britain.

» The scale of the additional wood energy plants that are being planned, and whose potential wood fibre demands are covered in this report, range in size from ones producing about 10MW to ones producing 400MW.

» It is not possible at this stage to assess with any certainty which of the proposed new energy plants will be built, but a major factor will be the ability of the developers to secure long term wood fibre supply contracts covering 7 to 10 years or longer in order to win the necessary funding from banks and other financial backers to build and operate the plants.

» The sizes of wood fibre supply chains are relatively small and fragmented in Britain which makes it more difficult to provide and secure long term "bankable" supply contracts for new 'greenfield' projects, particularly if the projects are of any size. The sizes of supply contracts potentially available tend to favour the smaller developments, ones that can use a mix of wood fibre sources in the case of wood energy plants, or the expansion of existing plants.

» Although there are potentially a variety of different fibre sources that could be used in wood energy plants, the focus of commercial activities is on the coniferous wood fibre resource derived from coniferous roundwood and forest residues, and recovered wood where long term supply contracts can potentially be secured. The contributions of other wood fibre sources

such as broadleaved woodlands and short rotation coppice are not perceived as potentially being a fibre source for any new larger scale wood energy plants because the supply chains are small and fragmented at present and long term supply contracts are not available. Potentially these fibre sources can be used once plants are operating, or for use in developing small scale domestic and industrial heating schemes.

» The absence of large long term wood fibre supply contracts for wood fibre sourced in Britain is resulting in a number of companies looking for them overseas which opens up the prospect of Britain importing significant quantities of wood chips and pellets on a regular basis for the first time.

Main implications for wood fibre availability & demand if all proposed developments proceed

11.7. The main implications for potential wood fibre availability and demand are:

» Coniferous Roundwood. The potential demand for coniferous sawlogs in Britain appears likely to remain slightly less than their potential availability, but the difference is not large. Of more significance is the fact that the potential demand for SRW appears likely to significantly exceed potential availability if all the planned wood energy developments take place. This additional demand could potentially be satisfied by purchasing sawlogs, but that could have a potentially serious consequential displacement impact of depriving the sawmilling industry of raw materials.

Included in the demand are the quantities of coniferous logs that companies are planning to continue to export from Britain and the amounts over the long term up to 2025 could be running at just over 650,000 tonnes per annum with an initial increase to about 800,000 tonnes per annum in 2011 before falling back.

» Sawmill Products. The demand for coniferous sawmill products has been, and is expected to continue to exceed their availability if all the planned projects proceed, but the gap between potential availability and demand may close slightly over time as the sawmill industry expands. There is no doubt

that the potential availability and demand for sawmill products is already very finely balanced and this is likely to remain the situation.

» Coniferous Forest Residues. The harvesting of coniferous forest residues is likely to increase significantly over the next five years.. The total amount could reach about 300,000 tonnes per annum by 2014 which will be a useful new potential additional source of wood fibre for wood energy plants. but the potential of sites to provide further wood fibre from brush and stumps will be limited in practice by environmental constraints such as ground damage, soil carbon loss, loss of soil fertility and acidification.

» Recovered Wood. The demand for recovered wood has been increasing sharply. This trend will continue if all the new wood energy plants being planned become operational, and by 2013 potential demand will exceed potential availability, even assuming that none is used for co-firing. In the longer term potential demand is expected to reach almost 7 million tonnes per annum compared with the potential maximum availability of about 4.5 million tonnes per annum. Potential demand at that stage would be almost double potential availability.

» Short Rotation Coppice. Some existing energy plants have indicated that they will take SRC material if it is available e.g. E.ON at Lockerbie, Wilton 10 and Drax, but none of the existing or planned energy plants with generating capacity of 5MW or more included in this survey are expecting to depend on SRC crops as a base load source of fuel over the next 15 years.

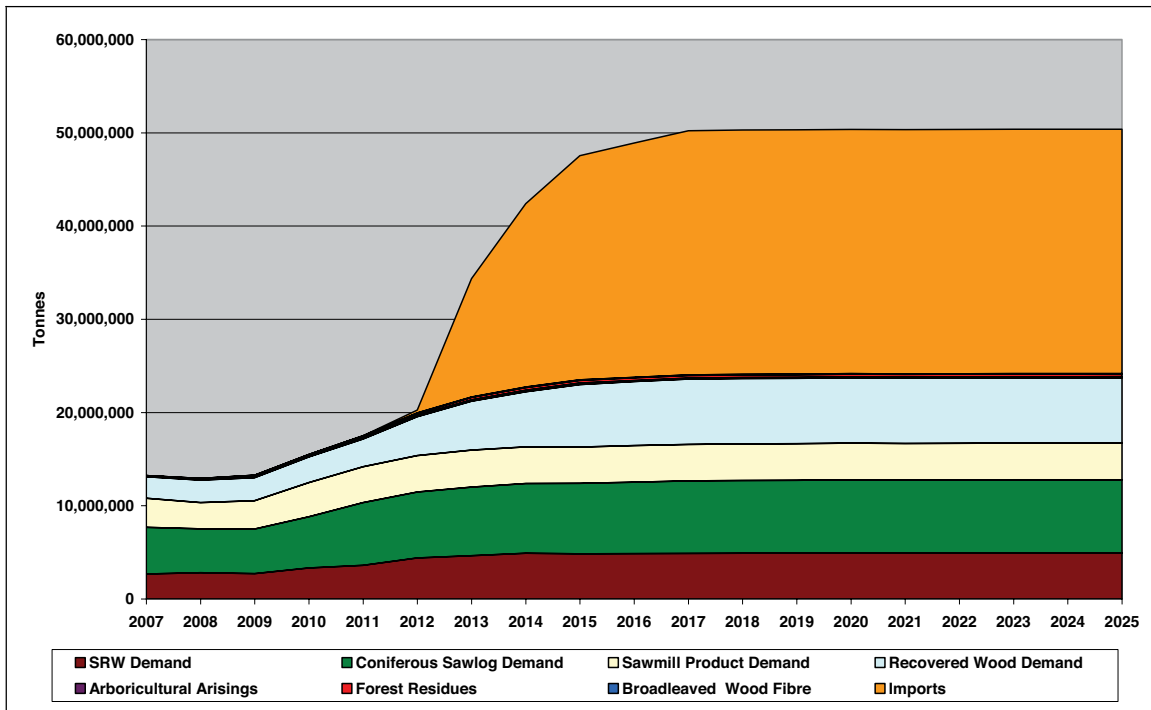
» Arboricultural Arisings: As a result of the increased demand for wood fibre for generating energy, companies are expecting to increase their use of arboricultural arisings from their present level of just over 120,000 tonnes per annum to slightly less than 180,000 tonnes annually in 2009 and continue at that level before dropping back down again to present levels in about 2016. This is a significant additional source of wood fibre for some energy plants.

» Broadleaved Woodlands. Only two of the planned energy plants in England have made specific provision to use broadleaved wood fibre as one of their main potential base load fibre sources, but others have indicated that they might take the material if it was available. At this stage the projected quantity is about 50,000 tonnes per annum. This is significantly below the quantity of broadleaved wood fibre that is potentially available, but there are no supply chains in place any longer for supplying large scale hardwood processing plants in England, although these could potentially be developed again quite quickly in commercially attractive market conditions.

» Imports. Britain could start importing wood chips and pellets for new wood energy plants in 2012 and the quantity could rapidly rise to about 27 million tonnes per annum if all the planned wood energy plants are built. If this quantity could be secured in the form of long term supply contracts, it would imply an almost doubling of the present world trade in wood chips and pellets. Presently it is estimated that up to about 150,000 tonnes per annum of British wood fibre is being used for co-firing. The major factor in determining the scale of future use of wood fibre, whether British sourced or imported, is likely to be the requirements and incentives offered under the Renewables Obligation Order. It is understood that the activity may be only marginally attractive at present.

11.8. Overall total demand for wood fibre of all types in Britain over the period 20007 to 2025 in Britain is shown in chart 11.1.

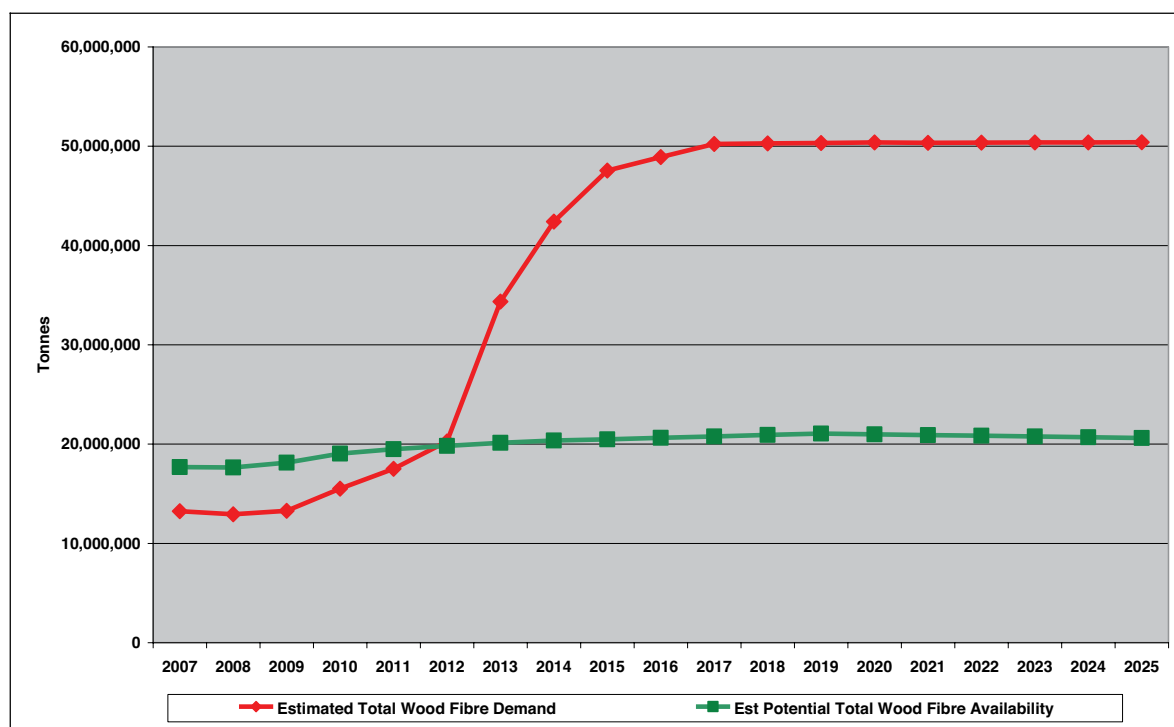
Chart 11.1: Forecast Total Demand for Wood Fibre in Britain by Type 2007 – 2025



11.9. The main feature of the chart is the planned level of imports by the wood energy companies amounting to almost 27 million tonnes per annum of wood chips and wood pellets with a number of companies indicating an interest in sourcing up to 10% or more of their supplies from Britain where possible.

11.10. The overall balance between total potential availability and forecast total demand in Britain for wood fibre based on present plans of companies in the forest and wood energy sectors and excluding any increase in the use of wood fibre for co-firing is shown in chart 11.2.

Chart 11.2: Forecast Total Potential Availability & Forecast Total Demand for Wood Fibre in Britain 2007 – 2025



11.11. The situation is complex and subject to continuous change, but even if a small proportion of the new energy plants become operational, this study shows that it would result in a very fine, and potentially sensitive balance developing between the availability and demand for SRW grown in Britain, sawmill products in the form of chips, slab wood, sawdust and bark derived from British grown wood, and recovered wood. It could also mean the beginning of significant wood biomass imports for the first time which could very rapidly increase to over 27 million tonnes per annum. This total would exceed the potential availability of British sourced wood fibre and almost equal the present size of the global wood fibre biomass trade.

11.12. The forecast tightness of the balance between the potential availability and demand for different types of wood fibre in Britain, if a significant number of new wood energy plants proceed, implies that supply chains are going to be subject to significant pressure, prices are likely to rise and this in turn will have important consequences for the existing and potential new users of wood fibre and the future shape of the wood processing and wood energy industries in Britain.

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Annexes »

01 Study methodology

1.1. The study has been primarily a desk based one and the methodology used is described in more detail in this annex

Geographical Coverage & Data Presentation

1.2. The study covers the whole of Britain, but as the potential availability of different types of wood fibre are known to vary geographically, the information has been provided separately for England, Scotland and Wales where it is available.

1.3. Coniferous roundwood is one of the major sources of wood fibre in Britain and a forecast of its availability is made by the Forestry Commission (FC) quinquennially. The Forestry Commission uses zones within England and Scotland to increase the availability forecast's accuracy for woodlands that are not managed by them. The zones used in this study are based on the ones used in the most recent coniferous roundwood availability forecast for England, Scotland and Wales that was published at the end of September 2006.

1.4. If the zones in Scotland were used to present the results in this report, it could compromise the confidentiality undertakings that have been given as there are relatively few companies in the new North, West, and East Scotland coniferous roundwood availability forecasting zones. To provide the necessary confidentiality to companies in these circumstances the FC's North Scotland and North East Scotland coniferous roundwood availability forecasting zones for the private sector have been combined in this report into a zone called Northern Scotland, and the FC's West Scotland and East Scotland coniferous roundwood availability forecasting zones for the private sector have been combined into a zone called Central Scotland. The 'Northern Scotland' and 'Central Scotland' zone names have been selected to avoid confusion with the names the Forestry Commission has given to their coniferous roundwood availability forecasting zones. The South Scotland zone has not been changed. Although part of the East Scotland boundary comes down into South Scotland, that inclusion has been maintained so that the wood availability forecast matches with the zones.

1.5. Map 1.1 shows the geographical boundaries of the zones that have been used.

Map 1.1. The study has been primarily a desk based one and the methodology used is described in more detail in this annex.



Identification of Potential Users & Exporters of Wood Fibre

1.6. The initial task was to identify all the sawmills, pulp and paper mills, and panelboard mills using coniferous roundwood in England, Scotland and Wales. This was done using information on the company's files, published information sources and help provided by members of the study Steering Group. A total of 61 companies or individuals in the forest and wood processing sector were identified who use, export, or plan to use coniferous roundwood or sawmill products in Britain. As a number of these companies have more than one plant, or they plan to build more than one plant, the survey covers a total of 70 plants.

1.7. There are no large scale users of small broadleaved roundwood in Britain and the sawmills using broadleaved / hardwood roundwood are small and geographically scattered. As their total demand for broadleaved roundwood is very small in relation to its potential availability and in relation to the size of coniferous roundwood availability and demand, no attempt has been made to identify these sawmills or to collect information on their roundwood requirements for the purposes of this study (see section 9 main report).

1.8. Using information obtained from a variety of published and confidential sources, a list of energy plants that are in operation, under construction or are being planned was drawn up. For the purposes of this study wood pellet manufacturing plants have been categorised as wood energy plants. The sizes of the wood energy plants accepted for inclusion in the survey ranged from small (minimum size 10,000 tonnes of coniferous roundwood consumption per annum for proposed wood energy plants) to very large.

1.9. The survey has not specifically identified:

- » The wood used by the sawmills, pulp and paper and board mills for generating their process heat or running kilns as the wood fibre has been allowed for in their roundwood intake or in their estimates of products usage.
- » The wood fired heating schemes that are being installed in a number of individual buildings are still relatively small, although in the longer term the quantities used may become more significant. Based on confidential unpublished Forestry Commission survey data in 2009, there were estimated to be about 158 small wood fuelled boilers providing heating throughout Scotland which in total are consuming about 38,000 tonnes of wood fibre per annum. A total of up to 100,000 tonnes of wood fibre per annum might be used if England and Wales are included. These totals exclude the use of firewood used for domestic purposes.

1.10. A total of 32 companies have been identified who are operating, or plan to operate, a total of 63 wood energy plants in Britain. Of this total 16 are in operation. We are aware of a further 5 wood energy plants that are at the planning stage, but we have not been given any information about them for reasons of total confidentiality and so their wood fibre requirements are not included in this report. It has not been possible to circulate this information to check whether it is comprehensive as some of the names of companies and individuals were given to us under conditions of commercial confidentiality.

1.11. A breakdown showing the numbers, types of plant and their geographical locations that are included in the survey is given in table 1.1. There may well be plans for other plants that we have not identified so that the estimated size of the potential demand for wood fibre given in this report may well be a conservative one.

Table 1.1. Geographical Locations & Types of Plants Included in the Survey detail in this annex

Zone	Plant type						Total: All plants No
	Sawmill plants	Panelboard mills	Paper mills	Existing energy plants	Proposed energy plants	Other	
North & NE Scotland	9	1		3 (1)	2		15
Central Scotland	7	1		2 (2)	13		23
South Scotland	11	1	1	2	3		18
Northern England	11 (1)	2	1	1	7 (1)		22
Central England	11 (1)			3	12 (3)		26
Southern England	5 (1)	1		1	4 (1)		11
Wales	7 (2)	1		4 (2)	6 (3)		18
Other / Exports						6	6
Total	61	7	2	16	47	6	139

Footnotes: Figures in brackets show the number of companies that have not directly contributed information to this study. Industry sources or publicly available information has been used to estimate their wood fibre availability and demand. Plants involved in the production of horse bedding have been classified as sawmills for the purpose of this survey. A further 6 small sawmills were contacted, but they had ceased operating. The development of a further 4 energy plants requiring in excess of 10,000 tonnes of wood fibre per annum are under consideration. One company that is using British wood fibre for co-firing is included in the existing energy plant total. Wood pellet manufacturers have been included under the category of wood energy plants.

Survey Form Design

1.12. It was agreed with the study sponsors that very similar forms to those used in the 2005/6 study would be used again as they were found to be satisfactory in the last survey. There were separate forms for sawmills, pulp and paper mills and board mills, log exporters and energy plants. The forms asked companies to supply information on the quantity of roundwood they used in 2007 and 2008, what they expect to use annually up to 2025, and the zones from which the roundwood was being or could be sourced in the future. In addition, sawmills were asked to supply information on the types and quantities of sawmill products (e.g. unbarked/barked chips, slab wood, sawdust and bark) they estimated they produced, or are likely to produce, and what the uses of these products were, or might be in the future. The panelboard and paper mills were asked about the wood fibre types they used and their zonal sourcing.

1.13. Respondees were asked to identify from which zones they sourced their logs based on average annual percentages and so the net availability of coniferous roundwood may not be a precise figure for a particular year, but it will provide a useful overall pattern. Respondees will not be aware of other companies' zonal roundwood sourcing strategies and they will probably have made no allowance for changes that will take place in these supply patterns if a company plans to increase production or a large new user / buyer enters the market because they may not be aware of these developments. Net coniferous roundwood availability figures may well therefore be less than the forecast demand in some zones.

1.14. Discussions prior to the previous study about what roundwood size categories to use resulted in the conclusion that few mills kept a detailed inventory of the size categories of roundwood they used so there would be no merit in seeking to collect this information and trying to match it to the forecasts of potential roundwood availability.

Mailing of Survey Forms & Response

1.15. The survey forms were posted and emailed out between the middle and end of November 2009. Where companies had taken part in the 2005 / 06 study their previous returns were copied and returned with information about this new study. Reminder letters were sent out in mid December 2009 and further follow up phone calls were made.

1.16. The final response rate obtained was 87% and suggests that all parties recognised the importance of the findings of the study. Only 18 companies in total failed or refused to provide information and of those 5 were in the forest sector and 13 were involved in wood fired energy. To overcome this we have used information from a variety of sources within the industry and public information to obtain data on these companies' existing or proposed production or use of wood fibre and estimates for these companies are included in the results.

Analysis of Results

1.17. The confidential information on the returned survey forms was entered on Excel spreadsheets where it was analysed. Some practical issues that were identified in analysing the data were:

- » the returns from some sawmills covered only single shift working, while for others it covered extended or double shift working. Potentially all sawmills could move to double shift working if there was the demand and there was suitable quality coniferous roundwood available at an acceptable price.
- » The locations of some sawmills and wood energy plants are very close to zonal boundaries and so there will be some distortions arising from this in the zonal transfer data for coniferous roundwood and sawmill products.

1.18. As the response rate was so high and the data relating to the operations from companies not responding has been identified through indirect means and has been included, the information given in this report can be regarded as a complete and very accurate picture of the potential wood fibre availability and demand in Britain up to 2025 based on the information presently available.

02 Coniferous roundwood availability

2.1. This section begins by considering a number of technical issues starting with a brief analysis of the different contexts in which the term ‘availability’ can be used before explaining how the term is defined for the purposes of this report. The factors that will shape the overall future availability of coniferous roundwood in England, Scotland and Wales are then identified, along with the technical information that any forecast should ideally provide if it is to bring the greatest strategic and operational benefits to businesses. The remainder of the section then presents the results from the 2005 coniferous roundwood availability forecast published by the Forestry Commission in September 2006. A new coniferous roundwood availability forecast is due in 2011.

Technical issues

Defining availability

2.2. The terms ‘roundwood production’ and ‘roundwood availability’ are sometimes used inter-changeably in certain contexts. In this report the term ‘roundwood production’ is taken to be the actual outturn of roundwood that is produced as a result of harvesting operations. ‘Roundwood availability’ refers to the roundwood that is available in the forest and it may be described as being either ‘potentially’ or ‘commercially’ available. The distinction between the two terms is very important. Where roundwood is described as being ‘potentially’ available it is taken to mean the maximum quantity of commercially suitable roundwood that could theoretically be harvested for commercial purposes. i.e. the biological potential. In practice there will be a number of planning, environmental, landscape, social, harvesting cost and location factors that commercial users will need to take into account in developing roundwood harvesting plans and these are likely to mean that commercial availability will be less than ‘potential availability’ to a greater or lesser degree at local, regional and national levels.

Approach & reliability of forecast

2.3. It is important to note that the forecast of coniferous roundwood availability has been developed using two quite different approaches. The forecast produced by Forest Enterprise has been developed using detailed information on growing stock in each Forest District, together with harvesting prescriptions from current design plans and crop management regimes. The output is therefore built up from the stand/felling coupe level and represents a production plan for the first five years and thereafter an indicative forecast of production.

2.4. The forecast for the private sector is based on much broader information about crops obtained from the National Inventory of Woodlands and Trees (NIWT). The NIWT woodland information in Scotland is based on aerial photographs taken at a scale of 1:25,000 in 1988, and in England on photographs taken in the mid 1990s. The inventory then involved collecting data from a sample of 1% of all woodlands over 2 ha identified from the aerial photographs. A further limitation on the private sector forecast is that the private sector woodlands are in a multiplicity of ownerships and the management and production assumptions do not include firm individual or collective plans to harvest timber at a particular time, although they are based on a set of management prescriptions provided by the larger woodland management companies. The key assumptions that underlie the private sector wood availability forecast are shown in table 2.1.

Table 2.1. Key Assumptions Underlying the 2005 Private Sector Coniferous Roundwood Availability Forecast

Assumption	England	Scotland	Wales
Unproductive Areas	7.1% open space	10.9% open space	2.6% open space
Timber Potential	Based on National Inventory assessments of productive potential	Based on National Inventory assessments of productive potential	Based on National Inventory assessments of productive potential
Volume Adjustments	Reduced by 3.7% to allow for extractability & stocking	Zonal reductions to allow for extractability & stocking: North 2.8% North East 7.2% East 5.7% South 8% West 6.8%	Reduced by 2%
Yield Class	Assumed the same as FC Estate	Assumed the same as FC Estate	Assumed the same as FC Estate
Thin / No Thin	Assumptions based on present low level of thinning activity	Assumptions based on present low level of thinning activity	Assumes 17% of conifer forest area converted to low impact silvicultural systems
Rotation Period	Assumptions designed to reflect present practice and site conditions. Low yield class stands assigned for either premature felling or retention	Assumptions designed to reflect present practice and site conditions	Modified because of thin / no thin assumptions
Stands beyond Rotation Age	11.4 million m ³ beyond assumed felling ages in England. The % assumed available of volume beyond felling ages by zones: Northern England 10% Central 20% South 30%	13.0 million m ³ beyond assumed felling ages. The % assumed available of volume beyond felling ages by zones: North: 39% North East: 44% East: 50% South: 73% West: 86%	1.8 million m ³ beyond rotation age. 70% of volume beyond felling age assumed available

Source: Forestry Commission, 2006

2.5. The private sector roundwood forecast therefore mainly represents a forecast of “availability” rather than a forecast of “production”.

2.6. The Forestry Commission’s 2006 forecast of coniferous roundwood availability for Great Britain is provided in five year periods covering the period 2007 to 2026. The forecast for Scotland was only provided for two zones – north and south Scotland. The Forestry Commission subsequently provided us with the data broken down for 3 zones in Scotland and the geographical boundaries of each zone are shown on map 1.1. The total availability of coniferous roundwood in Britain is expected to increase annually up to 2020 when it reaches 11.45 million tonnes per annum and then it will

start to decline gradually. This has important future strategic implications for companies expecting to be using coniferous roundwood in the different countries after 2020

2.7. The annual coniferous roundwood availability differs between countries, and zones within countries, and this reflects the area and age of the coniferous woodlands that are present in each. There are 365,000 ha of coniferous woodlands in England (32% of the woodland area in England), 1,042,000 ha in Scotland (77.7% of the woodland area in

Scotland) and 156,000 ha in Wales (54.9% of the woodland area in Wales). Table 2.2 shows the Forestry Commission’s forecast of average annual availability of coniferous roundwood above 7 cm t.d. in England, Scotland and Wales by zones for each five year period after converting from standing volumes to roundwood outturn in tonnes. This information is shown graphically in chart 2.1.

Chart 2.1: Potential Availability of Coniferous Roundwood in England, Scotland & Wales 2007 -2025

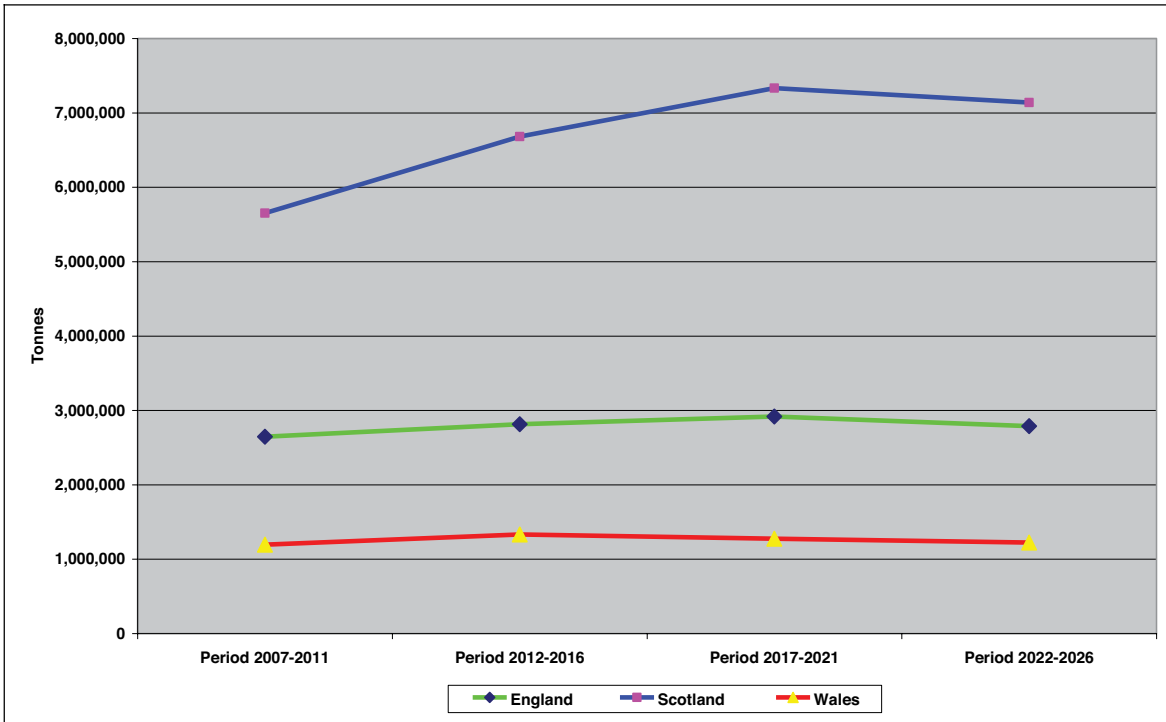


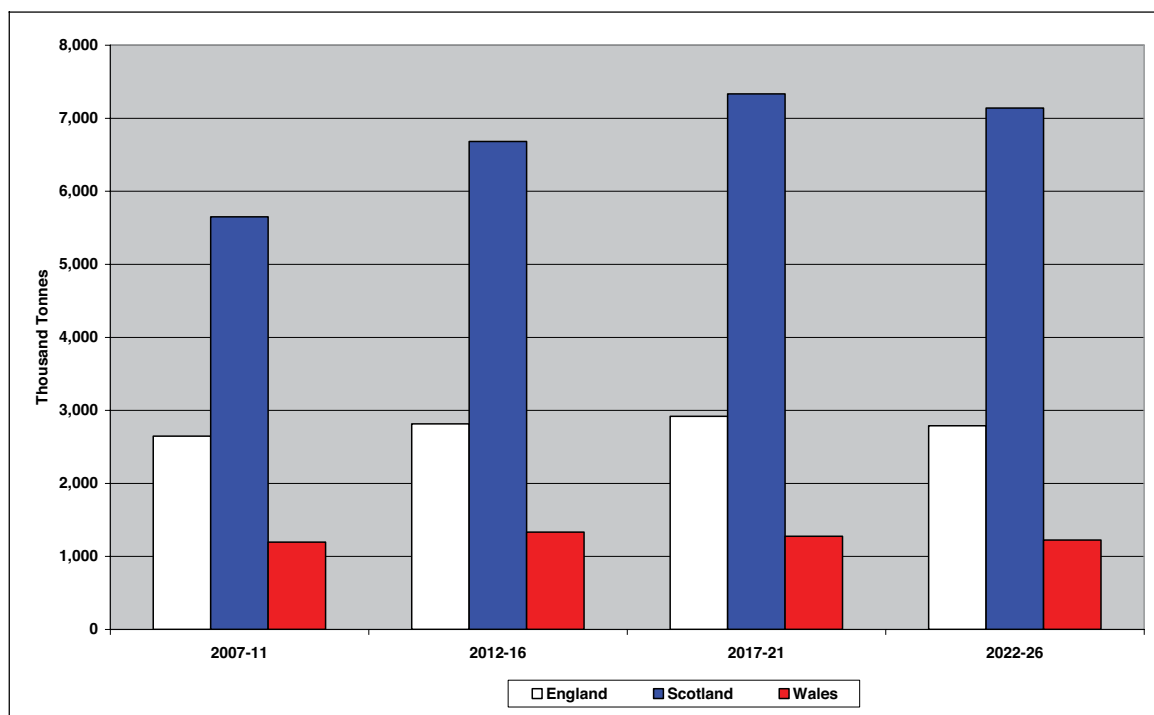
Table 2.2: Forecast Coniferous Roundwood Availability for England Scotland & Wales converted to '000 tonnes of Roundwood

Top-diameter Class	2007-2011			2012-2016			2017-2021			2022-2026			
	FE	PS	Total	% Spruce	FE	PS	Total	% Spruce	FE	PS	Total	% Spruce	
Northern Scotland													
7-14 cm	192	224	416		200	248	448		183	296	479		
14-16 cm	65	81	146		72	100	172		71	116	187		
16-18 cm	61	81	142		69	101	170		70	119	189		
18+ cm	280	418	698		308	522	830		367	599	966		
Total	597	804	1,401	44	649	971	1,620	41	690	1,130	1,820	40	
Central Scotland													
7-14 cm	269	228	497		325	268	593		365	288	653		
14-16 cm	102	98	200		131	118	249		156	140	296		
16-18 cm	98	105	203		129	132	261		156	160	316		
18+ cm	518	506	1,024		667	682	1,349		756	845	1,601		
Total	986	937	1,923	78	1,251	2,442	80	1,433	2,866	4,433	2,866	81	
South Scotland													
7-14 cm	358	323	681		353	339	692		317	331	648		
14-16 cm	126	149	275		135	158	293		133	154	287		
16-18 cm	117	157	274		131	174	305		134	171	305		
18+ cm	466	628	1,094		571	759	1,330		659	749	1,408		
Total	1,068	1,258	2,326	87	1,190	1,430	2,620	88	1,242	1,405	2,647	89	
North England													
7-14 cm	212	112	324		216	109	325		180	106	286		
14-16 cm	74	45	119		73	49	122		67	50	117		
16-18 cm	66	48	114		65	55	120		62	58	120		
18+ cm	278	257	535		292	317	609		276	369	645		
Total	631	461	1,092	64	646	530	1,176	66	585	583	1,168	65	
Central England													
7-14 cm	51	60	111		39	49	89		34	43	77		
14-16 cm	18	26	44		16	23	39		16	21	36		
16-18 cm	17	30	47		16	28	43		16	26	43		
18+ cm	125	233	358		148	264	412		157	295	453		
Total	212	349	560	12	218	363	582	13	224	385	608	14	
South England													
7-14 cm	46	120	166		46	104	150		43	94	138		
14-16 cm	16	51	67		17	45	62		18	41	59		
16-18 cm	18	57	75		19	53	71		20	49	69		
18+ cm	199	487	686		226	545	772		261	615	876		
Total	280	714	995	21	308	748	1,055	21	342	799	1,141	21	
Wales													
7-14 cm	136	127	263		143	128	271		139	146	285		
14-16 cm	57	45	102		60	46	106		58	44	103		
16-18 cm	59	50	109		52	52	116		60	52	112		
18+ cm	395	326	721		457	385	841		394	382	776		
Total	647	549	1,195	65	722	612	1,333	68	650	624	1,274	69	
Total	4,421	5,072	9,492	62	4,984	5,845	10,828	64	5,166	6,359	11,524	64	
Great Britain													
7-14 cm	1,264	1,193	2,458		1,322	1,237	2,559		1,261	1,304	2,565		
14-16 cm	458	497	954		504	540	1,044		464	567	1,031		
16-18 cm	436	529	965		491	595	1,086		517	634	1,151		
18+ cm	2,361	2,854	5,215		2,668	3,473	6,141		2,568	3,855	6,423		
Total	4,419	5,074	9,493	62	4,986	5,845	10,830	64	5,164	6,360	11,524	64	
Total	4,421	5,072	9,492	62	4,984	5,845	10,828	64	5,166	6,359	11,524	64	

Source: Forestry Commission, 2006
Footnote: FE = Forest Enterprise, PS = Private Sector

2.8. The relative sizes of the quantities of coniferous roundwood above 7 cm t.d. that are forecast to be potentially available in England, Scotland and Wales, and how these change by 5 year periods over the next fifteen years, are shown in chart 2.2.

Chart 2.2: Forecast Size & Change in Availability of Coniferous Roundwood in England, Scotland and Wales in 5 year periods from 2007 to 2025



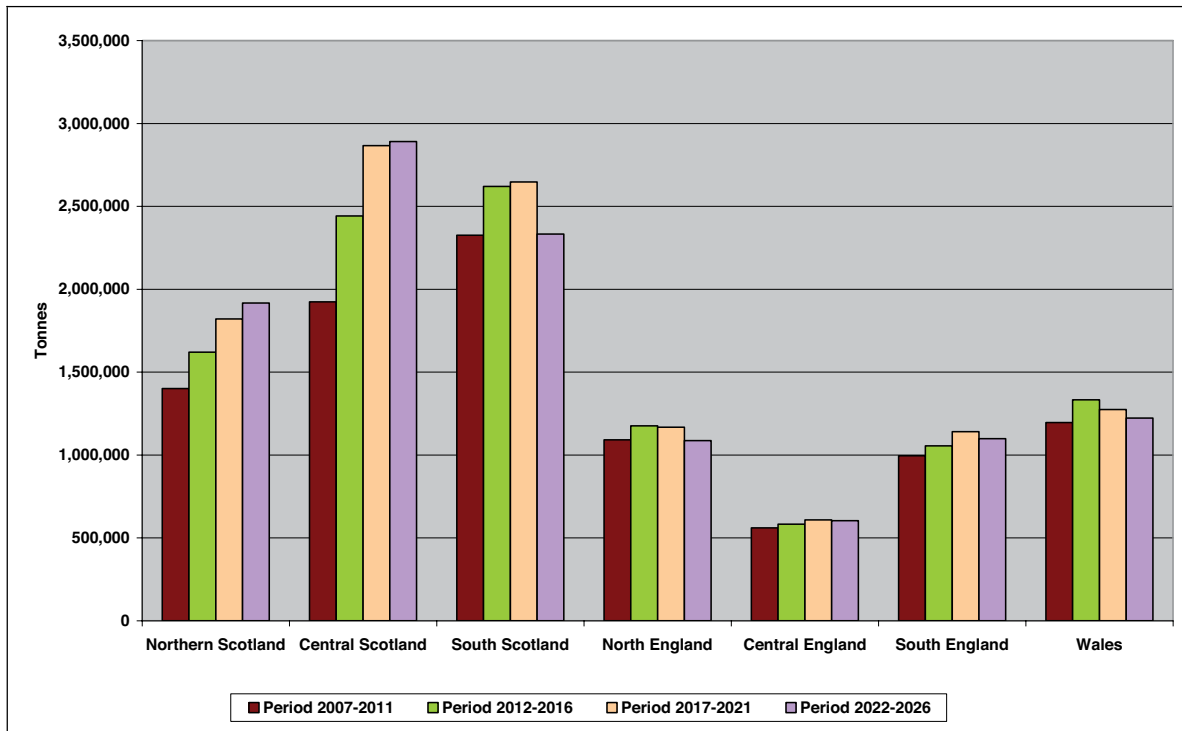
Source: Forestry Commission, 2006

2.9. This chart shows that the potential average annual availability of coniferous roundwood (and therefore by implication sawmill products) is small in Wales, and also in England given the size of the country's total woodland area relative to Scotland's.

2.10. The location of the coniferous roundwood that is forecast to be potentially available is very important for industry. Roundwood located a long way from an existing wood processing or wood energy plant may be uneconomic to purchase and transport, particularly at a time of rising fuel prices and global price competition. At present it is not possible to use GIS to show the FC's forecast availability of coniferous roundwood at a greater local detail other than zones, nor can the locations of the coniferous woods and forests underlying the forecast be shown.

2.11. The potential availability of coniferous roundwood by zones and by 5 year periods up to 2025 within England and Scotland is shown in chart 2.3, along with the potential coniferous roundwood availability in Wales.

Chart 2.3: Potential Average Annual Availability of Coniferous Roundwood by Zones in England and Scotland and in Wales by Five Year Periods from 2007 to 2025



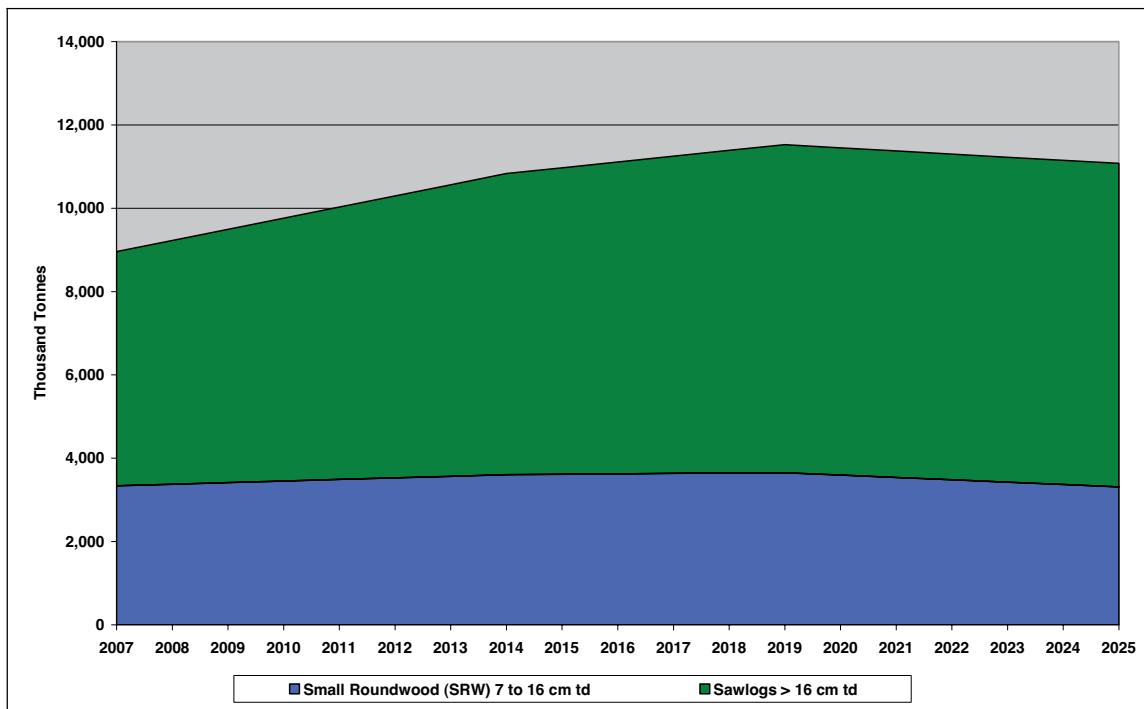
2.12. This shows that in the next 15 years the greatest increases in annual average coniferous roundwood availability are forecast for the zones in Scotland and very little change in availability is expected in any of the zones in England or in Wales.

2.13. The FC's potential coniferous roundwood availability forecast is given as an average annual volume over a 5 year period throughout the rest of the report. For the purpose of presenting the data in this report, the forecast has been smoothed to show changing annual quantities on the assumption that the forecast annual quantities for a five year period occur in the mid point of the Forestry Commission's five year forecasting period.

Potential quantity & dimensions of coniferous roundwood

2.14. The size of coniferous roundwood will have a major influence on its suitability for different end uses. Roundwood with a top diameter from 7 cm to 16 cm has been defined as small roundwood (SRW) for the purposes of this study and is mostly used for industrial wood processing. It is also normally lower priced than sawlogs. For these reasons this size of material is considered most suitable for use by wood fired energy plants. Roundwood with a top diameter of 16 cm and upwards has been defined in this study as a sawlog.

2.15. The potential availability of coniferous SRW and sawlogs can be obtained from the information in table 2.2 and it is shown graphically in chart 2.4.

Chart 2.4: Potential Availability of Coniferous SRW and Sawlogs in Britain 2007 - 2025

Source: Forestry Commission, 2006

2.16. The chart shows that the future growth in availability of coniferous roundwood in England, Scotland and Wales will be in sawlogs with a top diameter of 16 cm or more and not in SRW. Little increase is forecast in the future availability of coniferous SRW up until 2019 at which point potential availability is forecast to amount to 3.65 million tonnes per annum before its availability starts declining.

Quality of roundwood

2.17. The quality of potentially available roundwood is of considerable importance to the sawmilling industry, particularly in relation to the straightness of a log, as this will have a major influence on its suitability for different end uses. Straight logs of 3 metres or more in length, known as „green’ logs, are required if the material is to be used to produce sawn timber for the very large construction market. Other markets for domestically grown timber are smaller; more localised and are already fairly well supplied. The quality of the roundwood is

not as critical for other commercial end users as the material is mostly debarked and then chipped or flaked.

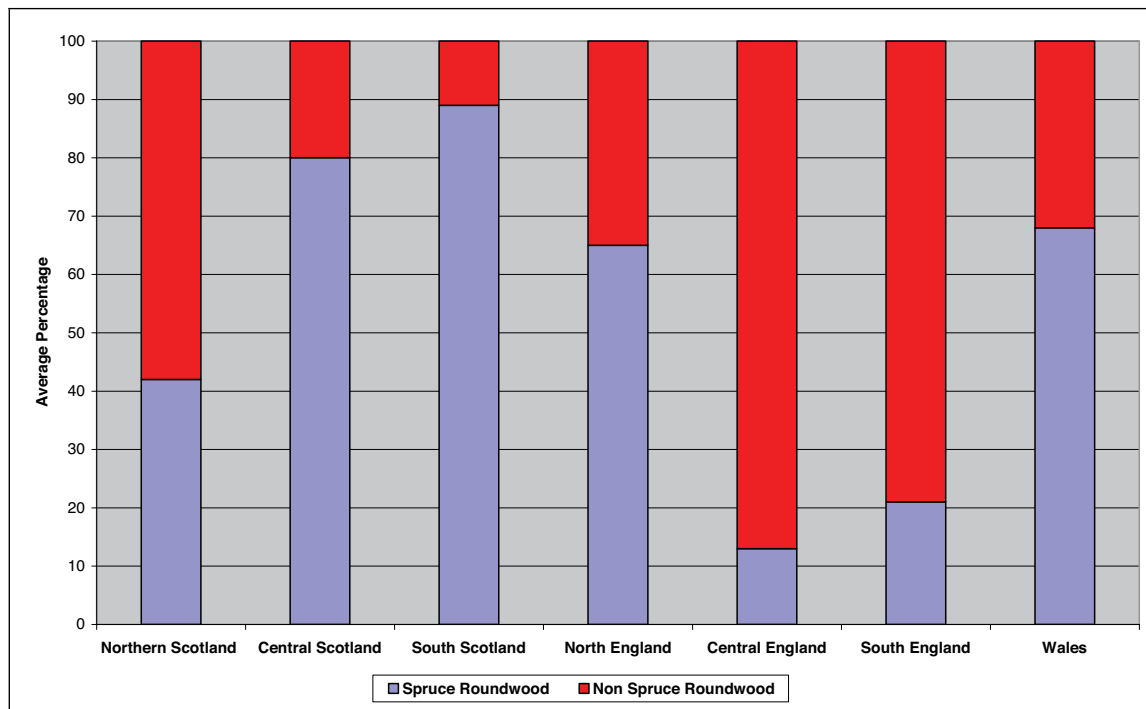
2.18. The quality of the roundwood resource is therefore critical to the expansion of the British sawmilling industry and therefore to the future potential availability of sawmill products. The FC’s potential coniferous roundwood availability forecast does not give information on the quality (straightness) of the roundwood that is potentially available from the private sector, but estimates will be made for Sitka spruce in the next availability forecast that is due in 2011.

Species composition

2.19. The species of tree from which the roundwood comes is important for some end uses because of the type of wood fibres it contains. Some end use processes are dependent on using spruce, such as paper making and MDF production, but for other purposes a variety of other coniferous species

can be used e.g. particle board production and wood fired energy plants. For the purposes of this study it was agreed with the Steering Group that the roundwood should be categorised into Spruce (predominantly Sitka spruce) and Non-spruce. This coincides with the categorisation used in the wood availability forecasts. The spruce: non-spruce composition of the roundwood forecast to be available in each zone or country does not vary by more than 2 or 3 % points either way over the next 15 years so the average percentages for each zone in England and Scotland and for Wales have been calculated for the 15 year period and they are shown in chart 2.5.

Chart 2.5: Forecast % Average Composition of Coniferous Roundwood by Zones 2007 -2025



Source: Forestry Commission, 2006

2.20. The chart shows that the highest percentages of spruce roundwood are available in the Central and South Scotland zones and in Wales. In zones covering the north, north east and east Scotland and eastern England, pines comprise high percentages of non-spruce roundwood. In Northern, Central and South England zones the non-spruce material tends to comprise a mix of other species but with pines and larches predominating.

Conclusions

2.21. There are a number of uncertainties surrounding the forecast potential availability of coniferous roundwood from the private sector over the next 15 years for the reasons explained earlier in this section. One of the most important uncertainties concerns the difference in the quantities of commercially suitable roundwood that could potentially become available and the quantities that actually become available for commercial use after allowing for constraints due to cost, planning and other technical issues.

2.22. The next forecast that is scheduled to be available in 2011 should address some of the issues.

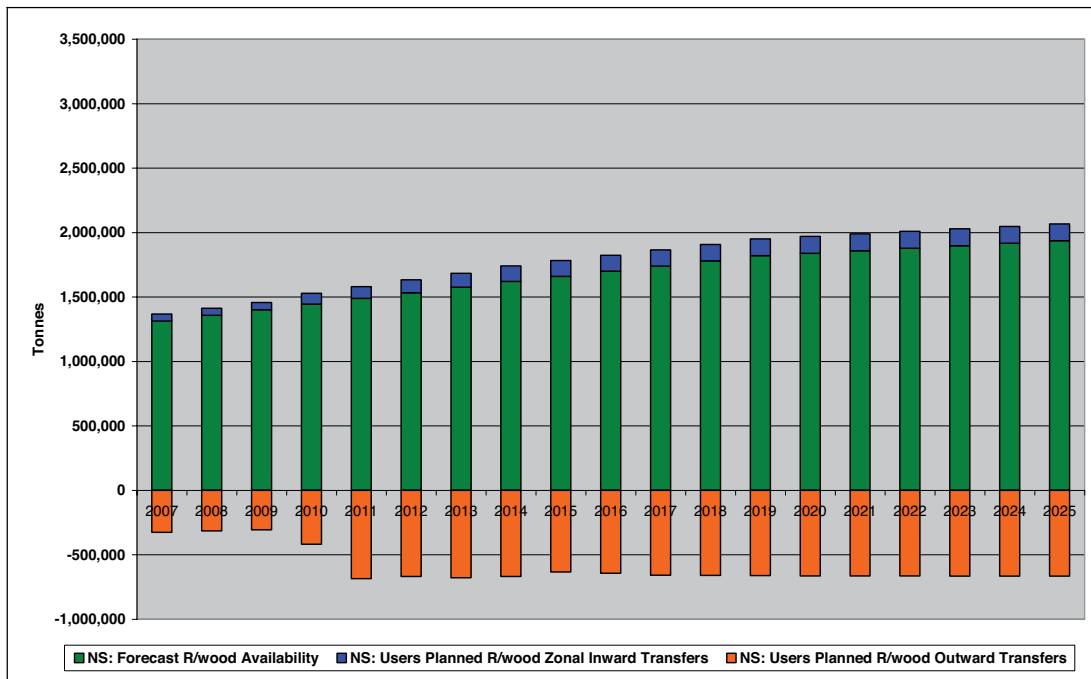
03 Northern Scotland zone: Coniferous roundwood & sawmill products forecast availability & demand

3.1. The information given in this section is for the area defined as the Northern Scotland zone (see map 1.1). This section of the report has been divided into two parts. The first part presents the situation for coniferous roundwood and the second part presents the results for coniferous sawmill products.

Coniferous roundwood

3.2. The forecast potential annual availability of coniferous roundwood from the coniferous woods in the Northern Scotland zone after adjusting for the inward and outward transfer of logs gives the potential net availability of coniferous roundwood (see also comments in para 1.13). The estimated amounts are shown in chart 3.1.

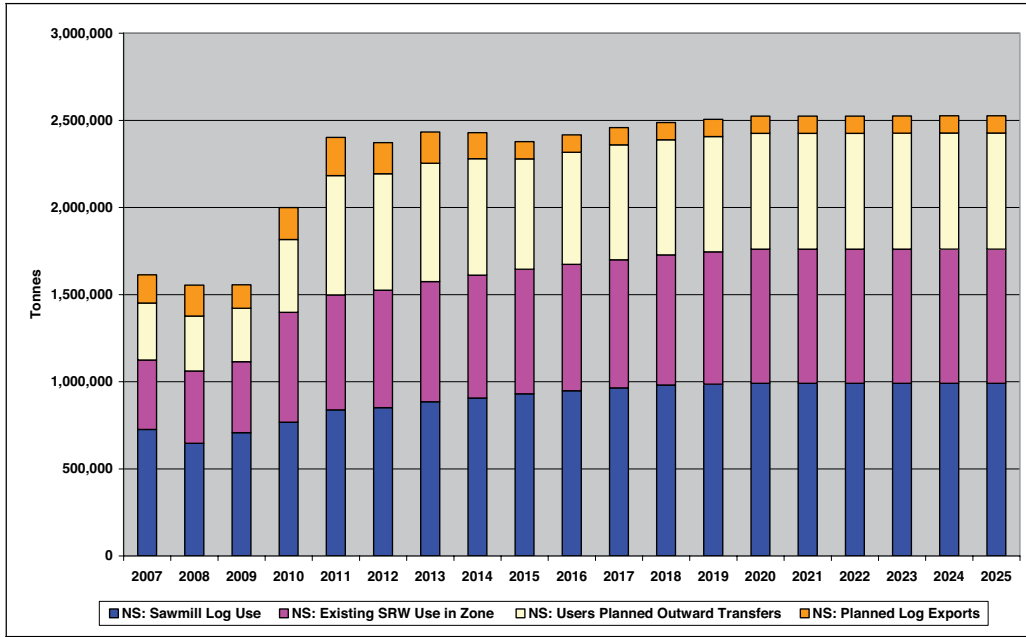
Chart 3.1: Northern Scotland zone: Forecast annual availability of coniferous roundwood with planned forest industry coniferous roundwood zonal transfers 2007 – 2025



3.3. The chart shows that the forecast potential annual availability of coniferous roundwood within the North Scotland zone is expected to continue to increase up to about 2020 after which it remains almost constant.

3.4. The forecast annual use of domestically grown coniferous roundwood by existing users from 2007 to 2025 is shown in chart 3.2.

Chart 3.2: Northern Scotland zone: Planned use of coniferous roundwood by the forest industry 2007 – 2025

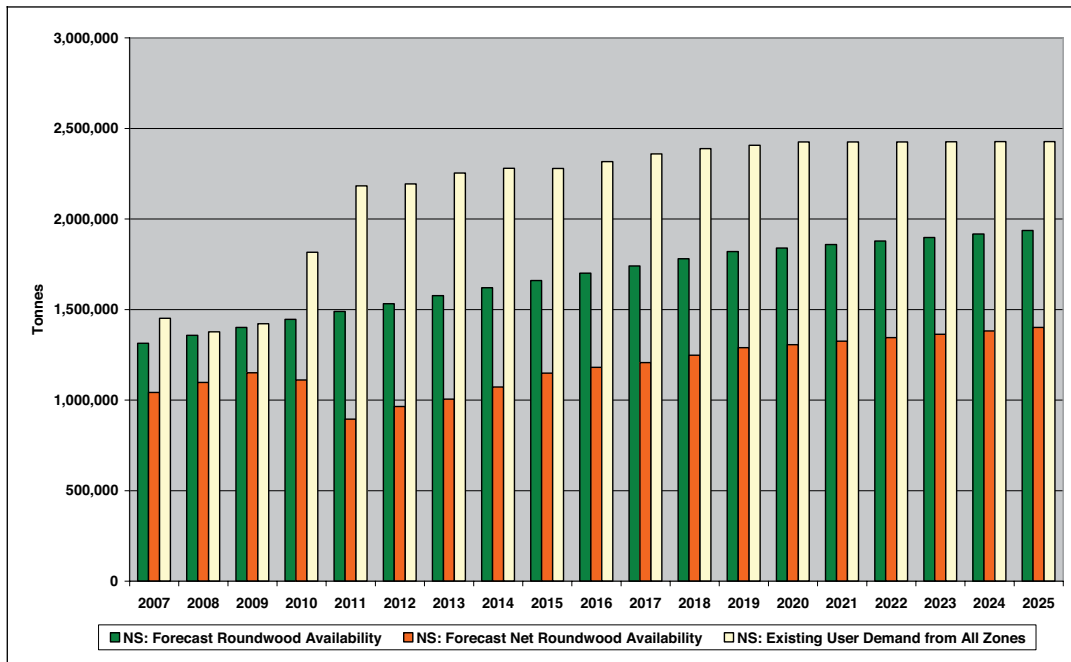


3.5. SRW exports are expected to go to Scandinavia and mainland Europe and the sawlog exports to Ireland.

3.6. Chart 3.2 shows that total demand for coniferous roundwood by the forest industry in Northern Scotland is expected to increase to a maximum of just over 2.5 million tonnes per annum. This is approximately 1 million tonnes per annum more than the present level. This is considerably below the estimate of 4.5 to 5.0 million green tonnes per annum that would have occurred if the proposed development of a pulp and paper mill at Invergordon by Forscot had gone ahead as was being proposed in 2005.

3.7. A comparison of potential availability of coniferous roundwood with forecast demand as a result of planned developments within the forest industry in the Northern Scotland zone over the period 2007-2025 is shown in chart 3.3.

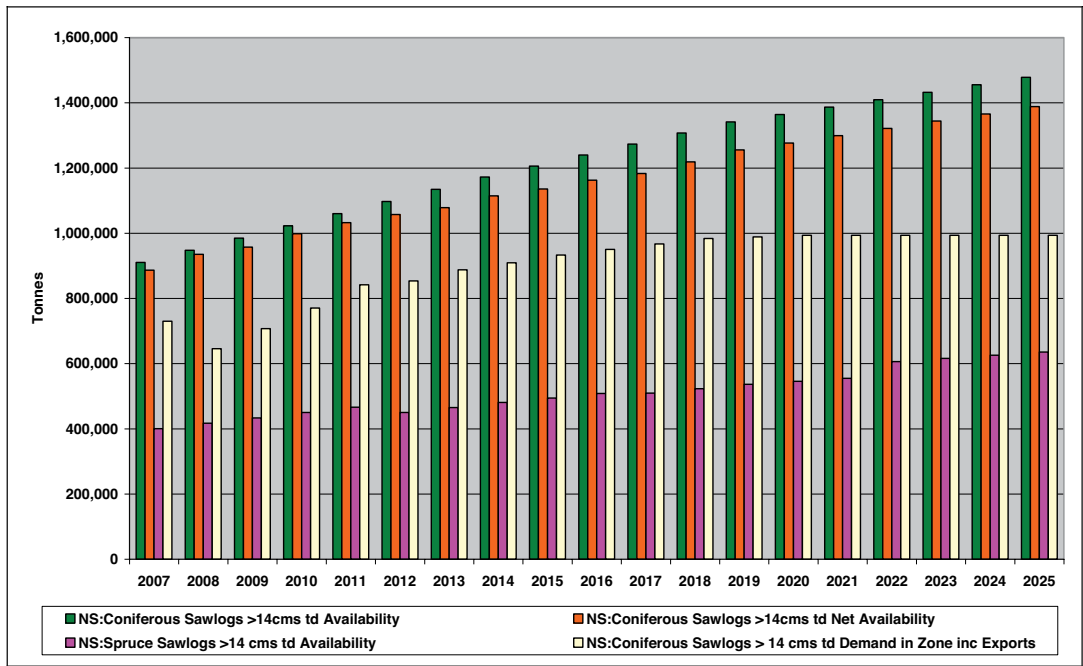
Chart 3.3: Northern Scotland zone: A comparison of forecast annual roundwood availability & net availability with demand based on existing users’ planned developments in all zones 2007 – 2025



3.8. This shows that if all the existing users’ planned developments proceed, demand, which is presently closely matched to potential availability of coniferous roundwood within the zone and slightly more than net roundwood availability, is going to increase considerably and exceed potential coniferous roundwood availability in Northern Scotland by almost 0.75 million green tonnes per annum by about 2014 before allowing for zonal transfers. Longer term potential demand is forecast to exceed net potential availability by over 1.3 million tonnes per year.

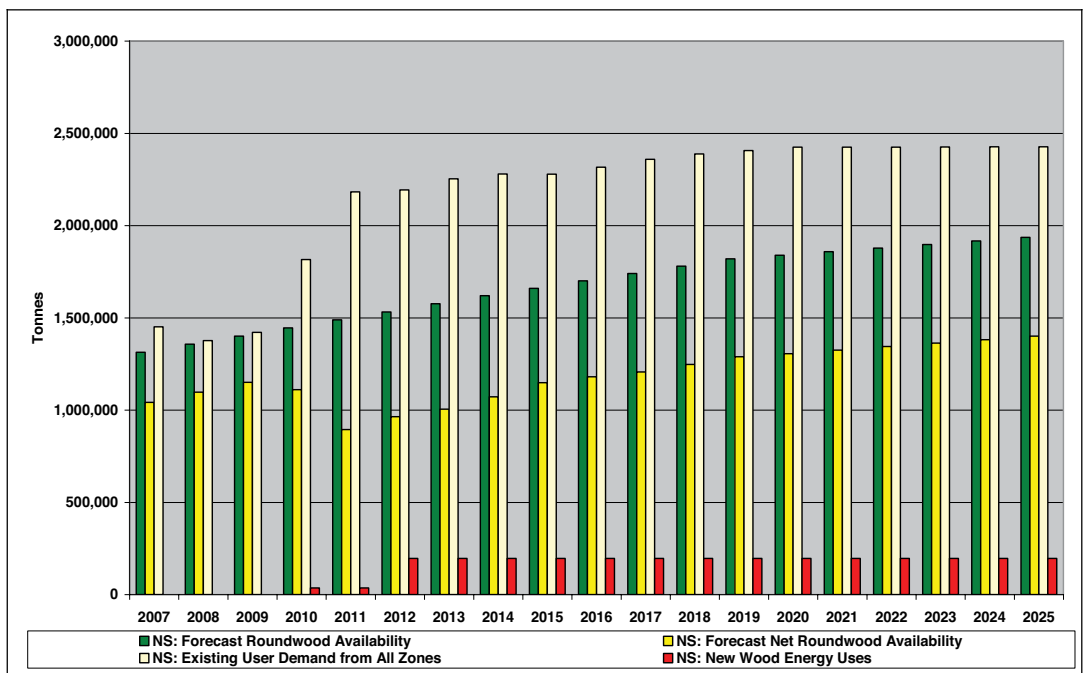
3.9. A comparison of potential availability and net availability of coniferous sawlogs and the potential availability of spruce sawlogs only with forecast demand as a result of planned developments within the forest industry in the Northern Scotland zone over the period 2007-2025 is shown in chart 3.4.

Chart 3.4: Comparison of potential availability and net availability of coniferous sawlogs and the potential availability of spruce sawlogs only with forecast demand in the Northern Scotland zone over the period 2007-2025



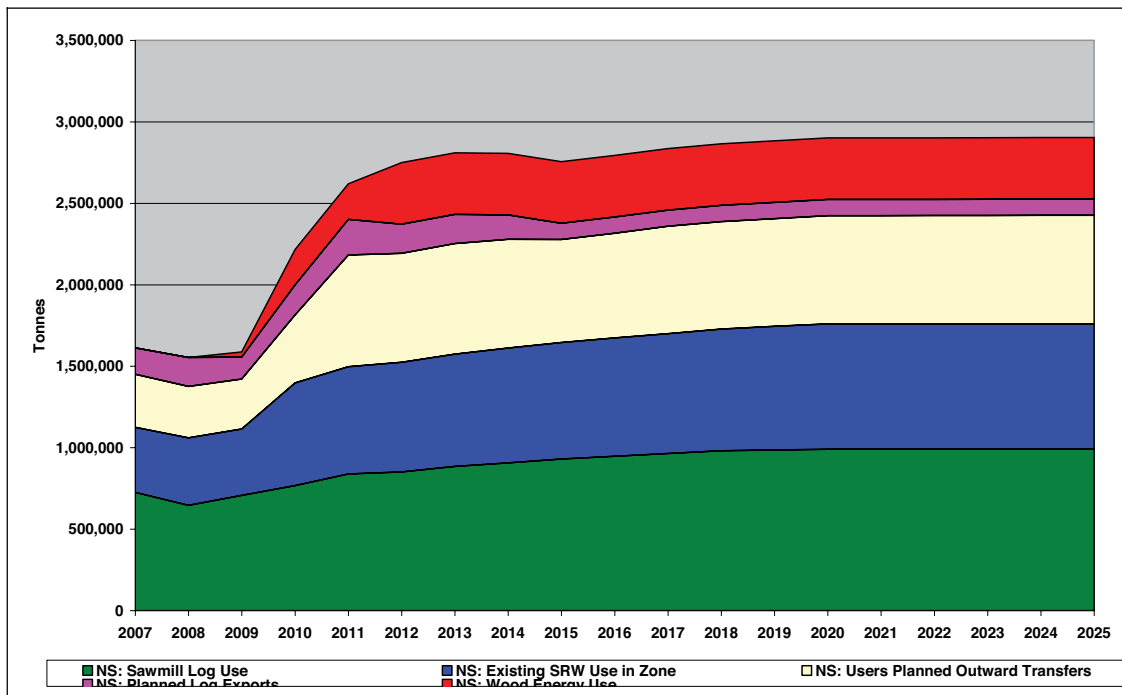
3.10. If all the planned new energy plants proceed, the forecast end uses for coniferous roundwood in North Scotland are shown in chart 3.5.

Chart 3.5: Northern Scotland zone: Overall coniferous roundwood availability - Demand balance based on demand from existing users in all zones & proposed new wood fired energy plants 2007 -2025



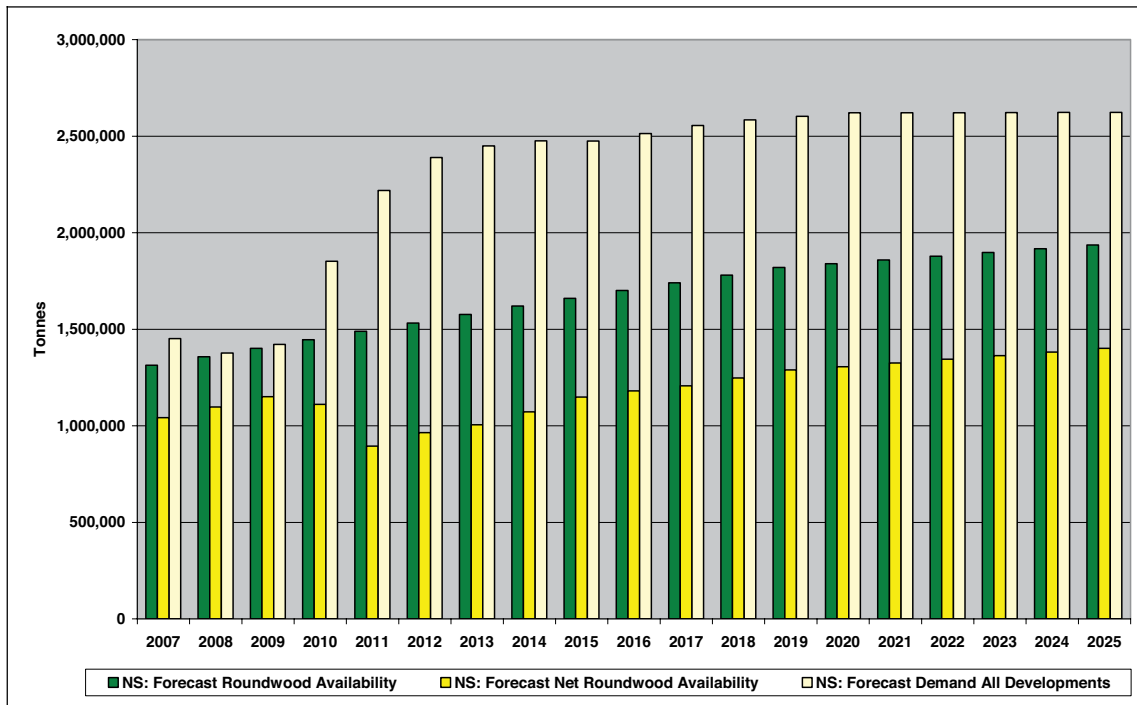
3.11. The likely end uses for coniferous roundwood in Northern Scotland are shown in Chart 3.6.

Chart 3.6: Northern Scotland zone: Likely end uses for coniferous roundwood in the zone by existing users in all zones & proposed new wood fired energy plants 2007 – 2025



3.12. The forecast annual demand: availability balance for coniferous roundwood in Northern Scotland, assuming all the developments in the forest and wood energy industries proceed as planned is shown in chart 3.7.

Chart 3.7: Northern Scotland: Potential annual availability - Demand balance for coniferous roundwood assuming all developments in the forest and energy industries proceed as planned 2007 – 2025



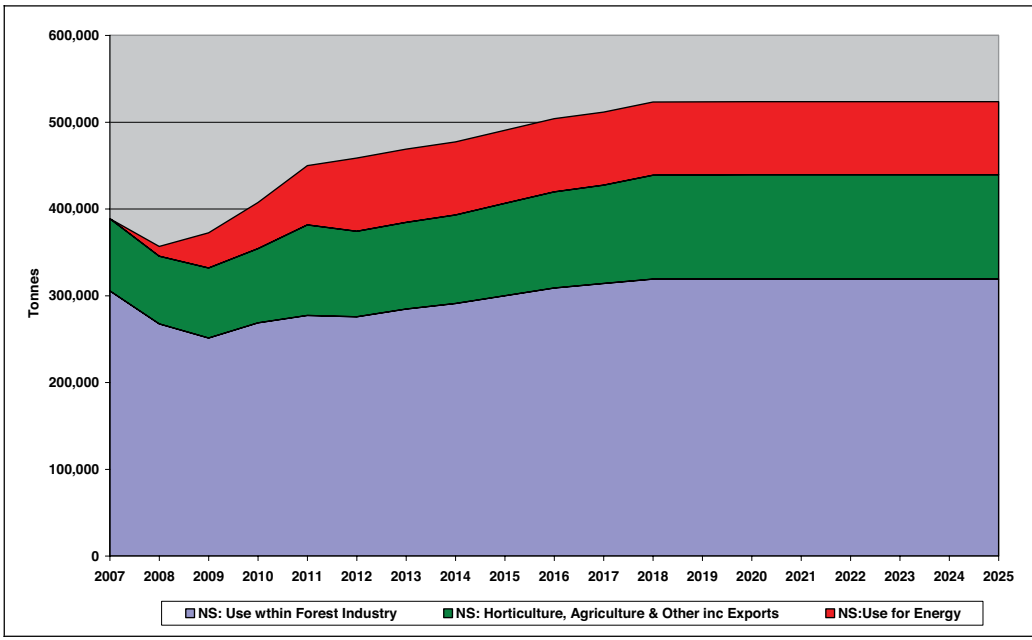
3.13. This shows that the forecast annual demand for coniferous roundwood will be significantly in excess of both its annual potential availability within the zone and in excess of its net potential availability after allowing for demand from existing users in all zones and log exports.

3.14. Coniferous sawmills produce sawn timber, wood chips, sawdust, pin chips, shavings, slab wood and bark. For the purposes of this report the term “coniferous sawmill products” or “sawmill products” relates to all the products except sawn timber.

3.15. The existing supply of sawmill products (chips, sawdust, slab wood and bark) produced by sawmills located in the Northern Scotland zone is sold into a variety of markets. The markets in the Northern Scotland zone can be broadly categorised as the panelboard mills, export, agriculture and horticultural markets with a number of other small miscellaneous ones. The quantities of chips that are exported annually are very small. By far the largest market at present for sawmill products is the panelboard industry.

3.16. The past and forecast future uses of sawmill products in the Northern Scotland zone, based on information provided by sawmills in the Northern Scotland zone, are shown graphically in chart 3.8.

Chart 3.8: Northern Scotland zone: Past & forecast future uses of sawmill products 2007 – 2025



3.17. For reasons of commercial confidentiality the zonal demand is not provided, nor are zonal transfers as some sawmills are uncertain as to which companies their sawmill products go to eventually as they sell them on to another company which handles their removal and sale.

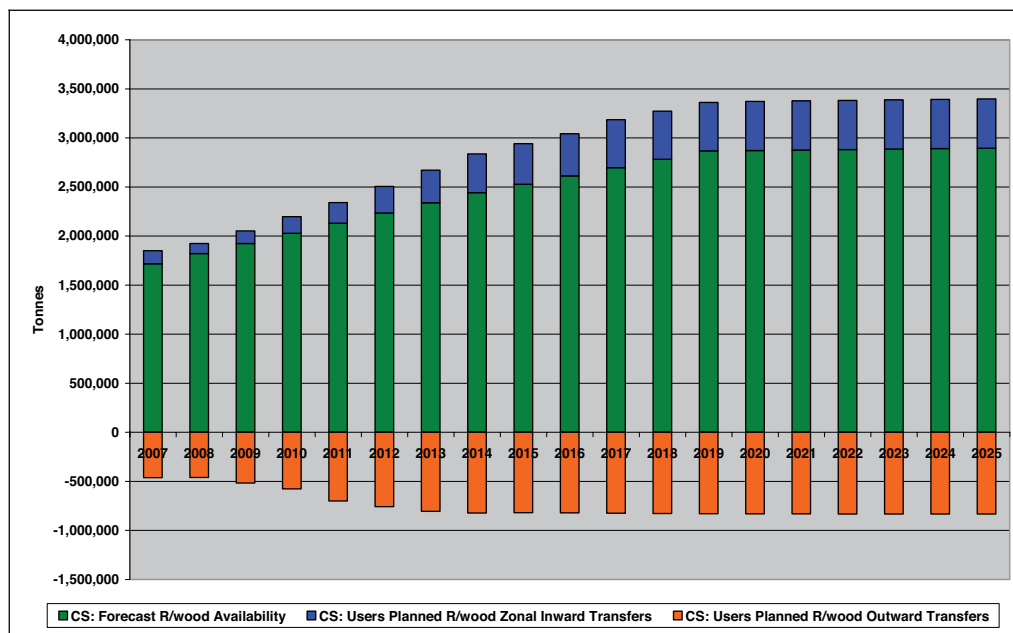
04 Central Scotland zone: Coniferous roundwood & sawmill products forecast availability & demand

4.1. The information given in this section is for the area defined as the Central Scotland zone (see map 1.1). This section of the report has been divided into two parts. The first part presents the situation for coniferous roundwood and the second part presents the results for coniferous sawmill products.

Coniferous roundwood

4.2. The forecast potential availability of coniferous roundwood from woodlands in the Central Scotland zone, less the net transfer of logs out of the zone, gives the net potential availability of coniferous roundwood in the Central Scotland zone (see also para 1.13). The estimated amounts are shown in chart 4.1.

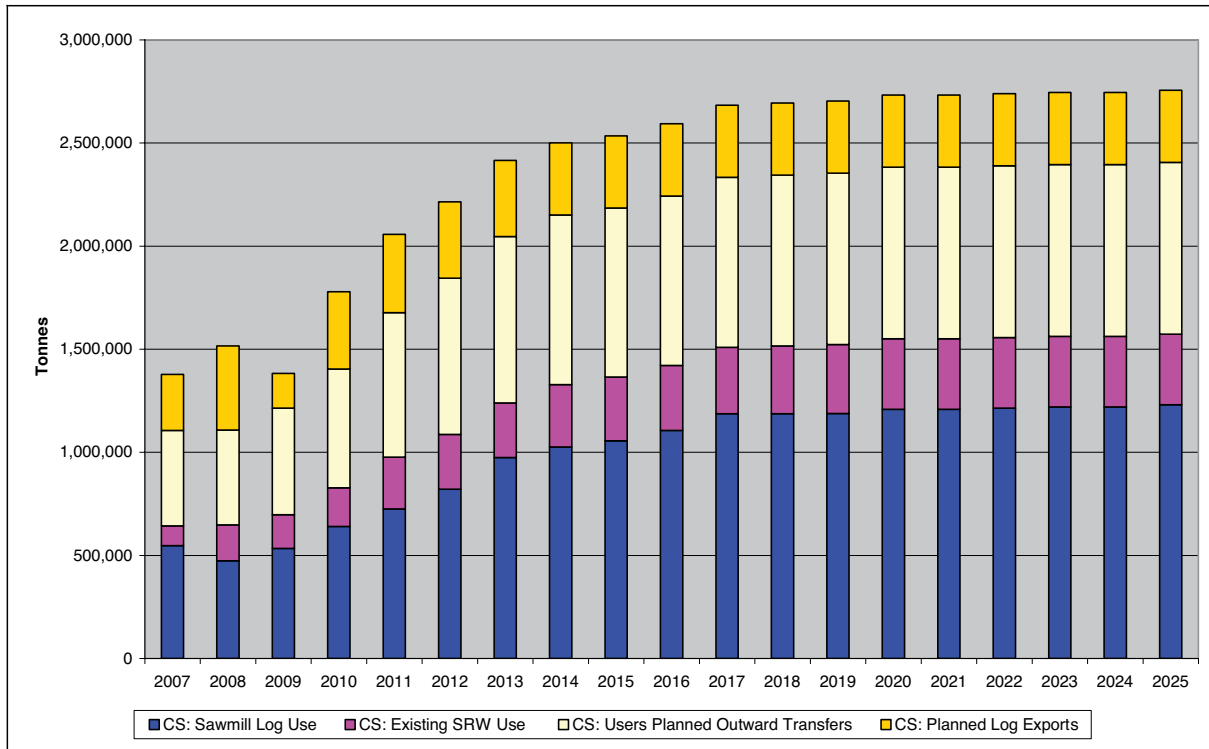
Chart 4.1: Central Scotland zone: Forecast annual availability of coniferous roundwood with existing users' planned coniferous roundwood zonal transfers 2007 – 2025



4.3. Chart 4.1 shows that the annual potential availability of coniferous roundwood in this zone is expected to go on rising up to about 2020 after which it is forecast to remain fairly constant.

4.4. The estimated planned annual use of domestically grown coniferous roundwood by the existing coniferous roundwood users in Central Scotland from 2007 to 2025 is shown in chart 4.2.

Chart 4.2: Central Scotland zone: Expected annual uses of coniferous roundwood by the existing users 2007 - 2025

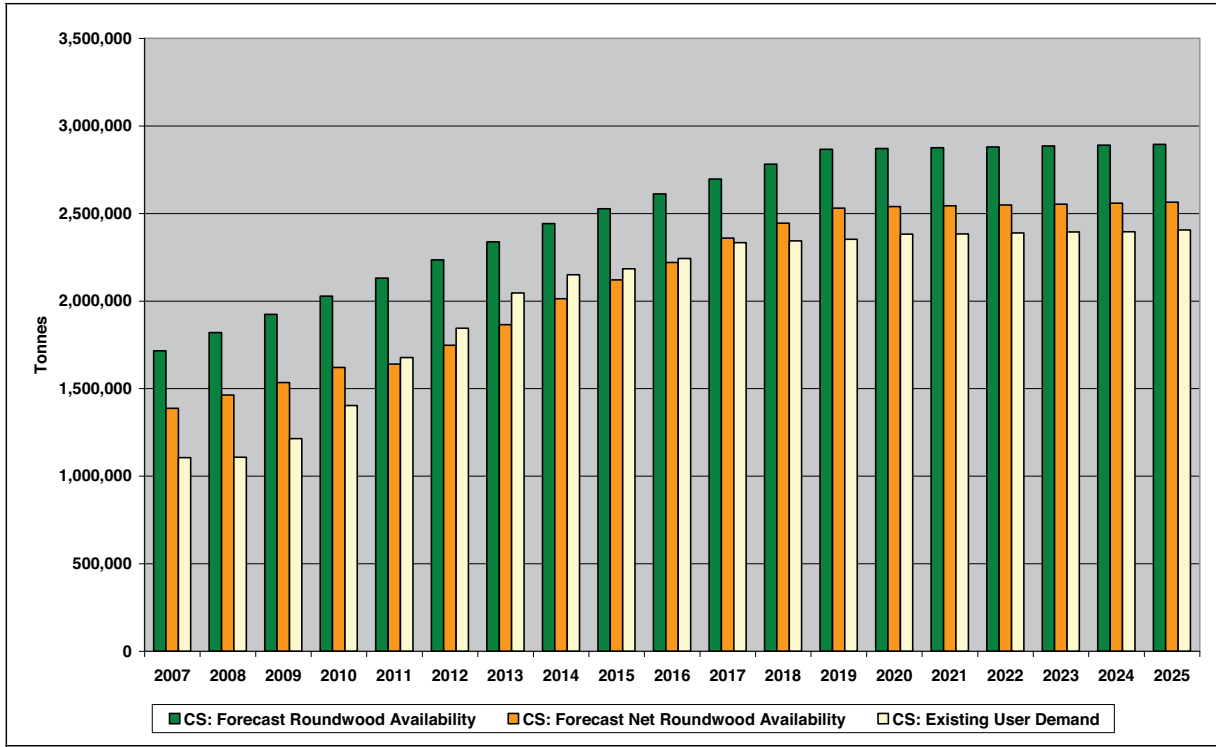


4.5. SRW exports are expected to go to Scandinavia and mainland Europe and the sawlogs to Ireland.

4.6. The chart shows that in the Central Scotland zone the expected uses for coniferous roundwood from planned developments by existing users in all zones is expected to reach just over 2 million tonnes per annum by 2012 and it will then continue to grow to about 2.75 million tonnes per annum by 2020, and then it remains fairly constant.

4.7. The overall annual balance between the demand arising from the existing users planned developments and potential roundwood availability in the Central Scotland zone is shown in chart 4.3.

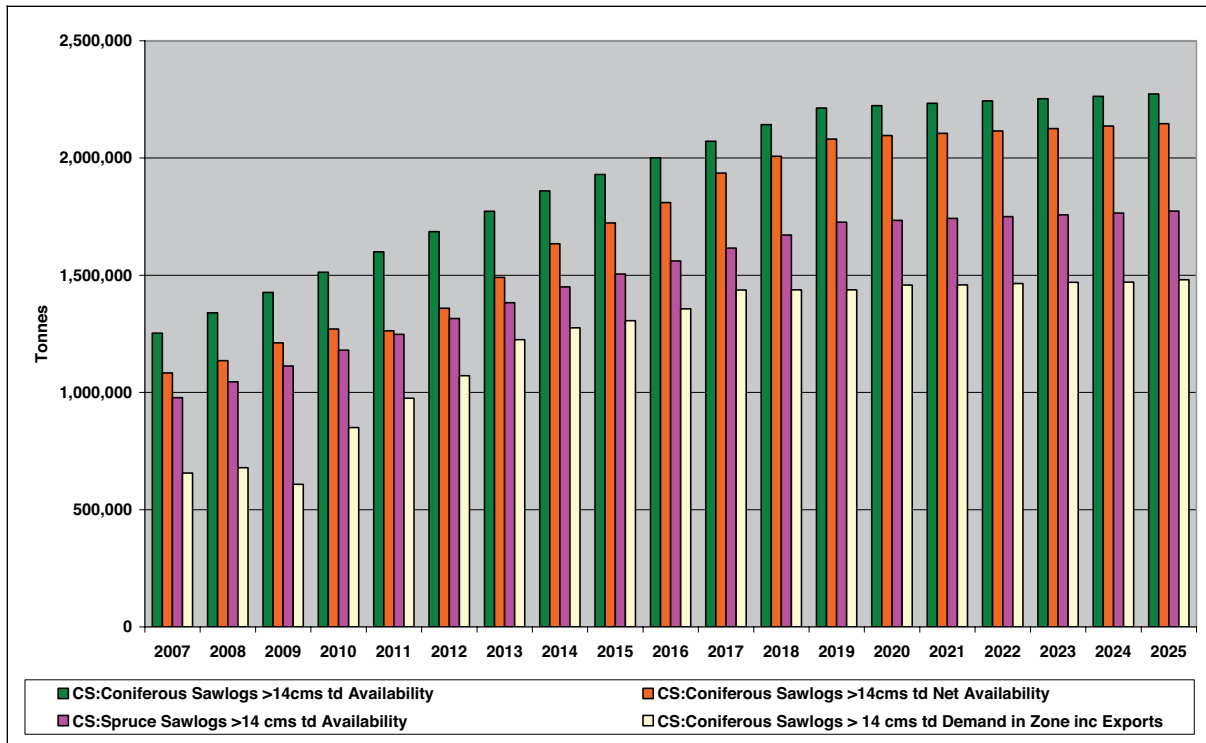
Chart 4.3: Central Scotland zone: A comparison of forecast annual roundwood availability with demand based on existing users' planned developments 2007 - 2025



4.8. This shows that even with all the present users' demands for coniferous roundwood there is still some coniferous roundwood potentially available within the zone and also after allowing for quantities of coniferous roundwood that existing users expect to transfer out of the zone.

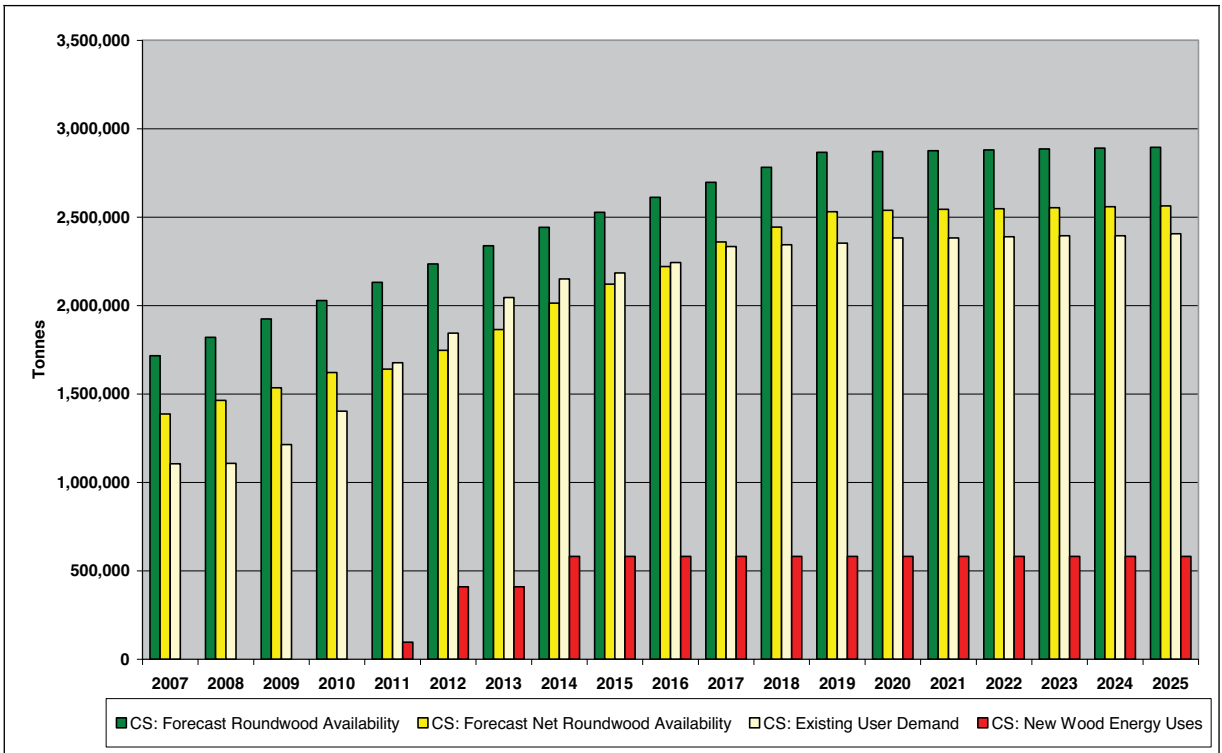
4.9. A comparison of potential availability and net availability of coniferous sawlogs, and the potential availability of spruce sawlogs only, with forecast demand as a result of planned developments within the forest industry in the Central Scotland zone over the period 2007-2025 is shown in chart 4.4.

Chart 4.4: Comparison of potential availability and net availability of coniferous sawlogs and the potential availability of spruce sawlogs only with forecast demand in the Central Scotland zone over the period 2007-2025



4.10. If all the planned energy plants proceed the annual demand for coniferous roundwood will increase by about 1 million tonnes per annum by 2019. The resulting overall use of coniferous roundwood for different uses within the Central Scotland zone is shown in chart 4.5.

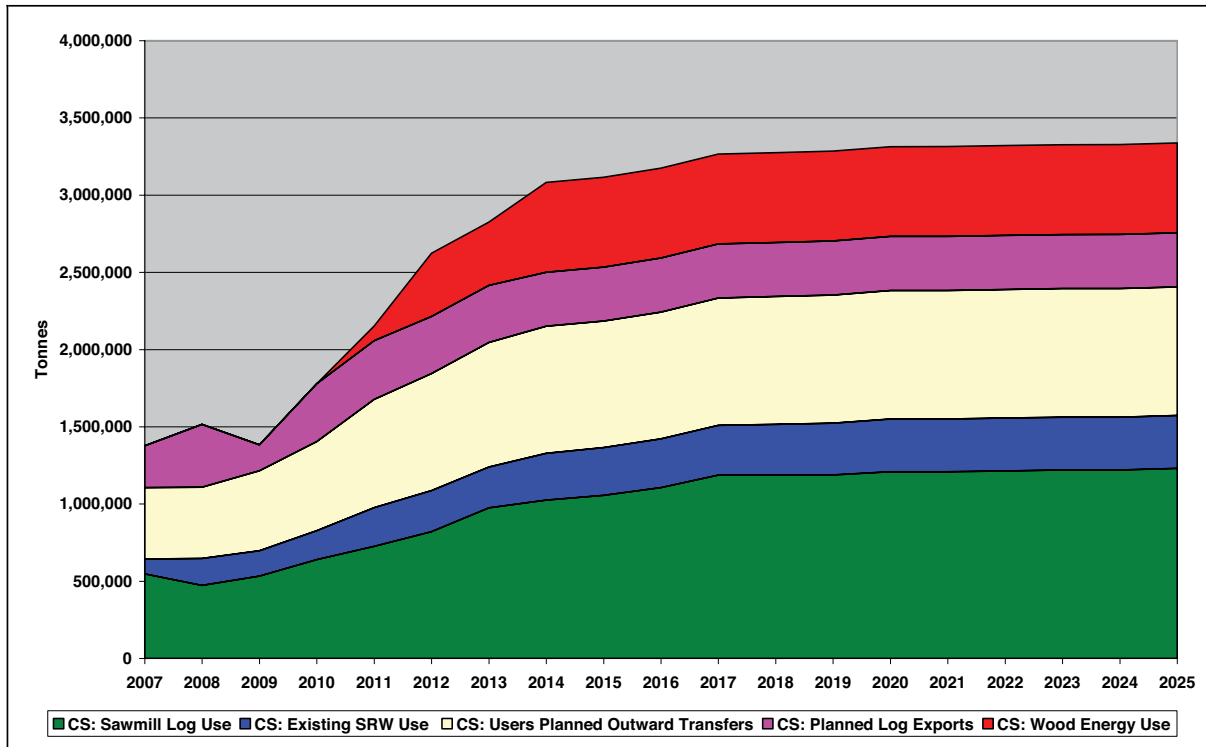
Chart 4.5: Central Scotland zone: Overall coniferous roundwood availability - Demand balance based on demand from existing users in all zones & proposed new wood fired energy plants 2007-2025



4.11. Of the forecast increase in the demand for coniferous roundwood just over half is expected to come from new wood energy plants.

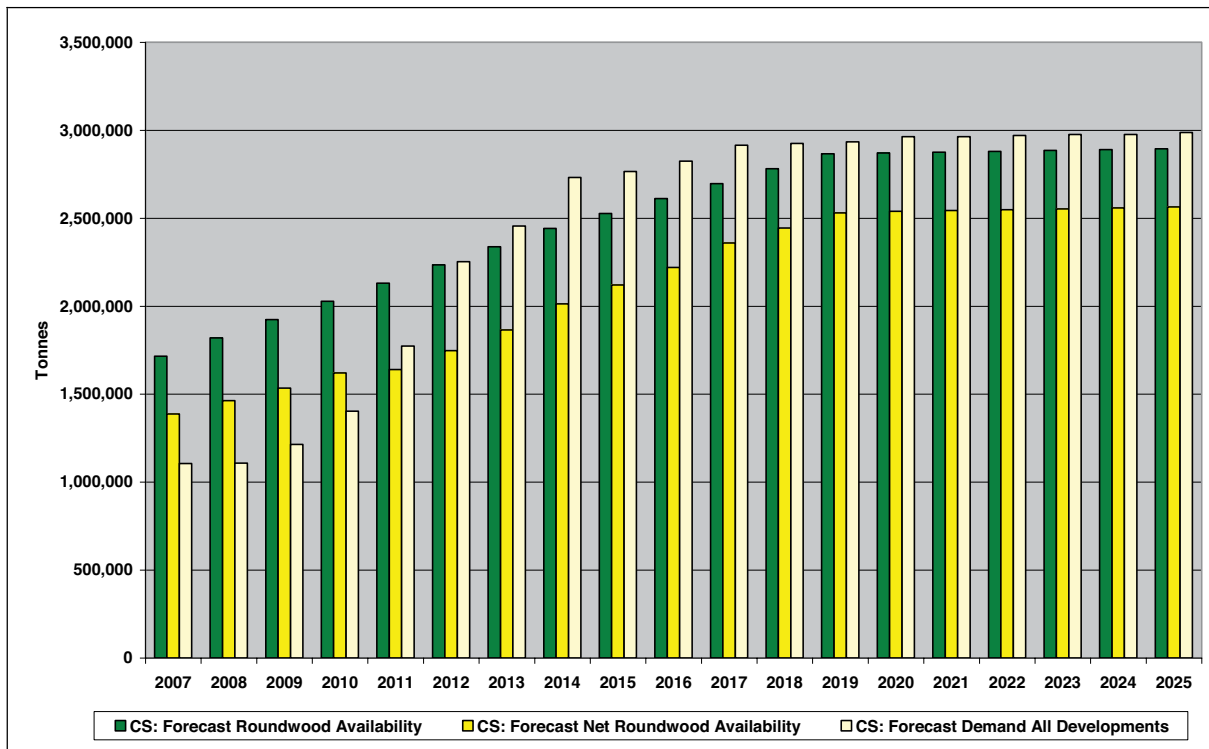
4.12. The likely end uses for coniferous roundwood in Central Scotland are shown in Chart 4.6

Chart 4.6: Central Scotland zone: Likely end uses for coniferous roundwood in the zone by existing users in all zones & proposed new wood fired energy plants 2007 – 2025



4.13. The annual demand: availability balance for coniferous roundwood in the Central Scotland zone, assuming all the developments in the forest and wood energy industries proceed as planned, and zonal transfers continue, is shown in chart 4.7.

Chart 4.7: Central Scotland zone: Potential annual availability - Demand balance for coniferous roundwood assuming all developments in the forest & wood energy industries proceed



4.14. This shows that if all the planned forest and wood energy industry developments proceed, potential annual availability of coniferous roundwood can be expected to be in excess of potential annual demand for coniferous roundwood within the zone up to 2013 but in that year potential annual demand for coniferous roundwood is expected to exceed both the potential availability of coniferous roundwood within the zone and also the net availability of coniferous roundwood after allowing for demand from other zones.

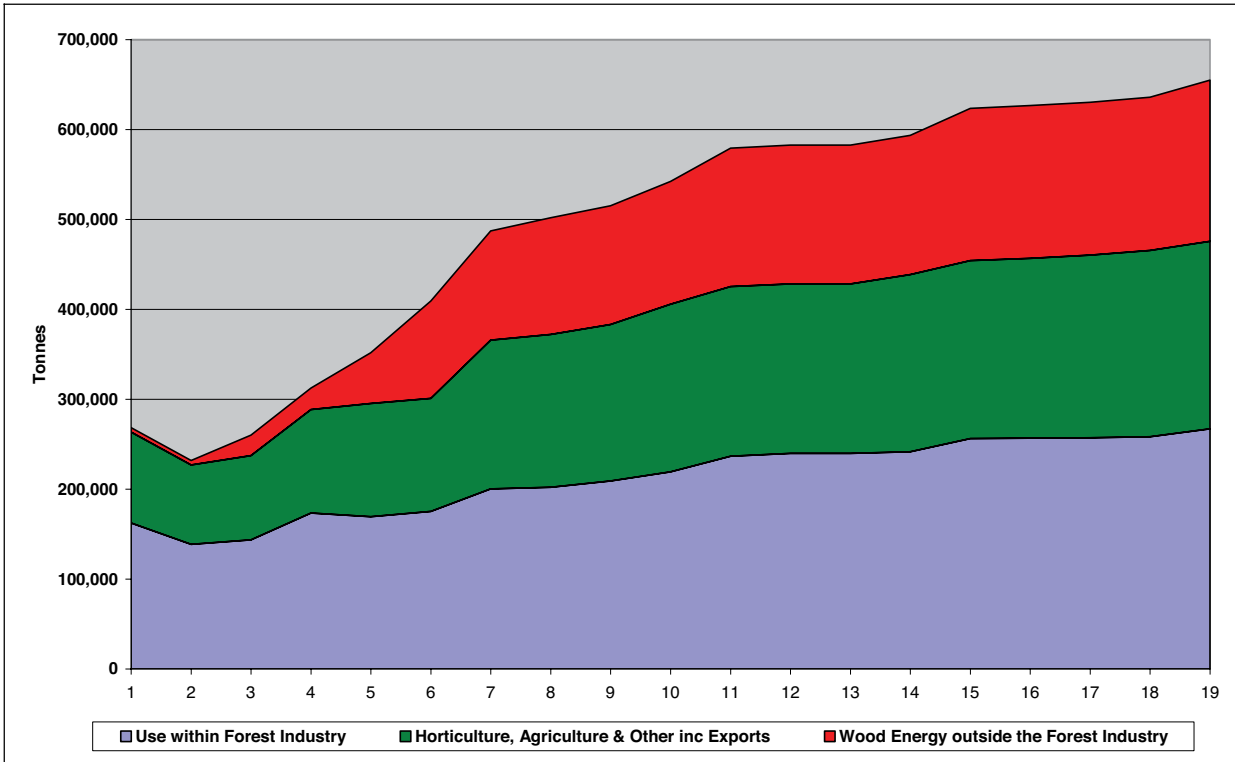
Sawmill products

4.15. Coniferous sawmills produce sawn timber, wood chips, sawdust, pin chips, shavings, slab wood and bark. For the purposes of this report the term “coniferous sawmill products” or “sawmill products” relates to all the products except sawn timber.

4.16. The existing supply of sawmill products (chips, sawdust, slab wood and bark) produced by sawmills located in the Central Scotland zone is sold into a variety of markets. The markets in the Central Scotland zone can be broadly categorised as the panelboard mills, export, agriculture and horticultural markets with a number of other small miscellaneous ones. A small quantity of wood chips and sawdust is exported. By far the largest market at present for sawmill products is the panelboard industry.

4.17. The past and forecast future uses of sawmill products in the Central Scotland zone, based on information provided by sawmills based in the Central Scotland zone, are shown graphically in chart 4.8.

Chart 4.8: Central Scotland zone: Past & forecast future uses of sawmill products 2007 – 2025



4.18. For reasons of commercial confidentiality the zonal demand is not provided, nor are zonal transfers as some sawmills are uncertain as to which companies their sawmill products go to eventually as they sell them on to another company which handles their removal and sale.

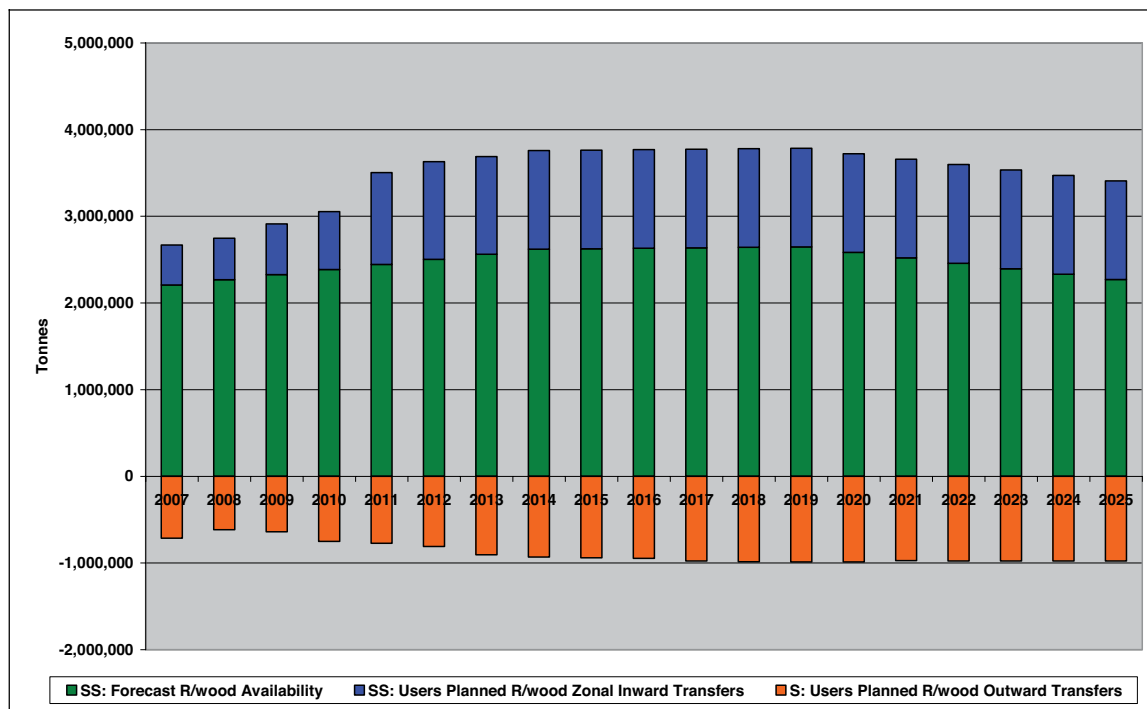
05 South Scotland zone: Coniferous roundwood & sawmill products forecast availability & demand

5.1. The information given in this section is for the area defined as the South Scotland zone (see map 1.1) and it is identical to the area used in the 2005 private sector coniferous roundwood potential availability forecast. It has therefore not been necessary to merge the zones as there was sufficient potential activity to protect the identities of the individual businesses that provided data. The first part presents the situation for coniferous roundwood and the second part presents the results for sawmill products.

Coniferous roundwood

5.2. The forecast potential availability of coniferous roundwood from the woods in the South Scotland zone, after allowing for the inward and outward transfer of logs, gives the forecast net potential availability of coniferous roundwood in the zone (see also para 1.13). The estimated amounts are shown in chart 5.1.

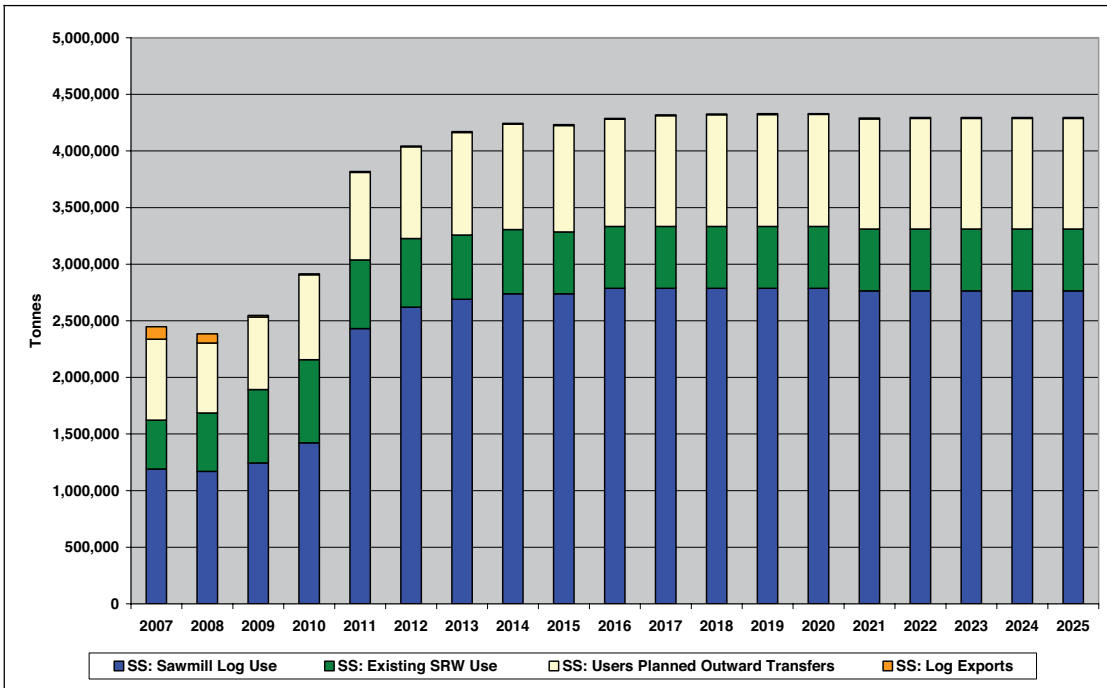
Chart 5.1: South Scotland zone: Forecast potential annual availability of coniferous roundwood with existing users' planned zonal transfers 2007 – 2025



5.3. The notable feature about the chart is that coniferous roundwood annual availability within the zone is forecast to go on rising very slightly up to about 2018 and thereafter it is forecast to decline quite noticeably.

5.4. The planned annual use of domestically grown coniferous roundwood by the existing wood fibre users in South Scotland from 2007 to 2025 is given in chart 5.2.

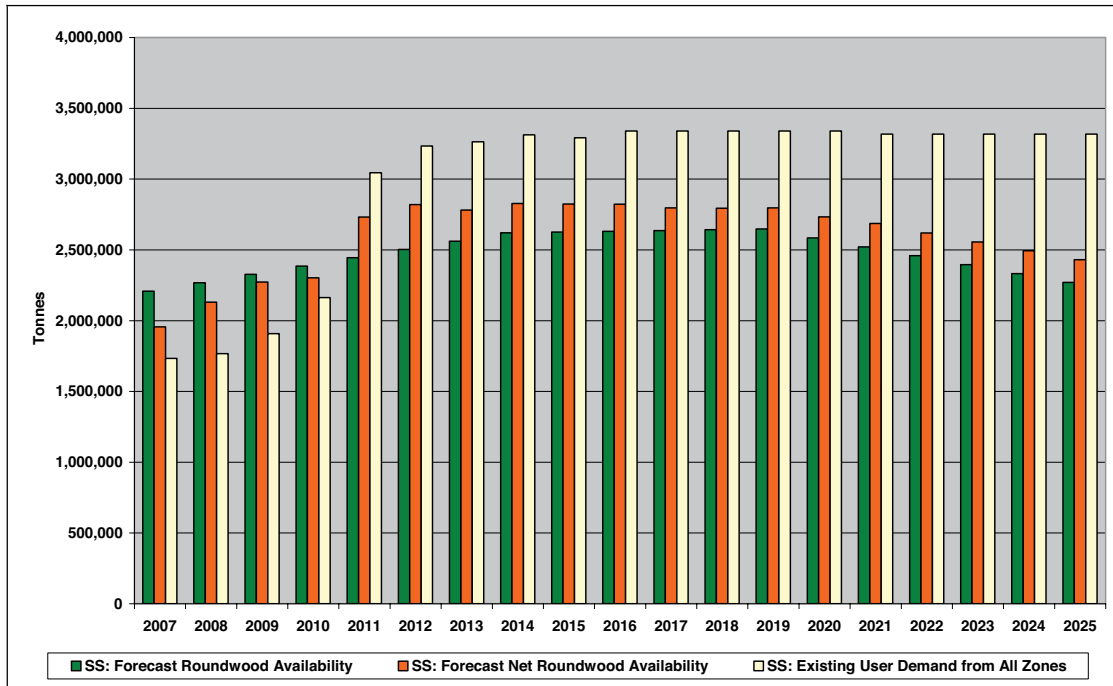
Chart 5.2: South Scotland zone: Past & planned future annual use of coniferous roundwood by the existing users 2007 - 2025



5.5. This shows that the demand for coniferous roundwood by the existing users in the South Scotland zone is expected to increase rapidly from its present level at about 2.5 million tonnes per annum to about 4.3 million tonnes annually by 2016. Thereafter demand is forecast to remain fairly constant.

5.6. The balance between the planned annual demand for coniferous roundwood from existing users and the forecast potential annual availability in South Scotland is shown in chart 5.3.

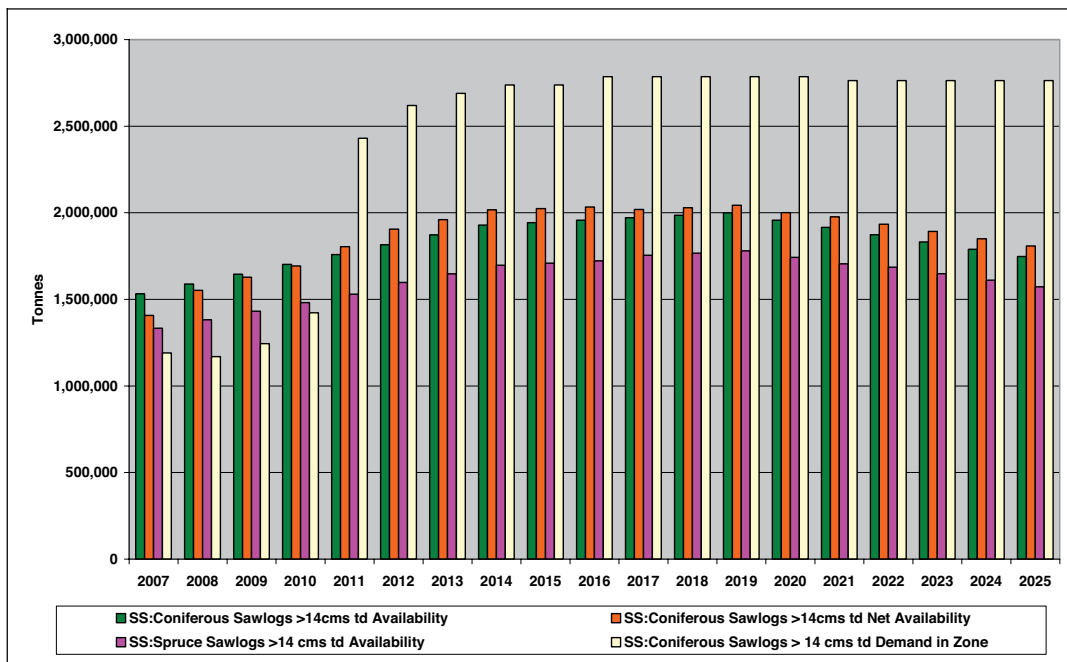
Chart 5.3: South Scotland zone: A comparison of forecast coniferous roundwood annual availability with demand based on existing wood users' planned developments 2007 - 2025



5.7. This shows that the planned developments of existing users within the South Scotland zone will result in the demand for coniferous roundwood exceeding potential coniferous roundwood availability and net availability in the zone in 2011 by about 0.25 million tonnes and this difference will rise to about 0.5 million tonnes per annum by 2016. This difference will increase further as the potential availability of coniferous roundwood falls away towards 2025.

5.8. A comparison of potential availability and net availability of coniferous sawlogs, and the potential availability of spruce sawlogs only, with forecast demand as a result of planned developments within the forest industry in the South Scotland zone over the period 2007-2025 is shown in chart 5.4.

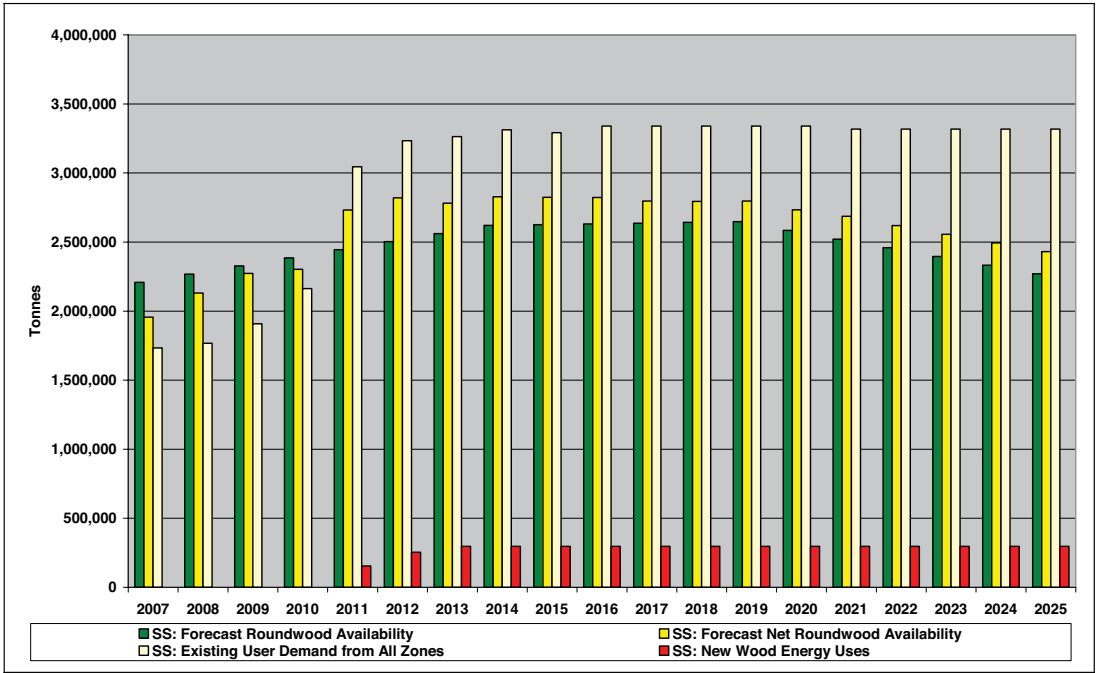
Chart 5.4: Comparison of potential availability and net availability of coniferous sawlogs and the potential availability of spruce sawlogs only with forecast demand in the south scotland zone over the period 2007-2025



5.9. The increased demand for sawlogs from 2011 mainly reflects the demand for sawlogs by a proposed new sawmill that is at the early planning stages. Forecast demand exceeds potential availability as other users are unlikely to have made any adjustment to the sourcing of their sawlogs as they were probably unaware of this possible development when providing estimates of where they plan to source their logs.

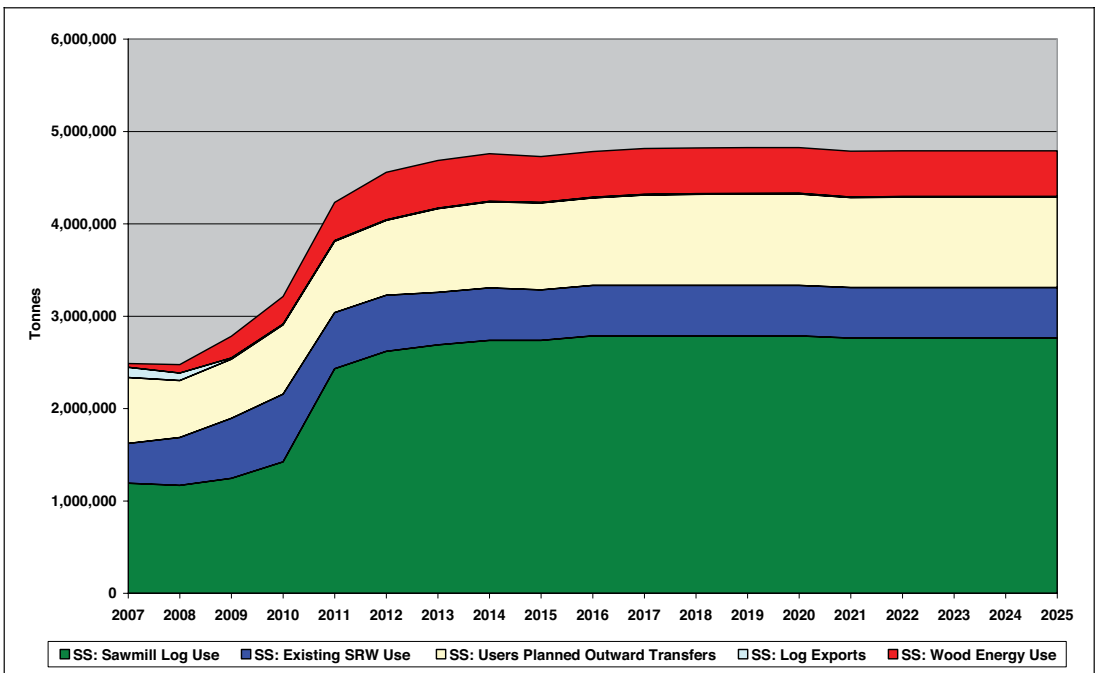
5.10. A small number of new wood fired energy plants, are planned in South Scotland, in addition to the ones at Lockerbie and Irvine that are identified within the existing users’ wood fibre requirements, and the total combined demand for coniferous roundwood from these and the forest industry plants are shown in chart 5.5.

Chart 5.5: South Scotland zone: A comparison of forecast coniferous roundwood annual availability with demand based on existing wood users’ planned developments 2007 - 2025



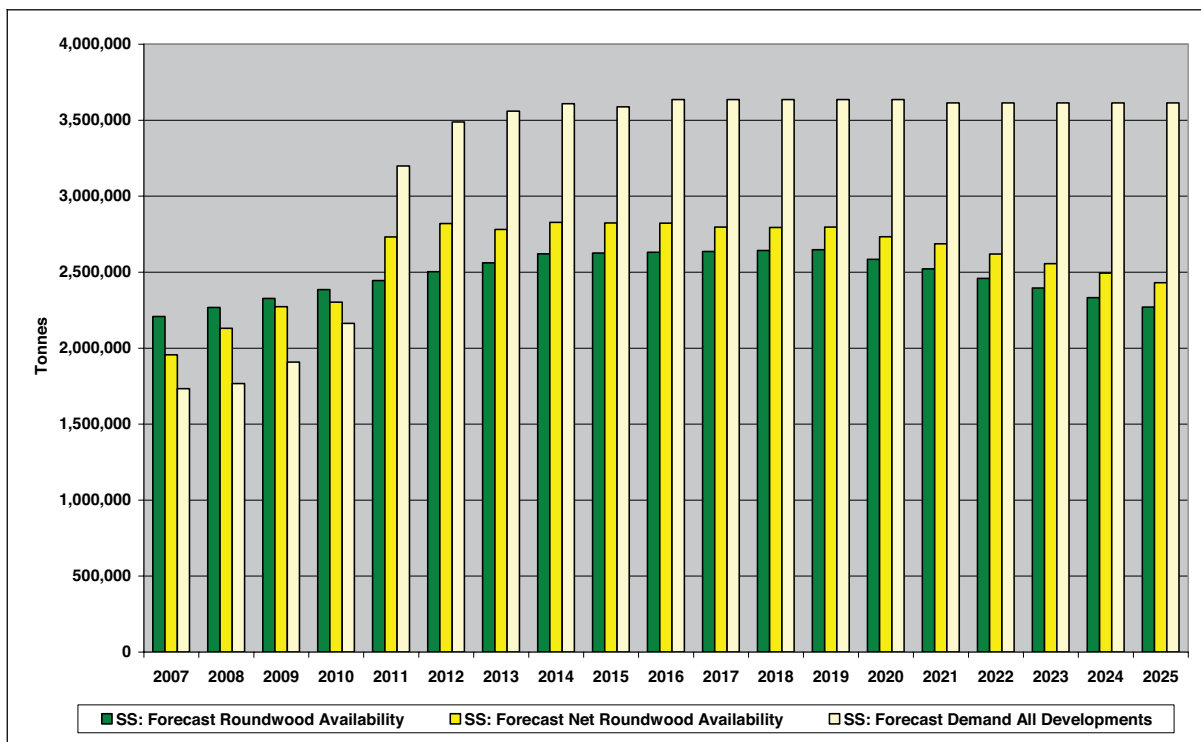
5.11. The likely end uses for coniferous roundwood in South Scotland are shown in Chart 5.6

Chart 5.6: South Scotland Zone: Likely End Uses for Coniferous Roundwood if All Planned Forest Industry & Wood Fired Energy Plants Meet Their Plans 2007 – 2025



5.12. The overall annual coniferous roundwood potential availability: demand balance in South Scotland if all the planned forest industry and wood fired energy plants proceed is shown in chart 5.7.

Chart 5.7: South Scotland zone: Likely end uses for coniferous roundwood in the zone by existing users in all zones & proposed new wood fired energy plants 2007 – 2025



3.12. The chart shows that the demand for coniferous roundwood in South Scotland is set to intensify significantly over the next 15 years. From 2010 forecast demand is expected to exceed potential availability of coniferous roundwood within the zone and also net availability of coniferous roundwood. This situation is likely to become worse as the potential availability of coniferous roundwood is forecast to drop away from 2018.

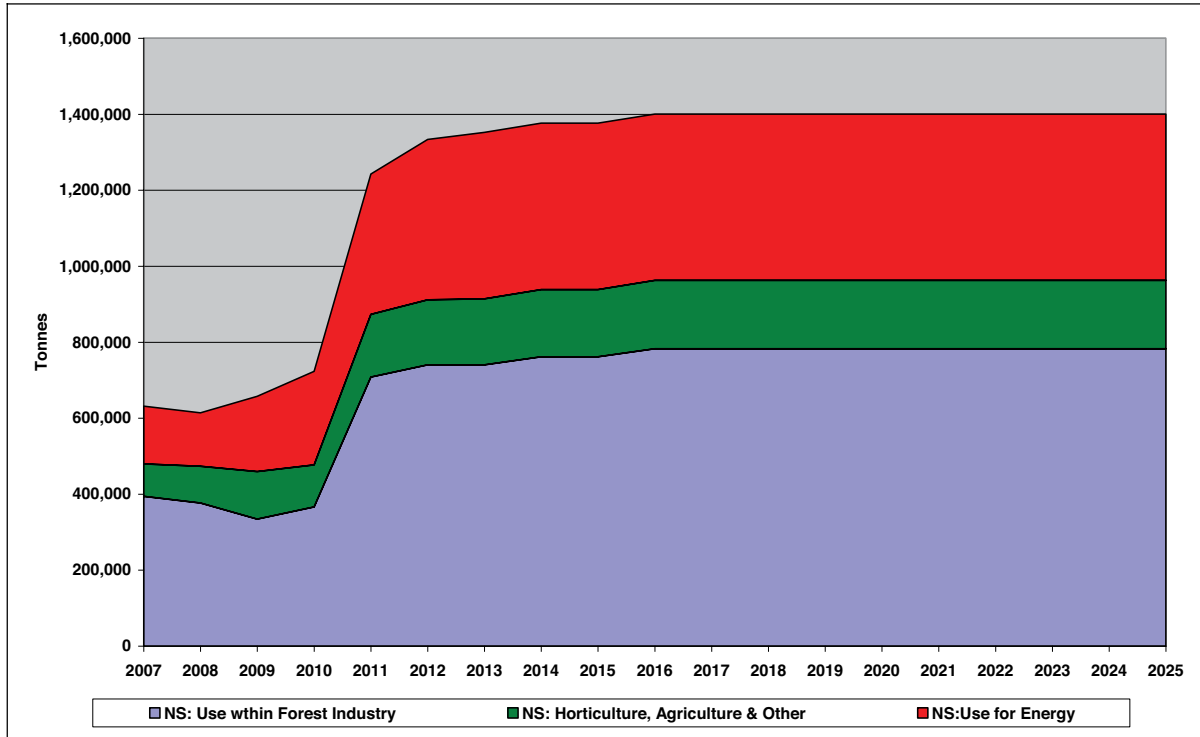
Sawmill products

5.14. Coniferous sawmills produce sawn timber, wood chips, sawdust, pin chips, shavings, slab wood and bark. For the purposes of this report the term “coniferous sawmill products” or “sawmill products” relates to all the products except sawn timber.

5.15. The existing supply of sawmill products (chips, sawdust, slab wood and bark) produced by sawmills located in the Southern Scotland zone is sold into a variety of markets. The markets in the Southern Scotland zone can be broadly categorised as the panelboard mills, export, agriculture and horticultural markets with a number of other small miscellaneous ones. By far the largest market at present for sawmill products is the panelboard industry.

5.16. The past and forecast future annual uses of sawmill products in the Northern Scotland zone, based on information provided by sawmills based in the Southern Scotland zone, are shown graphically in chart 5.8.

Chart 5.8: Southern Scotland Zone: Past & Forecast Future Annual Uses of Sawmill Products 2007 – 2025



5.17. For reasons of commercial confidentiality the zonal demand is not provided, nor are zonal transfers as some sawmills are uncertain as to which companies their sawmill products go to eventually as they sell them on to another company which handles their removal and sale.

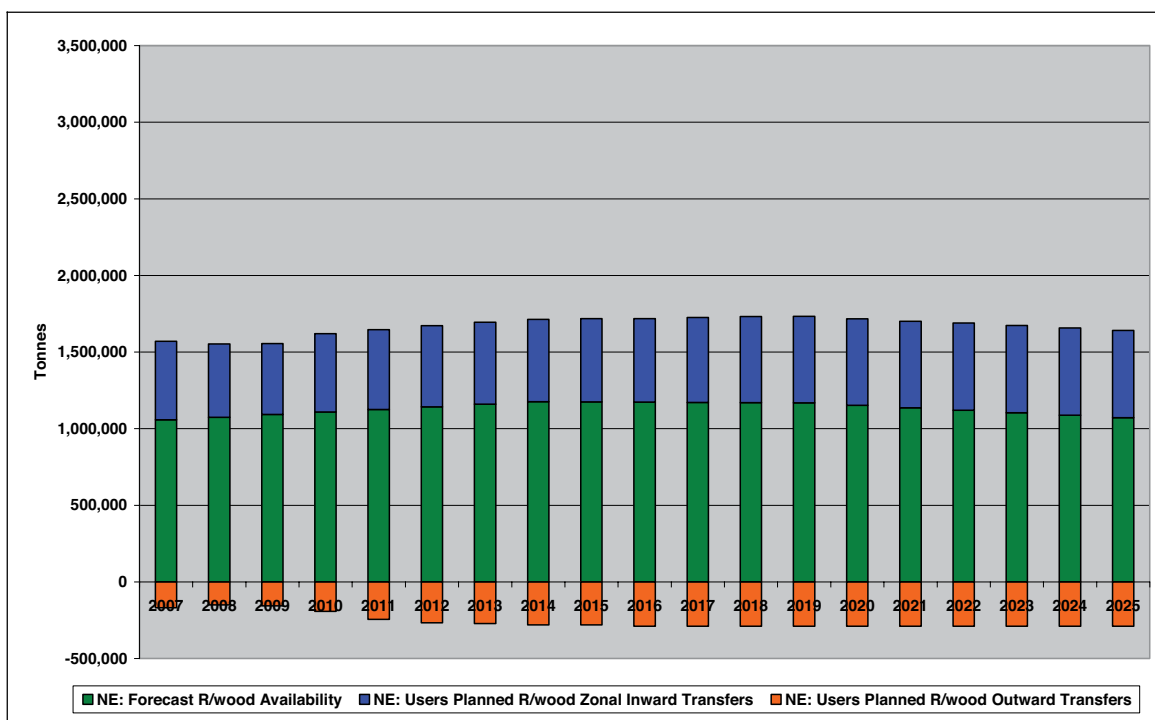
06 Northern England zone: coniferous roundwood & sawmill products forecast availability & demand

6.1. The information given in this section is for the area defined as the Northern England zone (see map 1.1) and this exactly matches the area used in the FC’s 2005 potential roundwood availability forecast. This section of the report has been divided into two parts. The first part presents the situation for coniferous roundwood and the second part presents the results for sawmill products.

Coniferous roundwood

6.2. The forecast potential availability of coniferous roundwood, after allowing for the inward and outward transfer of logs, gives the potential net availability of coniferous roundwood in the zone (see also para 1.13). The estimated amounts are shown in chart 6.1.

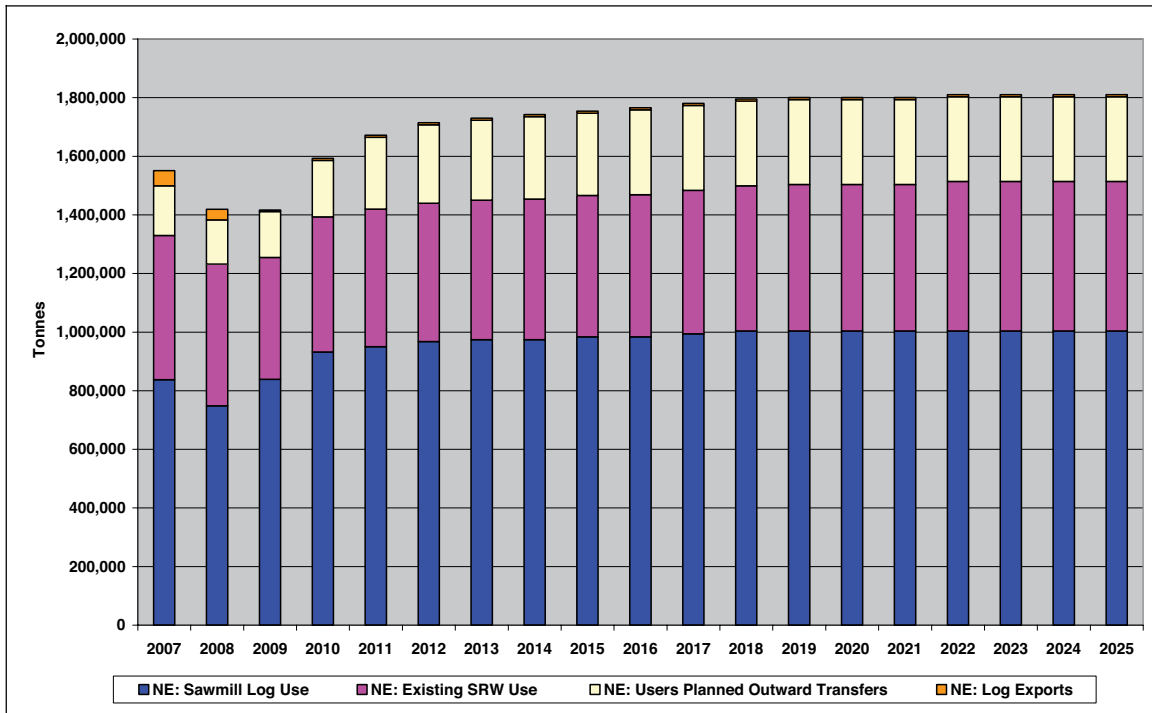
Chart 6.1: Northern England zone: Forecast potential annual availability of coniferous roundwood with existing users’ planned roundwood zonal transfers 2007 - 2025



6.3. The chart shows that the forecast potential annual availability of coniferous roundwood within the zone peaks over the period 2012 – 2016 and then starts to gradually decline.

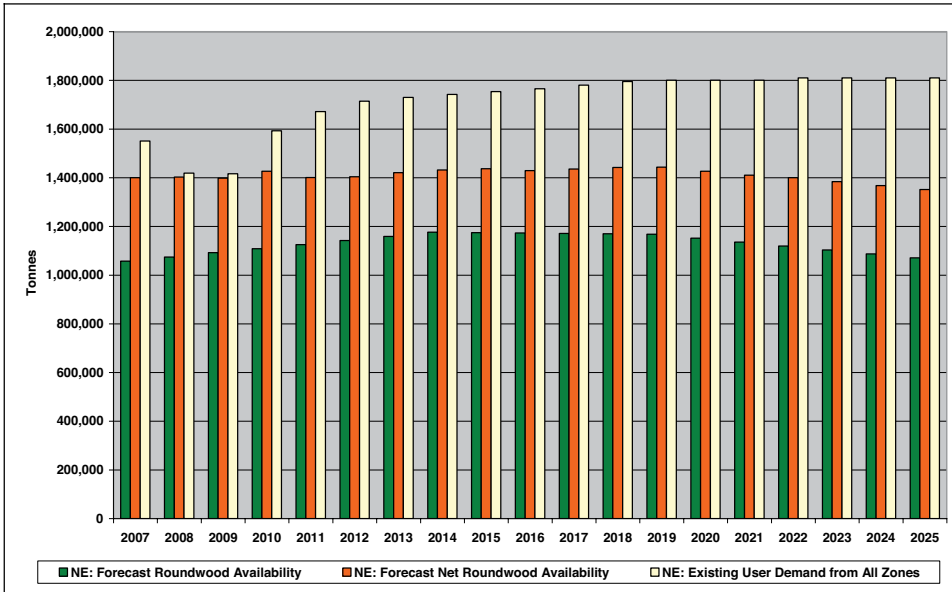
6.4. The use of domestically grown coniferous roundwood by existing users of coniferous roundwood from 2007 to 2025 is shown in chart 6.2.

Chart 6.2: Northern England zone: Annual use of coniferous roundwood by existing users 2007 – 2025



3.5. This shows that the demand for coniferous roundwood from existing users’ developments in Northern England is expected to increase to almost 1.8 million tonnes per annum by 2018. The balance between the planned forest industry growth in demand for coniferous roundwood in Northern England and its potential availability is shown in chart 6.3.

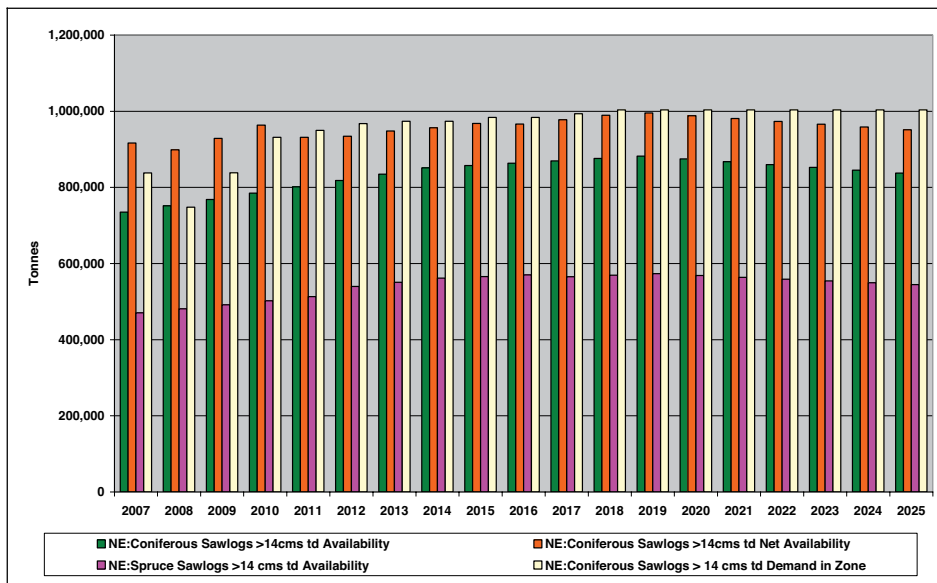
Chart 6.3: Northern England zone: Balance between forecast annual availability of coniferous roundwood and demand from existing users' developments 2007 - 2025



6.6. The chart shows that annual demand for coniferous roundwood by existing users exceeded forecast potential availability from 2007 and the gap between potential demand and availability of coniferous roundwood in the Northern England zone is expected to increase up to 2019. At that point the gap increases further as the potential annual availability of coniferous roundwood within the zone is forecast to start falling away.

6.7. A comparison of potential availability and net availability of coniferous sawlogs, and the potential availability of spruce sawlogs only, with forecast demand as a result of planned developments within the forest industry in the Northern England zone over the period 2007-2025 is shown in chart 6.4.

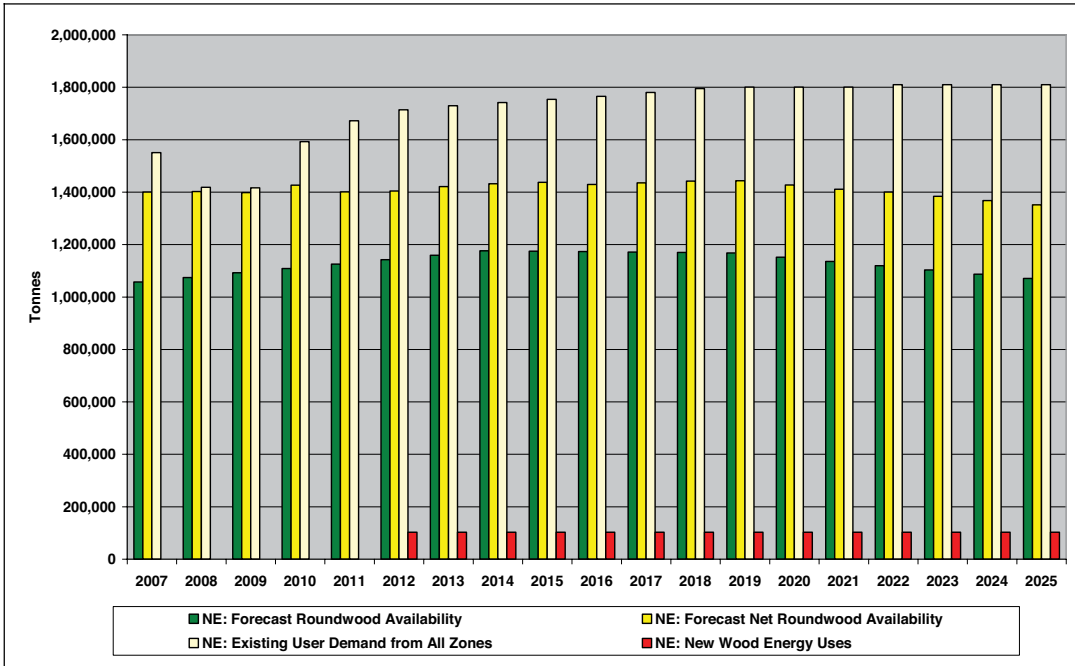
Chart 6.4: Comparison of potential availability and net availability of coniferous sawlogs and the potential availability of spruce sawlogs only with forecast demand in the Northern England zone over the period 2007-2025



6.8. Net availability of sawlogs between 2007 and 2010 exceeds demand. This probably relates to issues relating to the sizes of logs and a degree of trading of roundwood between companies.

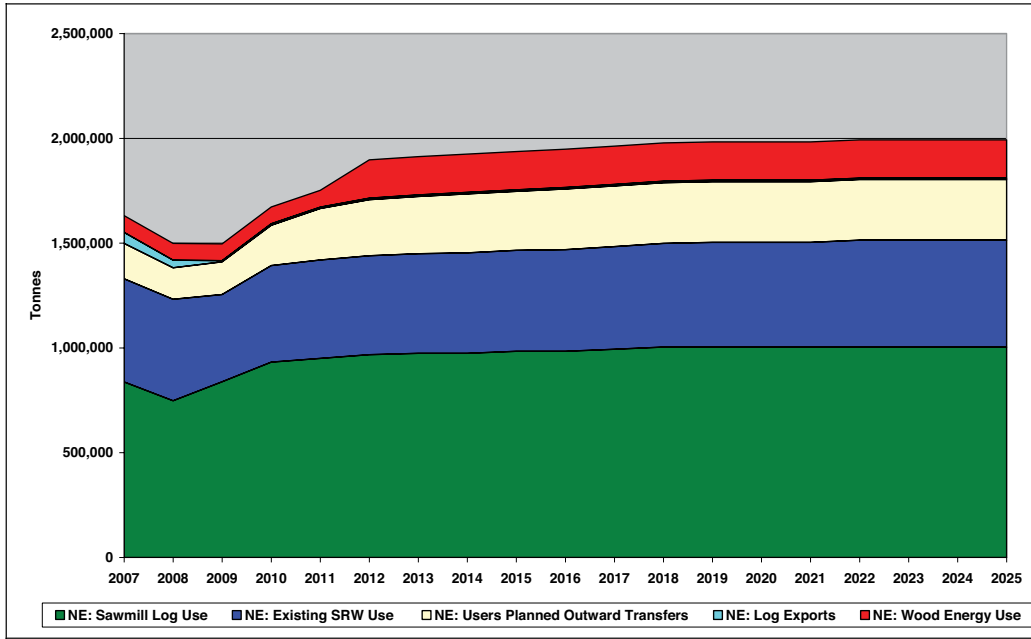
6.9. The estimated end uses of coniferous roundwood in Northern England are shown in chart 6.5.

Chart 6.5: Northern England zone: Overall coniferous roundwood availability - Demand balance based on demand from existing users in all zones & proposed new wood fired energy plants 2007 – 2025



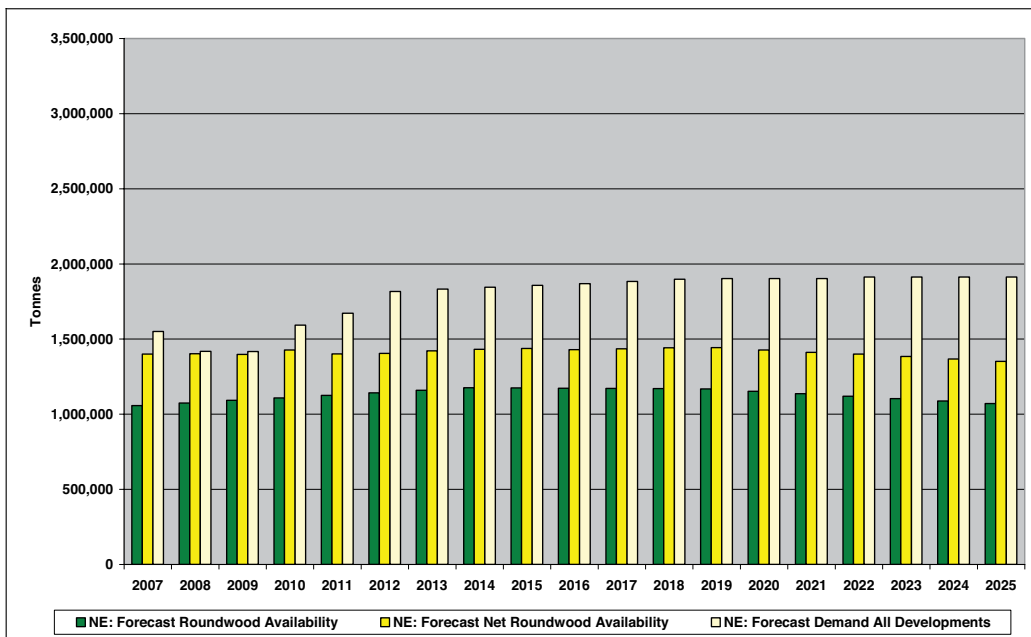
6.10. The likely end uses for coniferous roundwood in Northern England are shown in Chart 6.6.

Chart 6.6: Northern England zone: Likely end uses for coniferous roundwood in the zone by existing users in all zones & proposed new wood fired energy plants 2007 – 2025



6.11. The overall annual balance in coniferous roundwood availability and demand if all the developments in the forest and wood energy industries proceed is shown in chart 6.7.

Chart 6.7: Northern England zone: Overall coniferous roundwood annual availability - Demand balance assuming all developments in the forest & energy industry proceed as planned 2007 – 2025



6.12. The existing demand for coniferous roundwood from existing users in all zones has exceeded potential availability of coniferous roundwood in the Northern England zone and its net availability within the zone. The gap will increase if the planned new wood energy plants proceed and it will increase in size until it reaches about 700,000 tonnes per annum in 2012 where it remains from then until about 2019 when the gap widens further as the potential annual availability of coniferous roundwood within the zone is forecast to decrease.

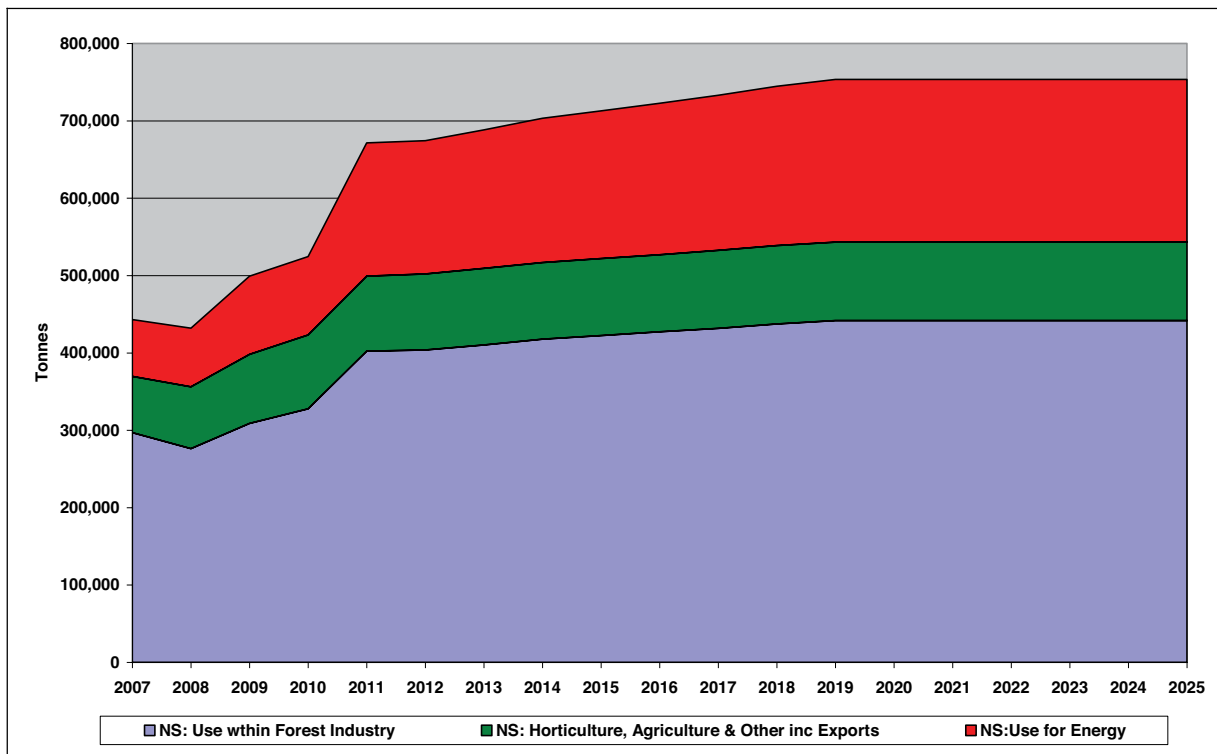
Sawmill products

6.13. Coniferous sawmills produce sawn timber, wood chips, sawdust, pin chips, shavings, slab wood and bark. For the purposes of this report the term “coniferous sawmill products” or “sawmill products” relates to all the products except sawn timber.

6.14. The existing supply of sawmill products (chips, sawdust, slab wood and bark) produced by sawmills located in the Northern England zone is sold into a variety of markets. The markets in the Northern England zone can be broadly categorised as the panelboard mills, export, agriculture and horticultural markets with a number of other small miscellaneous ones. By far the largest market at present for sawmill products is the panelboard industry.

6.15. The past and forecast future uses of sawmill products in the Northern England zone, based on information provided by sawmills based in the North England zone, are shown graphically in chart 6.8.

Chart 6.8: Northern England zone: Past & forecast future uses of sawmill products 2007 – 2025



6.16. For reasons of commercial confidentiality the zonal demand is not provided, nor are zonal transfers as some sawmills are uncertain as to which companies their sawmill products go to eventually as they sell them on to another company which handles their removal and sale.

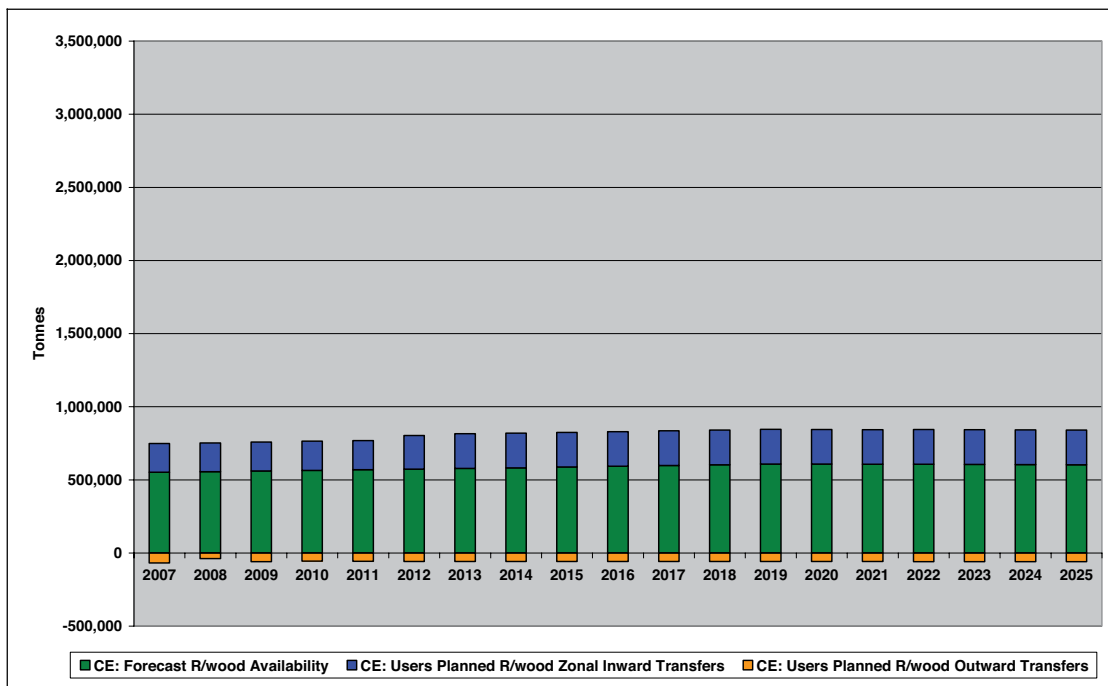
07 Central England zone: coniferous roundwood & sawmill products forecast availability & demand

7.1. The information given in this section is for the area defined as the Central England zone (see map 1.1) and this exactly matches the area used in the FC's 2005 potential roundwood availability forecast. This section of the report has been divided into two parts. The first part presents the situation for coniferous roundwood and the second part presents the results for sawmill products.

Coniferous roundwood

7.2. The forecast potential annual availability of coniferous roundwood, after allowing for the inward and outward transfer of logs, gives the potential net annual availability of coniferous roundwood in the Central England zone. The estimated amounts are shown in chart 7.1.

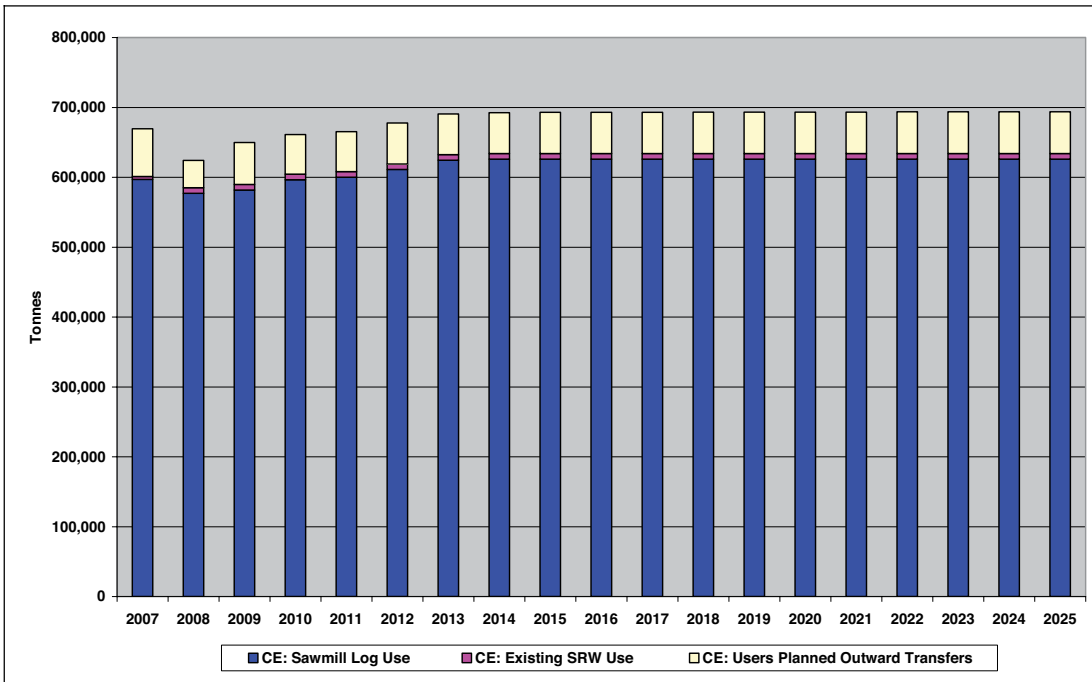
Chart 7.1: Central England zone: Forecast potential annual availability of coniferous roundwood with existing users' planned roundwood zonal transfers 2007 - 2025



7.3. The chart shows that the potential annual availability of coniferous roundwood within the zone is expected to increase very slightly and then remain fairly constant at about 600,000 tonnes.

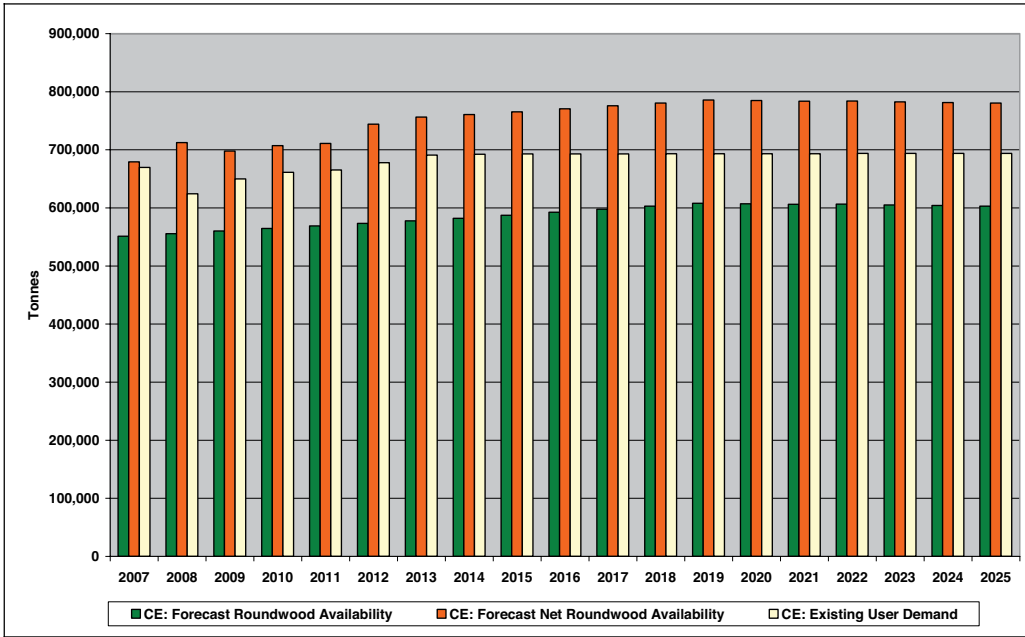
7.4. The forecast annual use of domestically grown coniferous roundwood by existing users from 2007 to 2025 is shown in chart 7.2.

Chart 7.2: Central England zone: Annual use of coniferous roundwood by existing users 2007 – 2025



7.5. This shows that the demand for coniferous roundwood arising from planned developments by existing users in Central England is expected to increase to about 600,000 green tonnes per annum by 2016. The annual balance in Central England between the demand for coniferous roundwood by existing users in all zones and its potential availability is shown in chart 7.3.

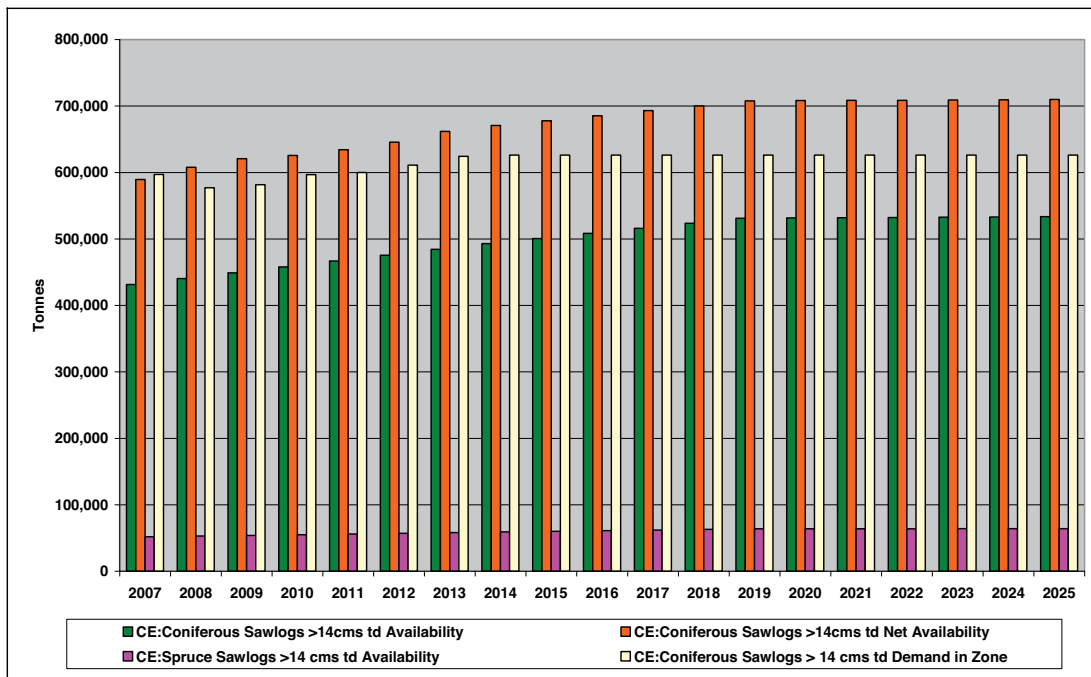
Chart 7.3: Central England zone: Balance between forecast annual availability of coniferous roundwood and demand from existing users' developments 2007 - 2025



7.6. The chart shows that the annual demand for coniferous roundwood is forecast to exceed coniferous roundwood availability within the zone, but net annual availability will be more than annual demand indicating an expected inflow of coniferous roundwood to the zone. This situation is expected to remain until 2025.

7.7. A comparison of potential availability and net availability of coniferous sawlogs, and the potential availability of spruce sawlogs only, with forecast demand as a result of planned developments within the forest industry in the Central England zone over the period 2007-2025 is shown in chart 6.4.

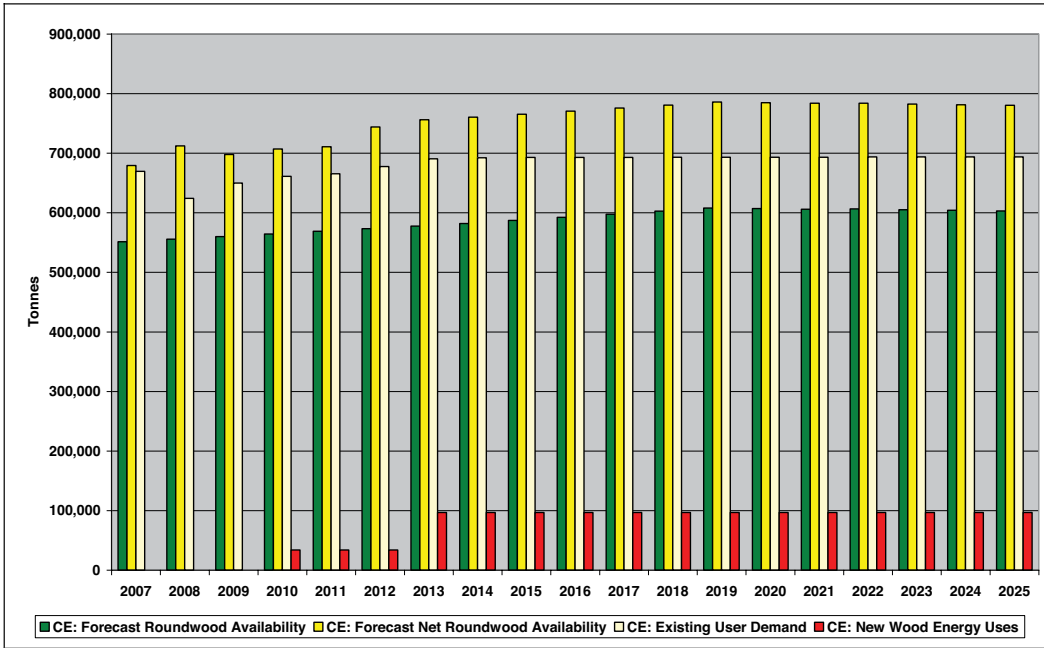
Chart 7.4: Comparison of potential availability and net availability of coniferous sawlogs and the potential availability of spruce sawlogs only with forecast demand in the Central England zone over the period 2007-2025



7.8. The chart shows that species other than spruce comprise most of the conifers in Central England. The high demand for coniferous roundwood is linked to at least one large sawmill on the edge of the zone that draws in coniferous roundwood from other zones.

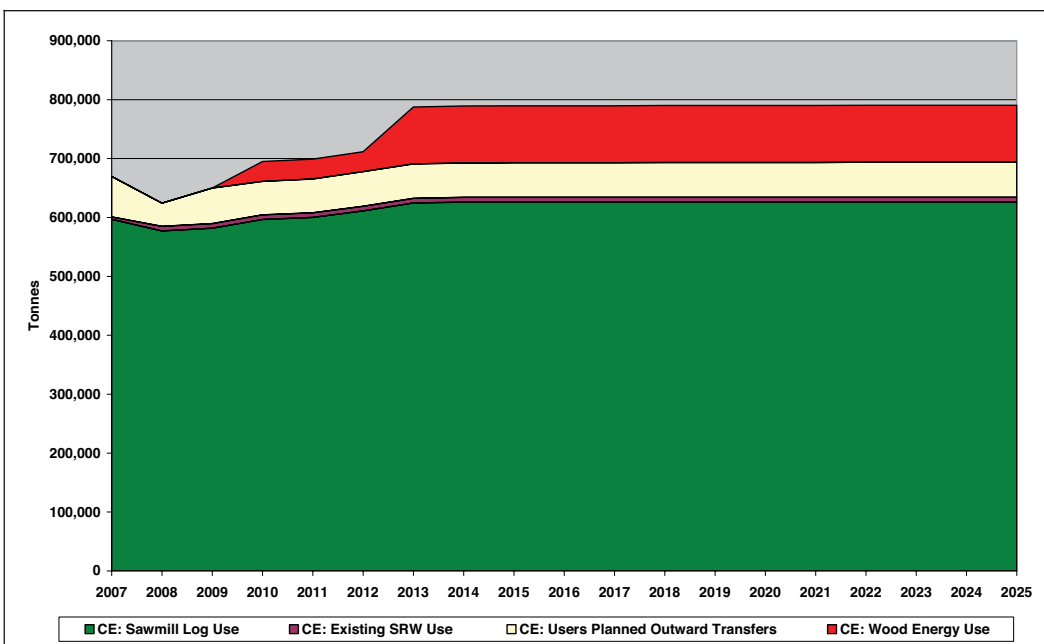
7.9. The potential overall demand when all the planned developments become operational is shown in chart 7.5.

Chart 7.5: Central England zone: Estimated total annual demand for coniferous roundwood from existing users in all zones & proposed new wood fired energy plants 2007 – 2025



7.10. The likely end uses for coniferous roundwood in Central England are shown in Chart 7.6.

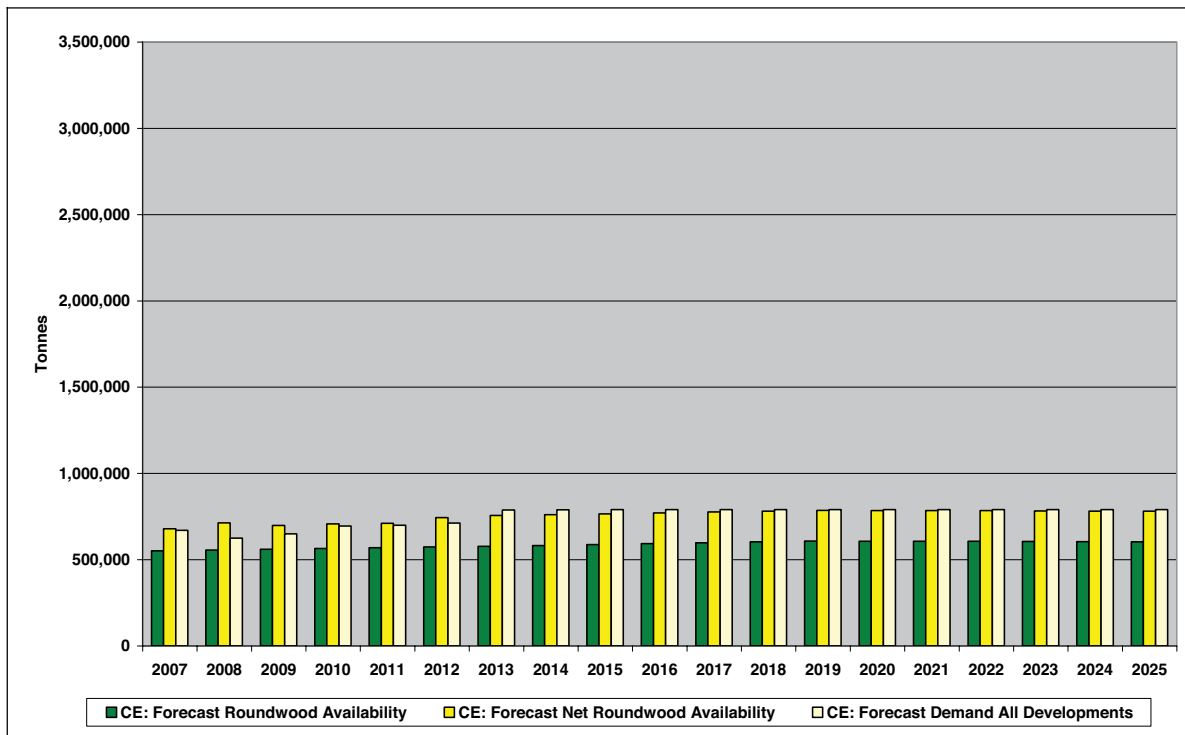
Chart 7.6: Central England zone: Likely end uses for coniferous roundwood in the zone by existing users in all zones & proposed new wood fired energy plants 2007 – 2025



7.8. The chart shows that species other than spruce comprise most of the conifers in Central England. The high demand for coniferous roundwood is linked to at least one large sawmill on the edge of the zone that draws in coniferous roundwood from other zones.

7.9. The potential overall demand when all the planned developments become operational is shown in chart 7.5.

Chart 7.7: Central England zone: Overall coniferous roundwood availability - Demand balance based on demand from existing users in all zones & proposed new wood fired energy plants 2007 – 2025



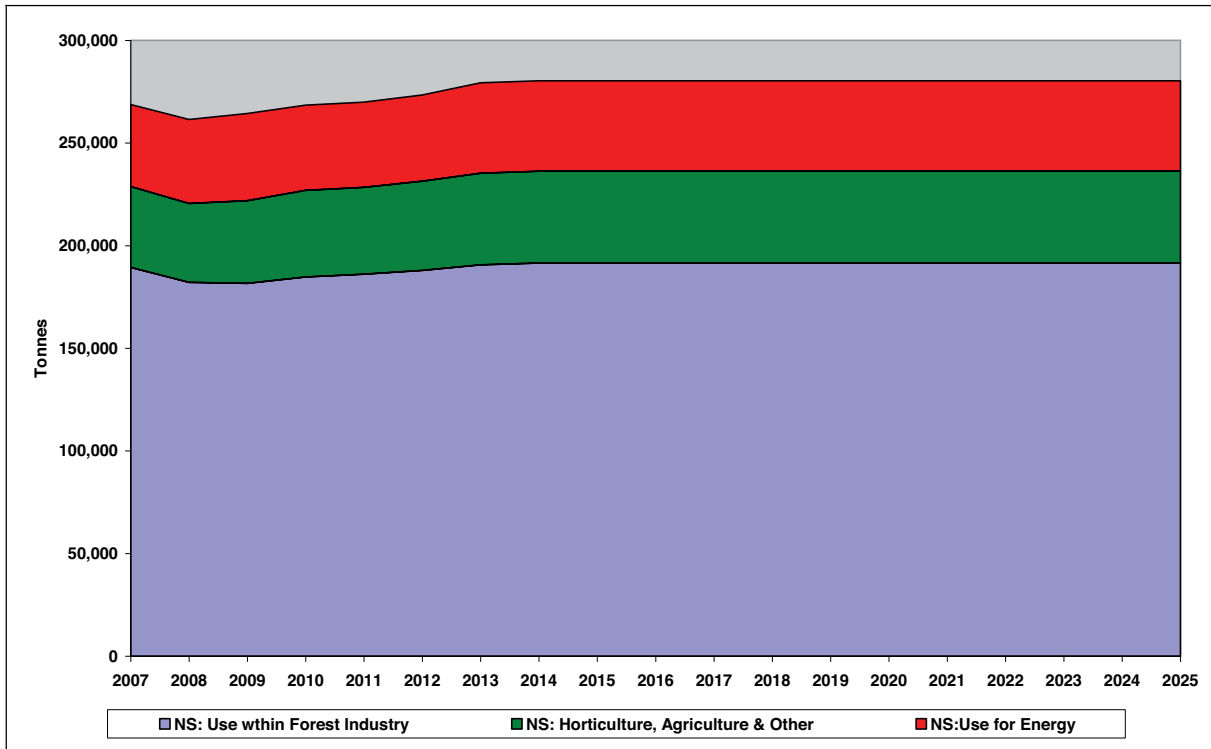
Sawmill products

7.13. Coniferous sawmills produce sawn timber, wood chips, sawdust, pin chips, shavings, slab wood and bark. For the purposes of this report the term “coniferous sawmill products” or “sawmill products” relates to all the products except sawn timber.

7.14. The existing supply of sawmill products (chips, sawdust, slab wood and bark) produced by sawmills located in the Central England zone is sold into a variety of markets. The markets in the Central England zone can be broadly categorised as the panelboard mills, export, agriculture and horticultural markets with a number of other small miscellaneous ones. By far the largest market at present for sawmill products is the panelboard industry.

7.15. The past and forecast future uses of sawmill products in the Central England zone, based on information provided by sawmills based in the Central England zone, are shown graphically in chart 7.8.

Chart 7.8: Central England zone: Past & Forecast Future Uses of Sawmill Products 2007 – 2025



7.16. For reasons of commercial confidentiality the zonal demand is not provided, nor are zonal transfers as some sawmills are uncertain as to which companies their sawmill products go to eventually as they sell them on to another company which handles their removal and sale.

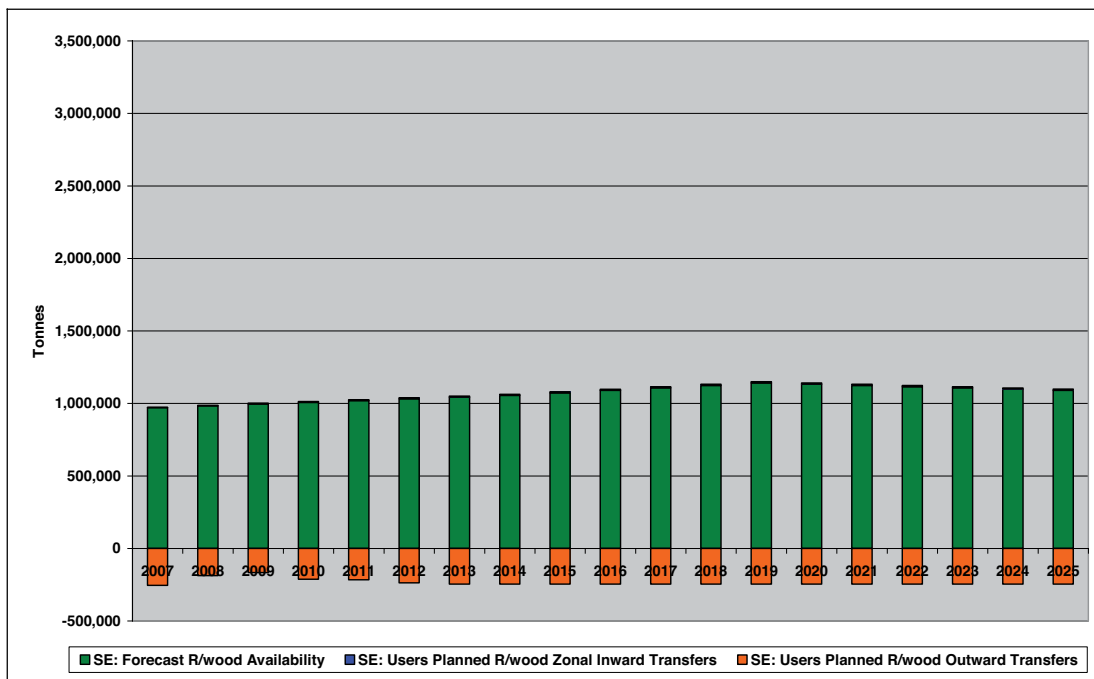
08 South England zone: coniferous roundwood & sawmill products forecast availability & demand

8.1. The information given in this section is for the area defined as the South England zone (see map 1.1) and this exactly matches the area used in the FC’s 2005 potential roundwood availability forecast. This section of the report has been divided into two parts. The first part presents the situation for coniferous roundwood and the second part presents the results for sawmill products.

Coniferous roundwood

8.2. The forecast potential annual availability of coniferous roundwood after allowing for the inward and outward transfer of logs, gives the potential net availability of coniferous roundwood in the zone (see also para 1.13). The estimated amounts are shown in chart 8.1.

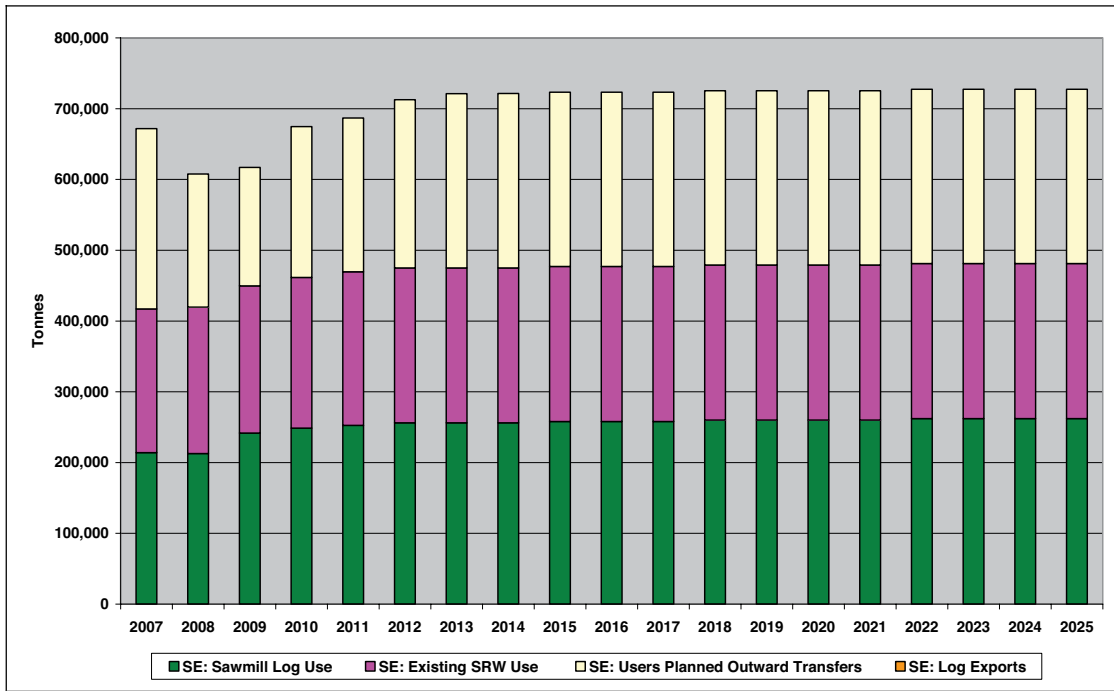
Chart 8.1: South England zone: Forecast potential annual availability of coniferous roundwood with existing users’ planned roundwood zonal transfers 2007 - 2025



8.3. In the South England zone coniferous roundwood annual availability is expected to increase gradually over the period up to about 1.1 million tonnes in 2021 and after that it is forecast to decline slightly. Very little coniferous roundwood is expected to be brought into the zone.

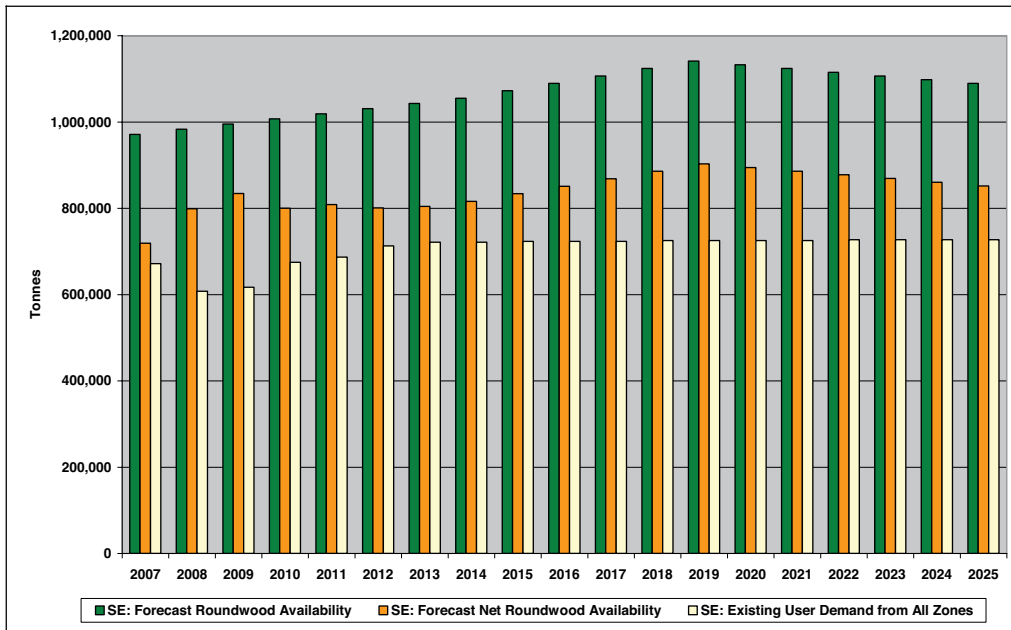
8.4. The forecast use of domestically grown coniferous roundwood by the forest industry from 2007 to 2025 is shown in chart 8.2.

Chart 8.2: South England zone: Annual use of coniferous roundwood by existing users 2007 – 2025



8.5. This shows the forecast annual use of coniferous roundwood by the existing forest industry users in South England is expected to increase to just over 0.7 million tonnes by 2013 and then to remain at that level to 2025. The balance between the existing users’ planned growth in demand for coniferous roundwood in South England and its potential availability is shown in chart 8.3.

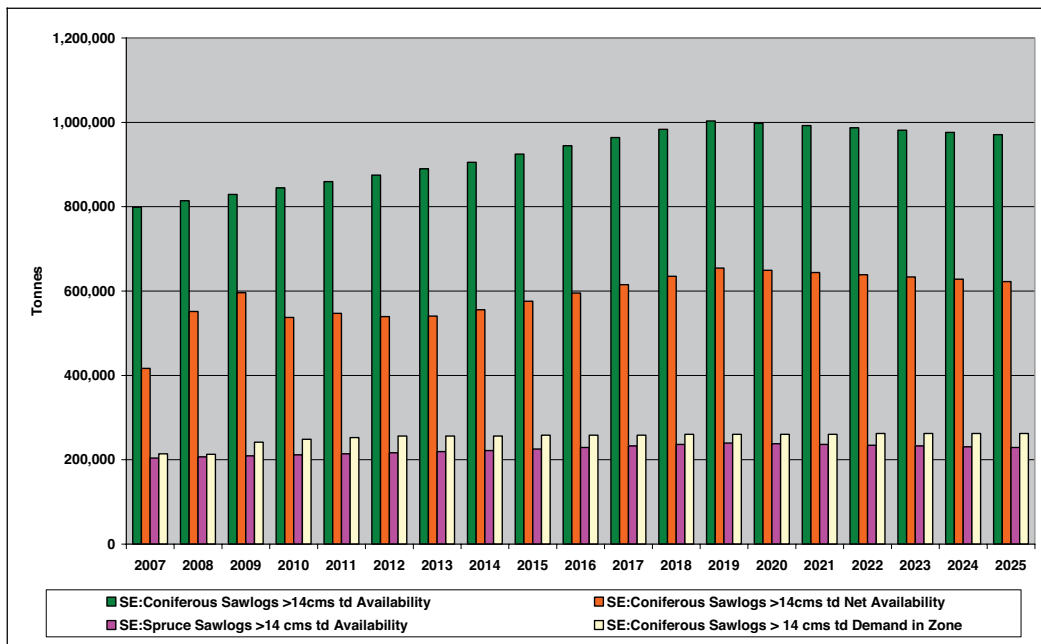
Chart 8.3: South England Zone: Balance between Forecast Annual Availability of Coniferous Roundwood and Demand from Existing Users' Developments 2007 - 2025



8.6. The chart shows that the forecast annual availability of coniferous roundwood has been in excess of potential demand from 2007, as has been the net availability, and this situation is likely to continue throughout the period to 2025.

8.7. A comparison of potential availability and net availability of coniferous sawlogs, and the potential availability of spruce sawlogs only, with forecast demand as a result of planned developments within the forest industry in the South England zone over the period 2007-2025 is shown in chart 8.4.

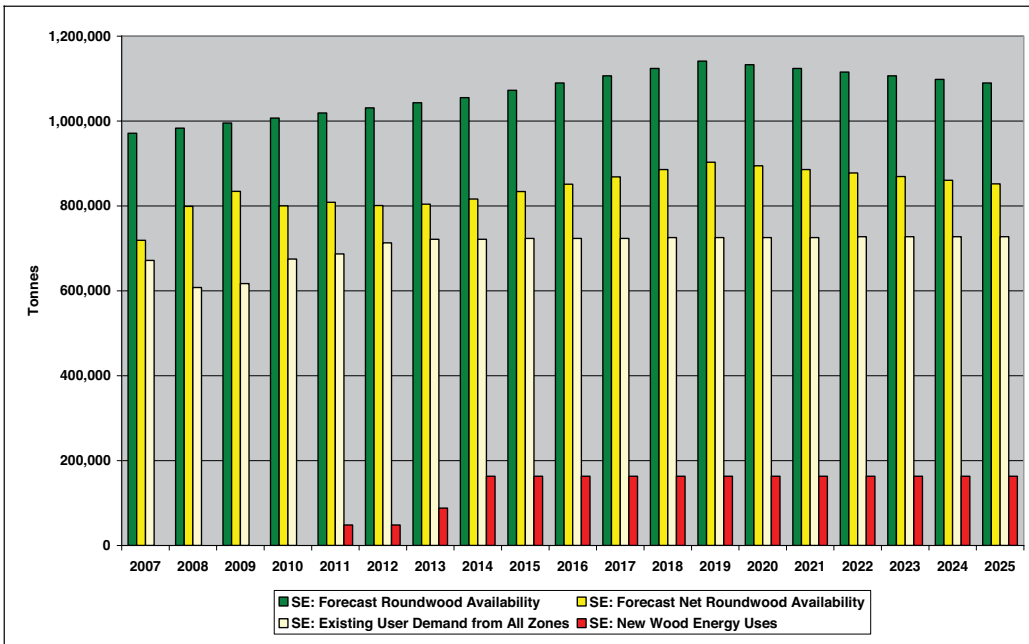
Chart 8.4: Comparison of potential availability and net availability of coniferous sawlogs and the potential availability of spruce sawlogs only with forecast demand in the South England zone over the period 2007-2025



8.8. The chart suggests that demand for coniferous roundwood is closely linked to the spruce component of the coniferous roundwood that is potentially available. Markets may not exist for some other conifer species or the quality might be poor as is often the case with larch for example.

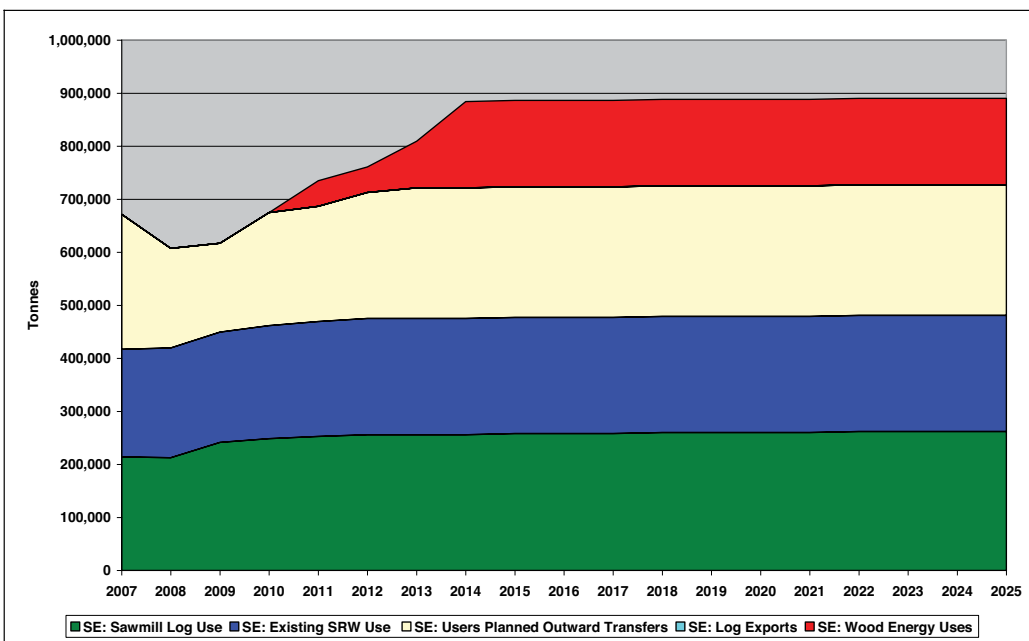
8.9. The overall demand, if the planned energy plants become operational, is shown in chart 8.5.

Chart 8.5: South England zone: Estimated total annual demand for coniferous roundwood from existing users in all zones & proposed new wood fired energy plants 2007 – 2025



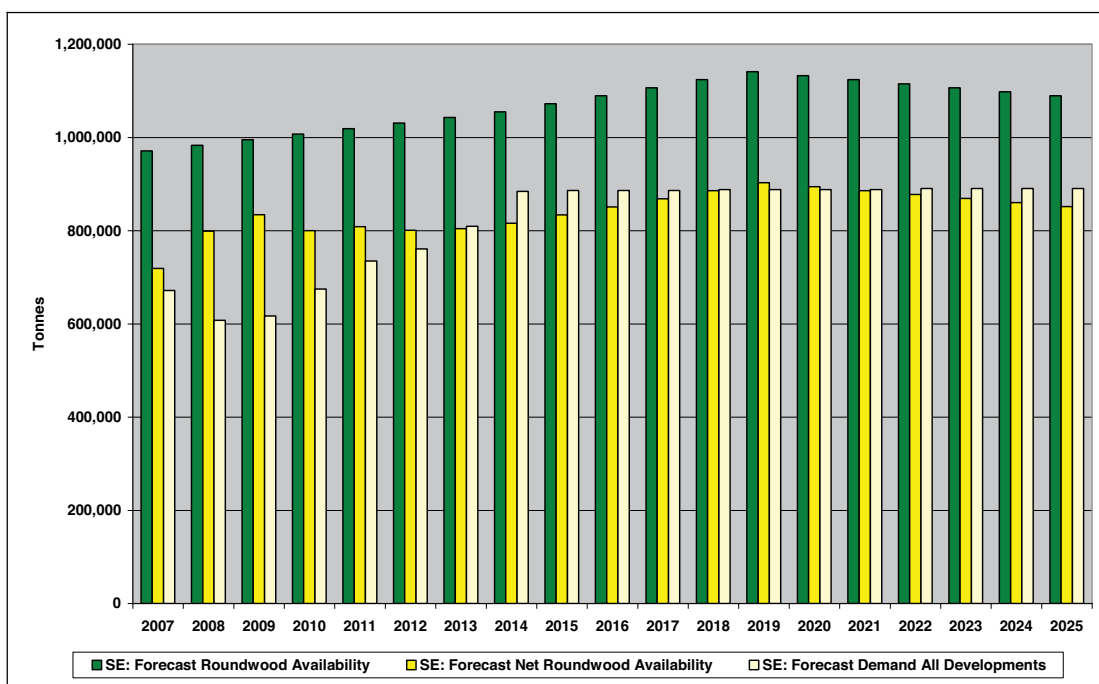
8.10. The likely end uses of coniferous roundwood in South England over the period 2007 to 2025 are shown in chart 8.6.

Chart 8.6: Central England zone: Likely end uses for coniferous roundwood in the zone by existing users in all zones & proposed new wood fired energy plants 2007 – 2025



8.11. The overall annual balance in coniferous roundwood potential availability and demand based on existing users' planned requirements and the additional demand from the planned wood energy plants is shown in chart 8.7.

Chart 8.7: South England zone: Overall coniferous roundwood availability - Demand balance based on demand from existing users in all zones & proposed new wood fired energy plants 2007 – 2025



8.12. If the planned wood energy developments proceed in South England, the potential availability of coniferous roundwood within the zone will continue above demand as it has done since 2007, but forecast net annual availability of and demand for coniferous

roundwood will be closely balanced from about 2013. The reasons that forecast availability of coniferous roundwood in the South England zone is potentially greater than forecast demand could be because most of the conifer woodlands are in the private sector and owners

have other objectives than commercial ones in managing them; restrictions on felling the trees for landscape reasons; harvesting and transport constraints and difficulties in obtaining planning permission for any utilisation plants.

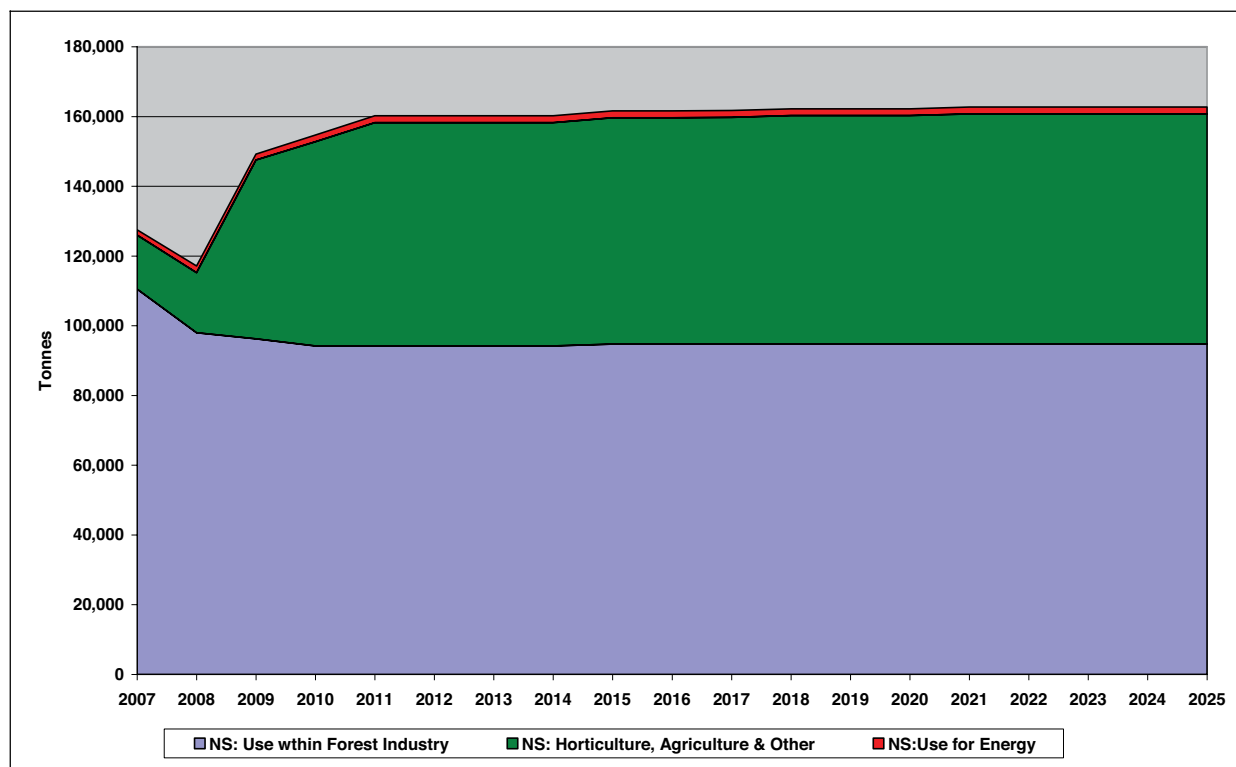
Sawmill products

8.13. Coniferous sawmills produce sawn timber, wood chips, sawdust, pin chips, shavings, slab wood and bark. For the purposes of this report the term “coniferous sawmill products” or “sawmill products” relates to all the products except sawn timber.

8.14. The existing supply of sawmill products (chips, sawdust, slab wood and bark) produced by sawmills located in the South England zone is sold into a variety of markets. The markets in the South England zone can be broadly categorised as the panelboard mills, export, agriculture and horticultural markets with a number of other small miscellaneous ones. By far the largest market at present for sawmill products is the panelboard industry.

8.15. The past and forecast future uses of sawmill products in the South England zone, based on information provided by sawmills based in the South England zone, are shown graphically in chart 8.8.

Chart 8.8: South England zone: Past & forecast future uses of sawmill products 2007 – 2025



8.16. For reasons of commercial confidentiality the zonal demand is not provided, nor are zonal transfers as some sawmills are uncertain as to which companies their sawmill products go to eventually as they sell them on to another company which handles their removal and sale.

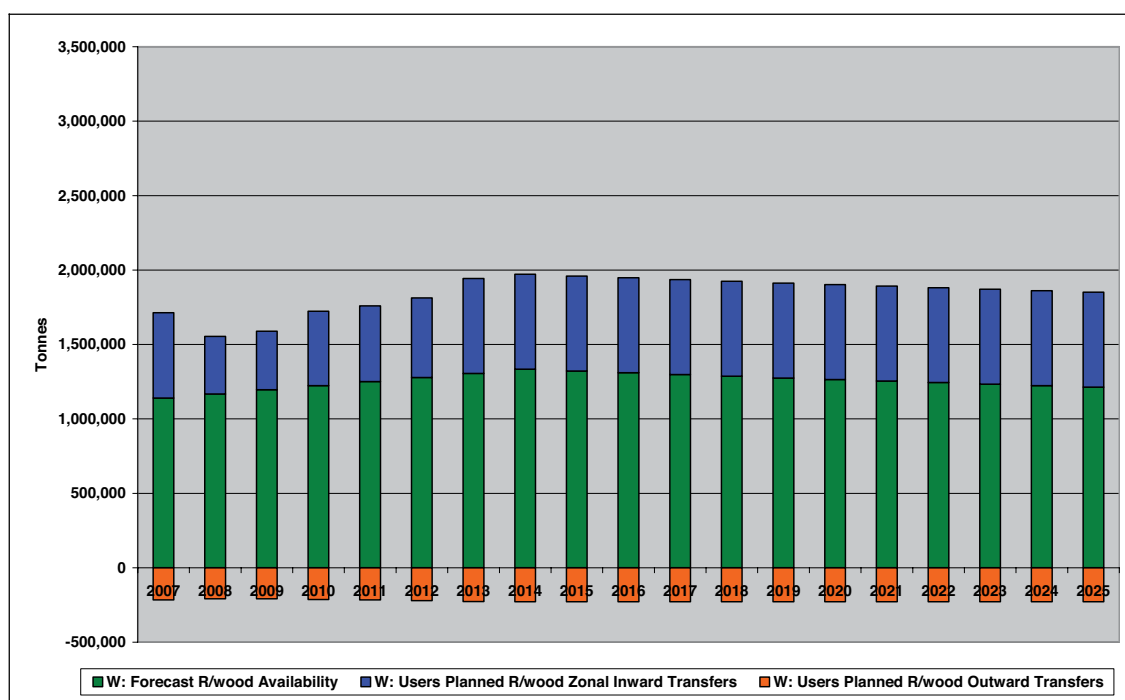
09 Wales: coniferous roundwood & sawmill products forecast availability & demand

9.1. The information given in this section is for the area defined as Wales (see map 1.1) and this exactly matches the area used in the FC's 2005 potential roundwood availability forecast. This section of the report has been divided into two parts. The first part presents the situation for coniferous roundwood and the second part presents the results for sawmill products.

Coniferous roundwood

9.2. The forecast potential availability of coniferous roundwood, after allowing for the inward and outward transfer of logs, gives the potential net availability of coniferous roundwood in Wales (see also para 1.13). The estimated amounts are shown in chart 9.1.

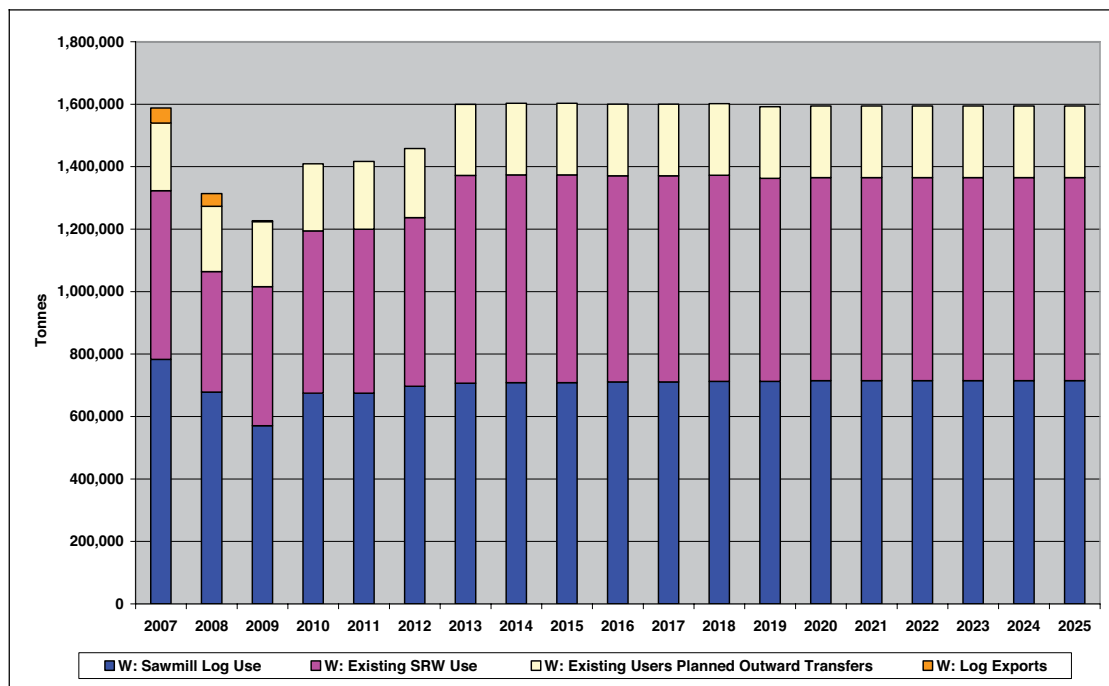
Chart 9.1: Wales: Forecast potential availability of coniferous roundwood with planned user roundwood zonal transfers 2007 - 2025



9.3. The chart shows that forecast potential availability of coniferous roundwood in Wales is expected to rise slightly to about 2014 and then it will start declining, although changes in the silvicultural management of many coniferous woodlands in Wales over the last few years may mean that the potential annual availability is less than forecast in the short term. Inward transfers of coniferous roundwood are very significant and are forecast to continue.

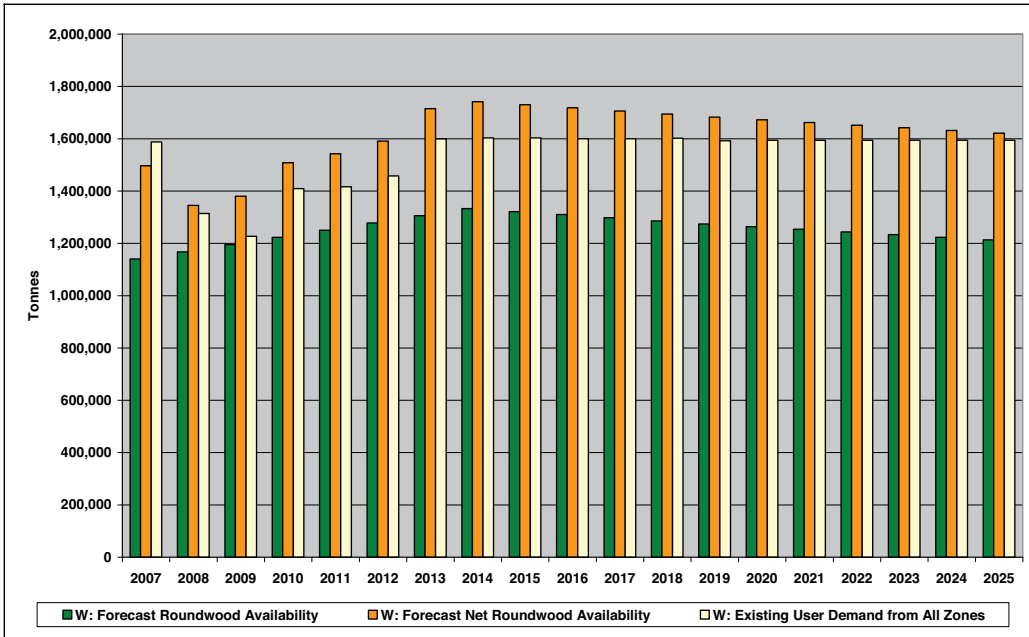
9.4. The forecast use of domestically grown coniferous roundwood by the forest industry from 2007 to 2025 is shown in chart 9.2.

Chart 9.2: Wales: Planned use of coniferous roundwood by the forest industry 2003 – 2016



9.5. This shows that the demand for coniferous roundwood arising from developments planned by existing users is expected to increase to just over 1.6 million tonnes per annum by 2013. The balance between the planned growth in demand for coniferous roundwood by existing users and its potential availability in Wales is shown in chart 9.3.

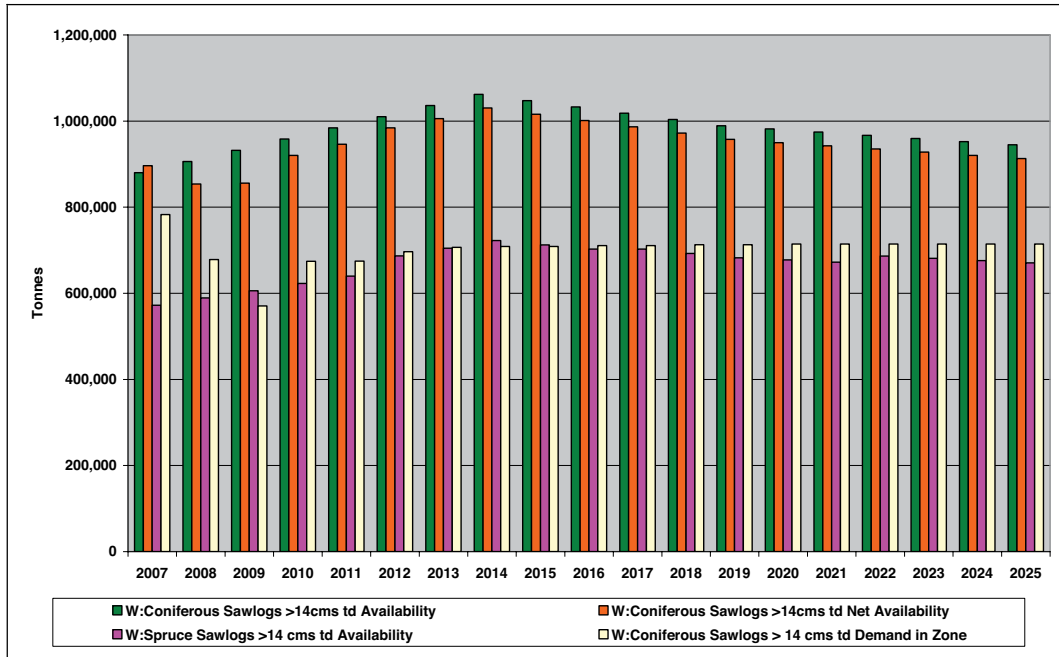
Chart 9.3: Wales: Balance between forecast annual availability of coniferous roundwood and demand from existing users’ developments 2007 - 2025



9.6. The chart shows that the annual demand for coniferous roundwood exceeds potential availability within the zone from 2007 and this situation is expected to remain until 2016, but net availability is likely to remain slightly greater than forecast demand.

9.7. A comparison of potential availability and net availability of coniferous sawlogs, and the potential availability of spruce sawlogs only, with forecast demand as a result of planned developments within the forest industry in Wales over the period 2007-2025 is shown in chart 9.4.

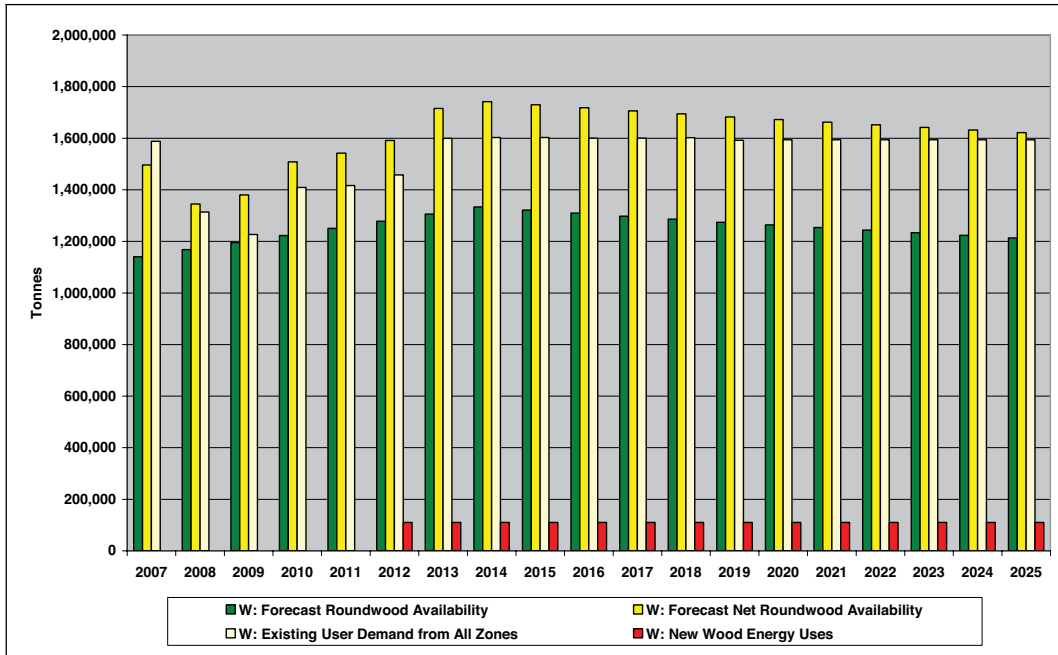
Chart 9.4: Comparison of potential availability and net availability of coniferous sawlogs and the potential availability of spruce sawlogs only with forecast demand in Wales over the period 2007-2025



8.8. The chart suggests that demand for coniferous roundwood is closely linked to the spruce component of the coniferous roundwood that is potentially available. Markets may not exist for some other conifer species or the quality might be poor as is often the case with larch for example.

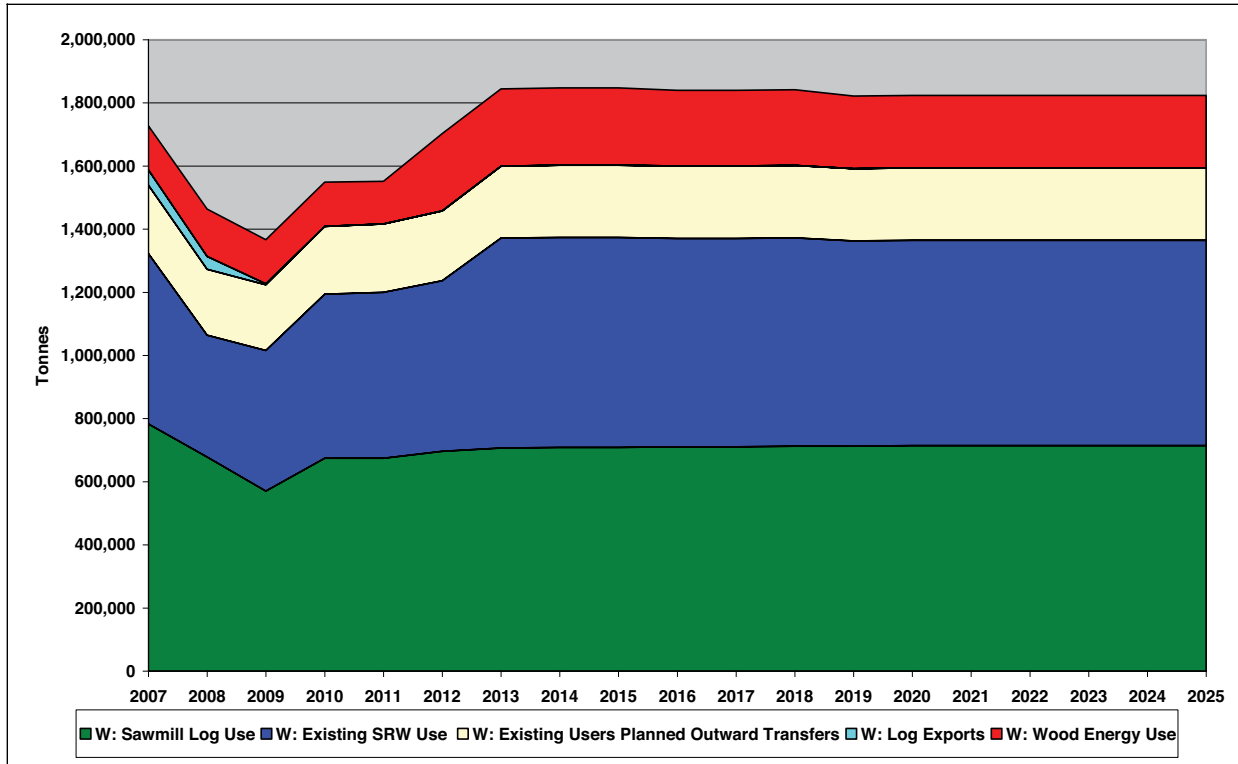
8.9. The overall demand, if the planned energy plants become operational, is shown in chart 8.5.

Chart 9.5: Wales: Estimated total annual demand for coniferous roundwood from existing users in all zones & proposed new wood fired energy plants 2007 – 2025



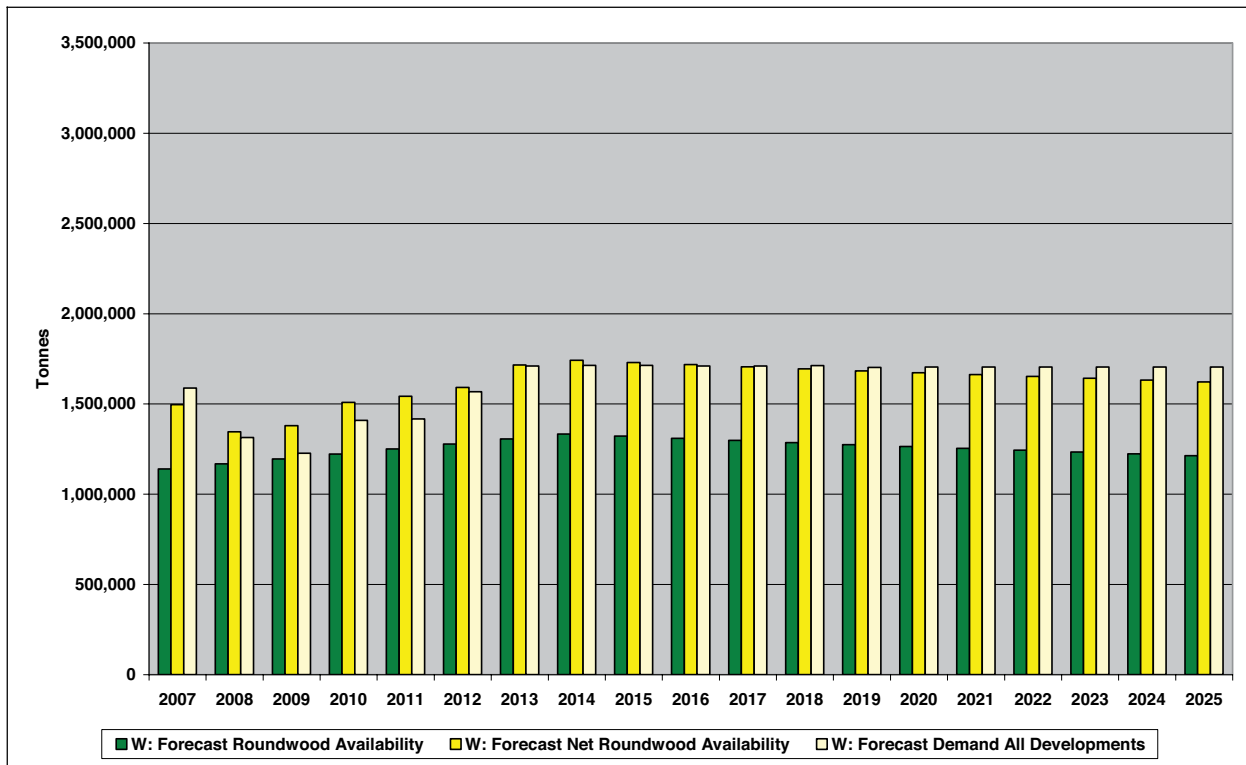
9.10. The likely uses of coniferous roundwood in Wales over the period 2007 to 2025 are shown in chart 9.6.

Chart 9.6: Wales: Likely end uses for coniferous roundwood in Wales by existing users in all zones & proposed new wood fired energy plants 2007 – 2025



9.11. The overall balance in coniferous roundwood potential availability and demand based on the demand from existing users in all zones and from the planned new energy plants in Wales is shown in chart 9.7.

Chart 9.7: Wales: Overall coniferous roundwood availability - Demand balance based on demand from existing users in all zones & proposed new wood fired energy plants 2007 – 2025



9.12. If all the planned new wood energy developments proceed, total demand for coniferous roundwood will be in excess of forecast coniferous roundwood availability within Wales, but it will be very close to the net availability of coniferous roundwood from 2012 suggesting that the inward transfers of coniferous roundwood into Wales will have to continue to meet demand.

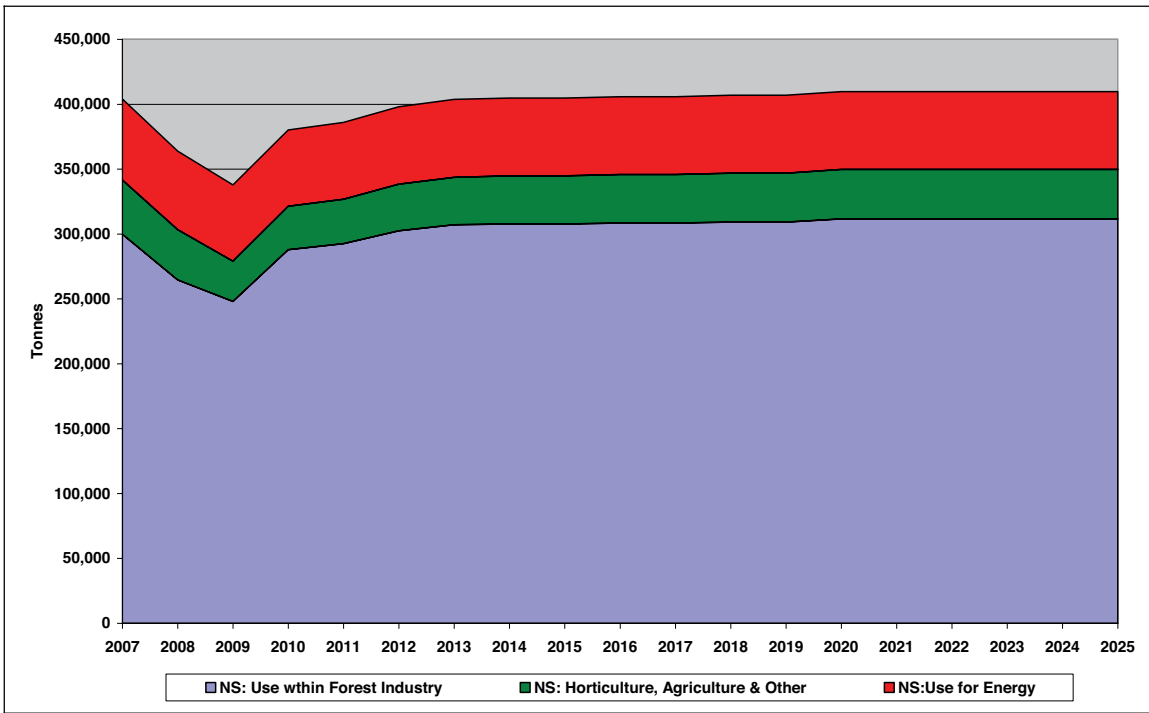
Sawmill products

9.13. Coniferous sawmills produce sawn timber, wood chips, sawdust, pin chips, shavings, slab wood and bark. For the purposes of this report the term “coniferous sawmill products” or “sawmill products” relates to all the products except sawn timber.

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9.15. The past and forecast future uses of sawmill products in Wales, based on information provided by sawmills based in Wales, are shown graphically in chart 9.8.

Chart 9.8: Wales: Past & forecast future uses of sawmill products 2007 – 2025



9.16. For reasons of commercial confidentiality the zonal demand is not provided, nor are zonal transfers as some sawmills are uncertain as to which companies their sawmill products go to eventually as they sell them on to another company which handles their removal and sale.

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ConFor
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UKFPA
UK Forest Products Association

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INDUSTRIES
FEDERATION**

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Uk Forest Products Association (UKFPA)

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www.wpif.org.uk

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