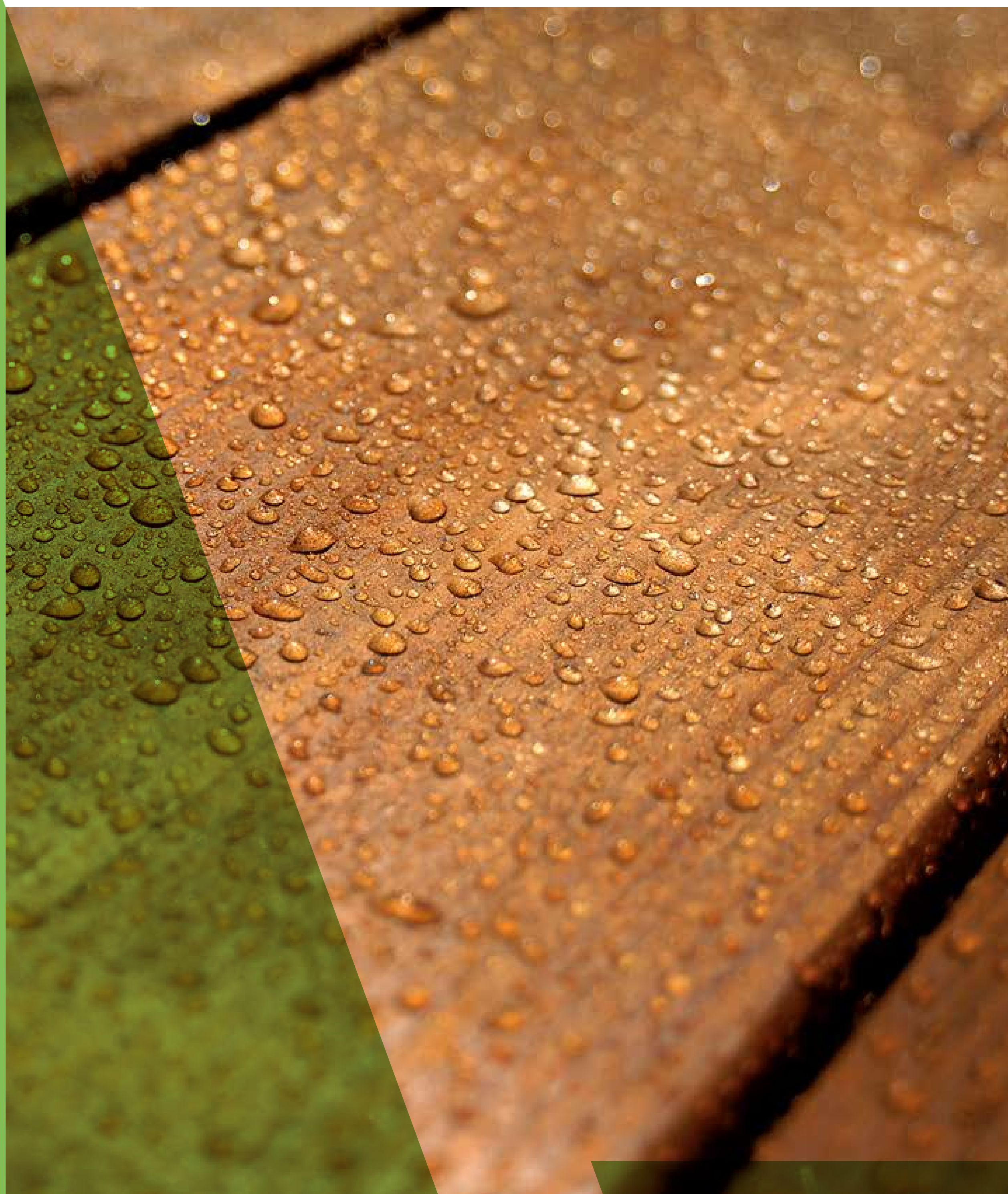
TREATED WOOD

A SUSTAINABLE CHOICE



CONTENTS

Treated Wood – A Sustainable Choice

A construction material, provided and renewable by Nature, with predictable performance, taking carbon from the atmosphere and locking it away for decades, with low energy demand and a feel good aesthetic, appreciated by almost everyone – that's treated wood.

Wood is part of the bioeconomy, can be sourced responsibly, is a flexible and adaptable material that can be used efficiently and aligns with the concept of a circular economy. At the end of its life wood can be reused in a cascading process of uses, recycling or recovery of energy. Wood is consequently the only truly renewable construction material.

Wood offers a simple way to reduce the CO_2 emissions that are understood to be the main cause of climate change through:

- **the carbon sink effect of the forests;**
- **the carbon storage effect of wood products;**
- **substitution for carbon-intensive materials.**

The energy used to create the materials that make up a building is typically 22% of the total energy expended over the lifetime of the building. [1] Therefore it is worth paying attention to the materials specified, as well as to the energy-efficiency of the structure. There is no other commonly used building material that requires so little energy to produce as wood. Thanks to photosynthesis, trees can capture CO_2 in the air and combine it with water from the soil and produce the organic material wood.

> **“Wood with enhanced durability has been treated, with preservatives or by other processes, to make it resistant to attack by wood-destroying organisms.”**

[1] Tackle Climate Change: Use Wood
Third edition, Rev 2 December 2011. CEI-Bios

INTRODUCTION

> "A 10% increase in the percentage of houses in Europe whose main structural components are wood, produces sufficient CO_2 savings to account for about 25% of the reductions prescribed by the Kyoto Protocol."

Not only is the production and processing of wood highly energy-efficient, giving wood products an ultra-low carbon footprint, but wood can often be used to substitute for materials like steel, aluminium, concrete or plastics, which require large amounts of energy to produce.

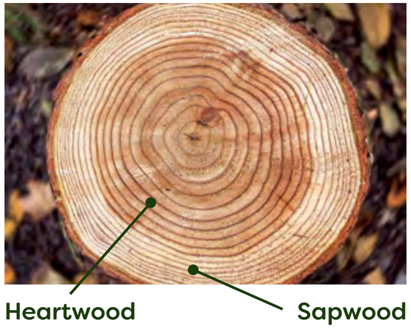
Every cubic metre of wood used as a substitute for other building materials reduces CO_2 emissions to the atmosphere by an average of 1.1 tonnes (t). If this is added to the 0.9 t of CO_2 stored in wood, each cubic metre of wood saves a total of 2.0 t CO_2. Based on these figures, a 10% increase in the percentage of houses in Europe whose main structural components are wood, produces sufficient CO_2 savings to account for about 25% of the reductions prescribed by the Kyoto Protocol. [2]

In another example, by choosing treated wooden sleepers rather than their concrete counterparts, 3.78 t of CO_2 can be saved per km of track per year. If 30,000 to 50,000 wooden sleepers were placed on the network each year instead of concrete sleepers, this would allow a reduction of CO_2 in the atmosphere equivalent to removing 860 to 1430 cars from the road (with average emissions of 158 g CO_2/km and average distance of 15,000 km/year).

Apart from a very few, mostly tropical species, untreated wood is vulnerable to biodeterioration by fungi and insects.

These agencies also degrade the sustainability credentials of untreated wood leading to early failure in service, premature release of carbon and economic loss more characteristic of a linear economy than a desirable circular economy.

Commercially important wood species are typically derived from well-managed forests delivering high growth rate material. The natural durability of wood is limited to the heartwood and depends on the species, growth conditions and provenance. Modern sawmill practices designed to maximise sawn wood production yield, driven by high demand, mean that it is impractical and uneconomic to exclude sapwood. The sapwood of all species is vulnerable to insect and fungal attack so requires protection against insect and when wood becomes and remains wet, fungal attack. Even where it is to be used, heartwood may also require protection depending on the wood species, the conditions of use and the service life required.



Recognising the short life of untreated wood for use in, for example, mines, ships, bridges, building and fencing and the inconvenience and cost of failure, humankind has from antiquity attempted to prolong the life of wood. Early methods included charring and soaking in various oils and salt water but it was not until the discovery of the biological causes of wood damage and decay, coinciding with the start of the Industrial Revolution, that the search for effective treatments began. So the foundations of sustainability of wood as a construction material were laid from the beginning of civilization.

[2] International Institute for Environment and Development, Using Wood Products to Mitigate Climate Change, 2004

The structure and characteristics of a particular wood species as it enters service indicate its likely performance, assuming best practice in design, construction and maintenance. Understanding the environment in which the wood is used leads to the opportunity to correctly specify the preservative protection requirements for that wood and the correct treatment to provide the required performance in service.

European Standard EN 335 describes five use classes for wood characterised by the risk of them becoming wet in service and becoming susceptible to biological attack.

USE CLASS 1 — **Interior dry**

USE CLASS 2 — **Interior but with risk of wetting**

USE CLASS 3 — **Exposed to weather but not in ground contact**

USE CLASS 4 — **In ground or freshwater contact**

USE CLASS 5 — **In seawater**

USING TREATED WOOD

The protection requirements emphasise not only effectiveness against fungal or insect biodeterioration but also to be resistant to leaching or decomposition by UV light.

The higher the use class, the more resistance against the different hazards is required.

The practice shows that individual parts of a timber construction may belong to different use classes. This must be considered when selecting the material and in construction.

In **Use Class 1** insects are a continuous, if mostly low impact risk in Europe, except in areas where termites are present. Building codes in termite-infested areas demand protection for wood against termite attack. When wood is at risk of becoming wet (Use Classes 2, 3 and 4) wood-destroying fungi are a high impact risk.

In **Use Classes 2 and 3** codes demand good practice in design, installation and maintenance reduce but do not avoid risk of wetting so the risk of decay and/or insect attack remains. In the sea **(Use Class 5)** fungi and marine borers are high impact risks. **Use Classes 2, 3 and 4** are the most important commercial markets for treated wood.

> **“Where a risk of biodeterioration is identified, wood must be protected against the risk.”**

Climate change is forecast to increase average temperature and rainfall in Europe and their effect on insect growth rates and extension of geographical range (especially termites) has yet to be fully characterised. Risk of increased condensation, water penetration and flooding and their impact on fungal decay risk are also yet to be fully characterised.

In all use classes, the durability of wood may be raised to the degree necessary to deliver climate and sustainability goals by adding substances which confer additional durability and limit or prevent biodeterioration. In most uses where a risk of biodeterioration is identified, wood must be protected against that risk to deliver confidence in performance essential to underpin its sustainability characteristics, especially when compared with alternative materials. Such substances are controlled in Europe under the terms of the Biocidal Products Regulation or equivalent national regulations, which through an intensive assessment by national competent authorities of potential health, safety and environmental impacts, are authorised for use for treatment of wood.

SUSTAINABILITY

Sustainability is most often defined as meeting the needs of the present without compromising the ability of future generations to meet theirs. [3]

For true sustainability, we need to integrate the goals of a high quality of life, health and prosperity with social justice and maintaining the earth's capacity to support life in all its diversity.

These social, economic and environmental goals are interdependent and mutually reinforcing and are recognised widely as the three aspects of sustainability: **economic, environmental and social.**

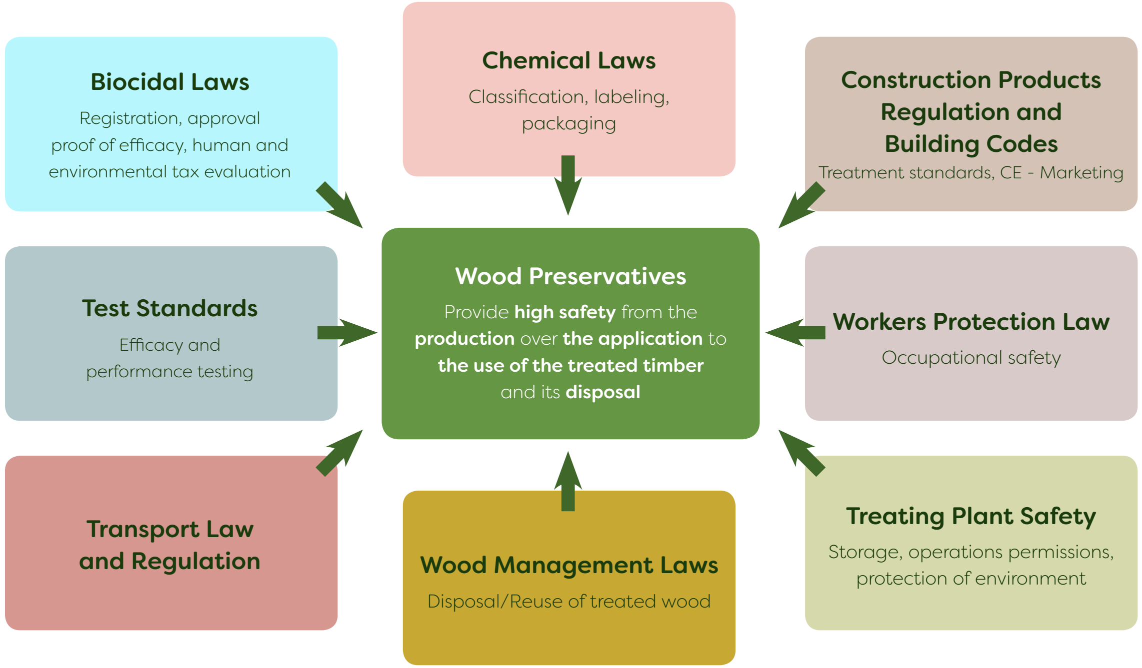
Only through balancing social, environmental and economic aspects can we achieve true sustainability.

Both treated wood and the biocides used in wood protection conform to the principles of sustainability and for clarity these are addressed separately.

> **"The three aspects of sustainability are often referred to as the 'three pillars' of sustainability but it is now widely recognised that sustainability is only achieved with a balance of all three aspects."**

[3] BS ISO 20400:2017 Sustainable procurement - Guidance

SUSTAINABLE USE OF BIOCIDES



Products containing biocides, such as wood preservatives, are a family of products intended to destroy or control harmful or unwanted organisms (such as fungi and insects) that have detrimental effects on the environment, on animals, on humans, their activities or the products they use or produce. Biocidal products are used in a wide variety of ways by both industrial and professional users as well as by the public.

Sustainable use can be defined for biocidal products as the objective of reducing the risks and impacts of the use of biocidal products on human health, animal health and the environment. Risk mitigation may involve the consideration of alternative approaches or techniques such as non-chemical alternatives to biocidal products. In such cases an assessment must be made of the cost and effectiveness of alternatives as well as any negative impact on society from their use as substitutes for biocidal products.

Return to Contents

It should however be noted that biocidal products are also important tools to protect human health, animal health and the environment and that non-chemical alternatives may not always be effective, practical or even available. Therefore, sustainable use strategies also ensure that sufficient biocidal products remain available to achieve these objectives.

Environment

European strategy for sustainable use of biocides and biocidal products is focused on the Biocidal Products Regulation (BPR). This regulation established a procedure for assessing the effectiveness, safety in use (humans and animals) and impact on the environment (air, soil and water-dwelling animals and plants) of biocides and similar assessments for products containing biocides and how they are used.

The BPR ensures that only biocides that meet its criteria are permitted for use. Their approval and authorisation are time-limited allowing for comparison of existing products with newer ones that may be more effective or have other desirable characteristics leading to the potential for substitution over time.

Assessment of effectiveness is important in ensuring that no more than the amount of biocides needed to protect wood in service are authorised. Combined with training and certification of treatment plant operatives using national and European standards for treated wood, use of biocides is limited to just enough to protect and to conform to health, safety and environmental protection measures set out in regulations.

Other regulations control how wood preservatives are used in industrial plants ensuring that all parts of the treatment process are contained or controlled within no-effect limits so there is no impact on or release to air, soil or ground water. These regulations build upon industry codes of practice developed long before regulations came into force establishing a base of safety at treatment plants that fits easily into more formal regulatory control.

"Wood preservatives are used in industrial plants ensuring that all parts of the treatment process are contained or controlled."

SUSTAINABLE USE OF BIOCIDES

Economic

The investment in research and development of wood preservatives coupled with their manufacture, use and distribution of treated wood provides employment and security for around a quarter of a million employees and their families across Europe. The availability of safe and effective treatments also impacts on the wider wood industries ensuring markets for wood products in situations where lack of natural durability limits or prevents the use of wood.

Wood which is treated in accordance with its end-use and installed and used in accordance with best practices reduces the economic impact of decay across society. For example, on owners and occupiers of buildings, those responsible for land management and authorities responsible for public buildings and infrastructure.

Social

Biocides, properly used, contribute to greater social wellbeing through the maintenance of socially beneficial living and working environments. While the control of rats and mice, bacteria and other high-profile biological agencies are easier to see as socially beneficial, wood preservatives are important contributors in this respect.

Decaying buildings and, for example, broken fencing and decking contribute to an environment in which social cohesion may be damaged. Decaying buildings contribute to loss of equity and cohesion between social groups.

A scientific basis involving research and development with testing for wood preservatives began in the 19th century and continues to this day. Coal tar creosote was identified early in this process followed by highly effective combinations of mostly water-based chemicals.

> **“Wood which is treated in accordance with its end-use and installed and used in accordance with best practices reduces the economic impact of decay across society.”**

Return to Contents

TREATED WOOD AS A SUSTAINABLE MATERIAL

The safety of those handling such chemicals and protection of the environment during the treatment process and from treated wood in service became a priority from the latter part of the 20th century as the importance of those characteristics came to be recognised.

Wood preservatives were among the first biocidal products to be subject to regulation and standardisation in respect of these characteristics and consequently are now accepted as both safe and effective.

Treated wood is the material of choice in every situation where its characteristics make it suitable. With such protection, designers have the choice of the foremost renewable and sustainable material.

When structures come to the end of their life, treated wood may be segregated for cascading and recycling uses potentially extending useful life indefinitely. Even when disposal eventually becomes the only option, energy generation by burning returns carbon to the atmosphere where it is turned back into wood by trees using the energy of sunlight. As the amount of CO_2 emitted from combustion is no more than the amount previously stored, burning wood is carbon neutral - a truly circular economy.

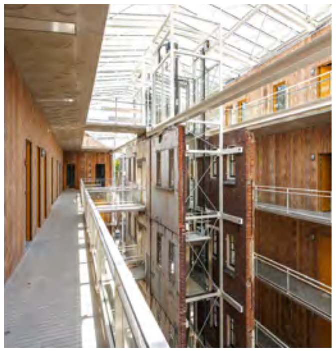
TREATED WOOD AS A SUSTAINABLE MATERIAL

Wood is also affected by non-biological agencies. These include, for example, fire and surface degradation by UV light. The wood protection industry has responded to the need to protect wood against these non-biological agencies by developing treatments that limit their effects.

In a fire, or when exposed to high temperature without burning, wood naturally chars, and the carbon-rich char insulates the wood beneath from the heat source, limiting the rate of burning. This natural effect is most effective when massive wood sections are used in construction and applies, for example, to the use of cross-laminated timber (CLT) now being used in timber-framed high-rise buildings. Internal and external reaction-to-fire protection in accordance with local regulations remains important but the frame itself is expected to survive even severe fires.

When wood is used as an external cladding or internal lining, even in escape route situations, it can easily be raised to all but the non-combustible classes in the European scheme by impregnation or coating with flame retardant formulations that meet fire safety rules for internal and external use.

When wood is exposed outdoors its surface is immediately vulnerable to the degradation effects of UV. If wood has been selected for its beautiful aesthetic in such situations its surface colour is lost and it weathers within months to a silvery grey. The disappointment of building owners and designers in such situations can be avoided by the use of surface coatings with combinations of pigments and UV-blockers. Such coatings may now be specified with long maintenance intervals owing to improvements in coating technology.



“Treated wood is the material of choice in every situation where its characteristics make it suitable.”

TREATED WOOD AS A SUSTAINABLE MATERIAL

Environment

Left entirely to nature, forests will grow only slowly as trees fall from age, wind, landslip, disease or fire.[5] Although natural regeneration will occur, the dead and dying trees decay or burn, emitting CO_2 from the carbon stored in the wood. Growth is matched by decay and with no sustainable forest management there is no net increase in carbon storage. Harvesting trees as they mature allows much of the carbon to be stored throughout the life of wood products, while at the same time giving society and forest owners an incentive to plant new trees increasing biodiversity.

The demand for wood that ensures the continuing vitality of Europe's forests is maintained in part by confidence in the performance of wood in all situations. Where wood could not be used owing to its limited natural durability, treated wood maintains wood's position in the face of competition from less sustainable materials.

Furthermore, carbon in treated wood is stored for decades longer than would be the case if untreated decay-susceptible wood was used.

[5] FAO, 2002, 'Forest Products 1996 - 2000', FAO Forestry Series 35, Rome

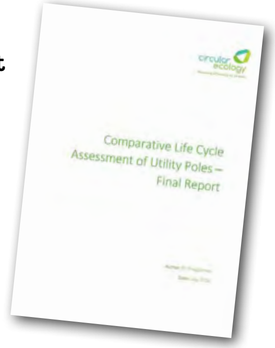
TREATED WOOD AS A SUSTAINABLE MATERIAL

Europe's forest cover is increasing by 800,000ha every year since 1990 [4] and only 64% of annual growth is harvested. The amount of wood available in Europe is growing continuously, because of under-harvest on the one hand, and the increase in forest cover on the other.

In Europe (even without Russia), the standing volume of forest is growing by 700 million m^3 every year, [5] almost the equivalent of the wood needed for a single-family wooden house every second. This means that very little needs to be imported into Europe, with over 97% of softwood, and over 90% of all wood used in Europe being sourced from European forests.

Turning to treated wood, the key to understanding its environmental credentials building on the environmental characteristics of wood, is to be found in life cycle assessment (LCA). Assessments have been carried out on treated wood in a wide range of end uses including comparisons with wood-based and inorganic materials.

LCA typically considers up to twelve environmental impact categories:



- **Climate Change**
- **Water Extraction**
- **Mineral Resource Extraction**
- **Stratospheric Ozone Depletion**
- **Human Toxicity**
- **Ecotoxicity to Freshwater and Land**
- **Nuclear Waste**
- **Waste Disposal**
- **Fossil Fuel Depletion**
- **Eutrophication**
- **Photochemical Ozone Creation**
- **Acidification**

“Carbon in treated wood is stored for decades longer than would be the case if untreated decay-susceptible wood were used.”

4 State of Europe's Forest 2011 - Status & Trends in Sustainable Forest Management in Europe, Forest Europe Liason Unit Oslo, Oslo, 2011

5 FAO, 2002, 'Forest Products 1996 - 2000', FAO Forestry Series 35, Rome

Wood for Construction

The widely respected Building Research Establishment (BRE) Centre for Sustainable Products looks at a broad range of environmental impacts for different construction elements, including landscaping, to establish the relative environmental performance of materials and components. [6]

Example classifications for construction timber include:

- **Pre-treated softwood weatherboarding, breather membrane, OSB/3 sheathing, timber frame with insulation, vapour control layer, plasterboard on battens, paint:** Classification A+
- **Preservative pre-treated softwood window, double glazed, water based opaque coating internally and externally (WWA specification):** Classification A+

These are compared with other materials:

- **Limestone faced precast concrete cladding panel, insulation, medium dense solid blockwork, plasterboard, paint:** Classification D
- **Powder coated aluminium window with softwood internal frame, double glazed, water based stain internally:** Classification C

> "Treated contruction wood achieves the highest environmental performance rating in the BRE Green Guide."

6 The Green Guide explained.
Mundy, J BRE Centre for Sustainable Products. (2015)

TREATED WOOD AS A SUSTAINABLE MATERIAL

Wood for Railway Sleepers

LCA studies 7 indicate that the use of treated wood sleepers offers lower fossil fuel and water use and lower environmental impacts than similar products manufactured of concrete and plastic composite (P/C), except for the eutrophication impact indicator for P/C sleepers.

Compared to treated wood sleepers the use of concrete results in 1.8 times more fossil fuel use and 8.7 times more water use. Concrete also results in emissions with the potential to cause approximately 5.8 times more greenhouse gas, 68 times more acid rain, 2.3 times more smog, and 2.0 times more eutrophication.

Compared to treated wood sleepers, the use of P/C results in 2.5 times more fossil fuel use and 11 times more water use. P/C results in emissions with the potential to cause 5.0 times more greenhouse gas, 72 times more acid rain, and 1.1 times more smog. Creosote sleepers result in approximately 1.4 times more eutrophication impact than P/C sleepers.

The life cycle of treated wood sleepers results in environmental benefits for the net greenhouse gas and ecotoxicity impact indicators.

Furthermore, a study of the service life of sleepers has shown that a normal variation in the life of the sleepers does not significantly affect the difference in emissions between concrete and wooden sleeper.

Reuse of treated wood sleepers in a series of cascading uses and ultimately for energy generation improves the environmental life cycle performance even more.

> **“The life cycle of treated wood sleepers results in environmental benefits for the net greenhouse gas and ecotoxicity imnpact indicators.”**

7 AquAeTer, I. (2013). Conclusions and Summary Report Environmental Life Cycle Assessment of Ammoniacal Copper Zinc Arsenate-Treated Railroad Ties with Comparisons to Concrete and Plastic / Composite Railroad Ties.

Bilan écologique de traverses comparant des traverses en béton, en hêtre, en chêne et en acier, EMPA, 2008

Bolin, C. A., & Smith, S. T. (2013). Life Cycle Assessment of Creosote-Treated Wooden Railroad Crossties in the US with Comparisons to Concrete and Plastic Composite Railroad Crossties. Journal of Transportation Technologies, 2013 (April).

International Union of Railways (UIC). (2013). Sustainable wooden railway sleepers.

Werner (2008), « Life Cycle Assessment of Railway Sleepers", Frank Werner, Unwelt & Entwicklung

Wood for Poles

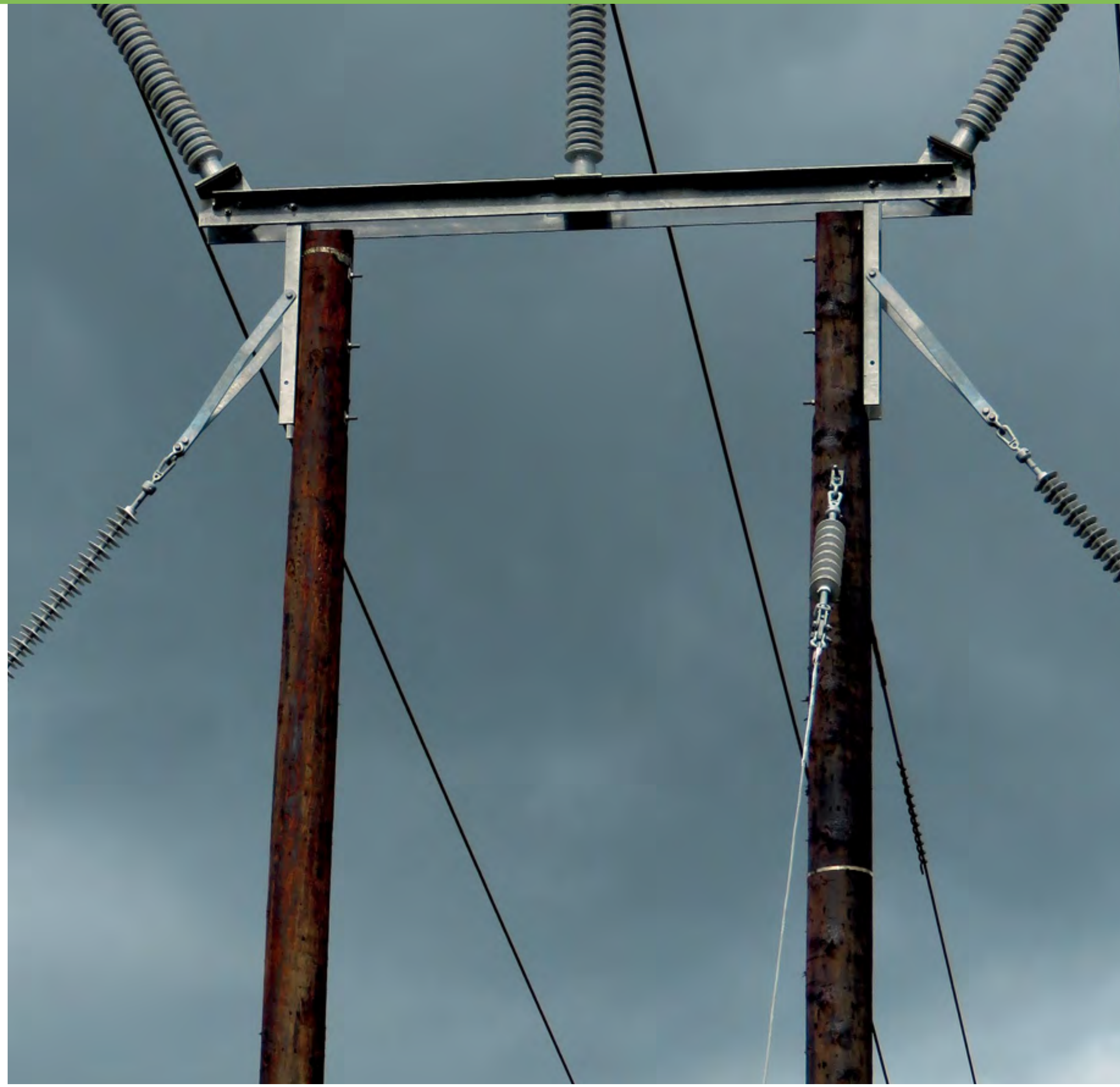
LCA [8] and socia-economic [9] studies on poles conforming to EN 14229 indicate:

- **Less Energy & Resource Use:**
  Treated wood utility poles require less total energy, less fossil fuel and less water than concrete, galvanized steel and fiber-reinforced composite utility poles.

- **Lower Environmental Impacts:**
  Treated wood utility poles have lower environmental impacts than concrete, steel and fiber-reinforced composite utility poles in five of the six impact indicator categories assessed: anthropogenic greenhouse gas, total greenhouse gas, acid rain, ecotoxicity, and eutrophication-causing emissions.

- **Decreases Greenhouse Gas Levels:**
  Use of treated wood utility poles lowers greenhouse gas levels in the atmosphere whereas concrete, galvanized steel and fiber reinforced composite utility poles increase greenhouse gas levels in the atmosphere.

- **Offsets Fossil Fuel Use:**
  Improved reuse of utility poles for energy recovery further reduces greenhouse gas levels in the atmosphere, while offsetting the use of fossil fuel energy.



8 Conclusions and Summary Report on an Environmental Life Cycle Assessment of Utility Poles ISO 14044 Compliant Prepared by: AquAeTer, Inc. © Treated Wood Council (2012)

9 Socio-economic analysis (SEA) of creosoted wood pole applications, WEI-IEO 2016.

TREATED WOOD AS A SUSTAINABLE MATERIAL

Wood for Landscaping and Decking

LCA studies comparing the environmental impact of different decking materials show that locally sourced treated wood compares favorably to other materials such as concrete slabs, and plastic composites.

A recent study [10] indicates that the global warming potential of a terrace deck made from treated wood was more than twice as low compared to concrete slabs and 7-10 times lower compared to plastic composites.

10 LCA on NTR treated wood decking and other decking materials. DTI/IVL report 715202/C302 (2018)

Return to Contents

Circular Economy

Management of treated wood at the end of its first service life becomes a part of its sustainability credentials when cascading is adopted as a concept instead of disposal as a waste. Cascading is the norm in some sectors already and is increasingly adopted across the wood-using sectors.

Cascading use is the efficient utilisation of resources by re-using and recycling materials to extend the useful life of the material.

Cascades may consist of a few or many stages, ending with a final use in burning for energy generation or controlled landfill. Disposal by landfill is the least sustainable option but the unique nature of wood and treated wood means that even in such cases, the release of stored carbon by decomposition and its uptake by growing forests acting as carbon sinks allows for an extended circular economy to be completed.

Cascading is widely practiced in sectors where the size and location of individual timber elements facilitates separation, collection and dispersal for recycling and re-use. Examples are wood sleepers from railway operations, poles from telecommunication and electricity distribution and fencing from infrastructure such as road maintenance and improvements projects.

Wherever identification and segregation is practiced even wood from demolition of buildings, potentially mixed with many other types of building materials, cascading is possible and is best practice.

Even if not segregated at source, wood recycling processes provide a further opportunity for cascading uses including wood subject to careful selection sent for particle board production, animal bedding and mulching.

> **“Management of treated wood at the end of its first service life becomes a part of its sustainability credentials when cascading is adopted as a concept instead of disposal as a waste.”**

TREATED WOOD AS A SUSTAINABLE MATERIAL

Economic

The companies within the woodworking industries are mostly SMEs with a few large groups operating on a national, regional or European scale. More than 365,000 businesses operate in the woodworking sector in Europe [1] with about 8000 (250,000 employees) of these businesses involved in wood treatment.

Each stage in the process of transforming wood into treated wood adds value that flows down the supply chain in the form of jobs, contribution to local economies and provision of durable materials for housing and infrastructure.

Wood may be treated in such a way that the amount of preservative and the depth of penetration into wood matches with the extent of the risk of attack by insects and fungi in service.

Treatment typically adds 2% to the cost of wood for Use Class 2, 3% for Use Class 3 and 5% for Use Class 4 for service lives up to 15 years. For increased service life (30 years and in some cases 60 years) treatment costs rise by only around 8%. These modest costs linked with exceptional extension to service life in challenging service situations compared with untreated wood confer economic benefit for house owners and society as a whole.

Other than for Use Class 4 where wood is continually exposed to risk of fungal attack and where present, termites and Use Class 5 (wood in the sea) wood preservation should be seen as one part of the design process and not a stand-alone means of ensuring long life for wood in service.

Design and maintenance should take into account the long-term risk of water entry into structures though weatherproofing and damp-proofing and where necessary, measures to prevent access by termites to construction wood. Where such measures fail to prevent water or termite entry into structures, treated wood is essential to preventing or limiting the need for high cost repairs while corrective action is taken.

> **“More than 365,000 businesses operate in the woodworking sector in Europe with about 8000 (250,000 employees) of these businesses involved in wood treatment.”**

[1] Tackle Climate Change: Use Wood Third edition, Rev 2 December 2011. CEI-Bios

In Europe, the use of resources is also regulated under the Construction Products Regulation (305/2011) (CPR). The CPR sets out basic requirements for construction works including sustainable use of natural resources.
The construction works must be designed, built and demolished in such a way that the use of natural resources is sustainable and in particular ensure the following:

(a) reuse or recyclability of the construction works, their materials and parts after demolition;

(b) durability of the construction works;

(c) use of environmentally compatible raw and secondary materials in the construction works.

The sustainability characteristics set out in this document show that treated wood is highly suitable for compliance with the regulatory requirements of the CPR.

Social

The social aspect of sustainability is the least well characterised and understood but social aspects of wood and treated wood can be identified.

Forests are the foundation of social sustainability that carries forward into the supply chain of wood and treated wood.

Increasingly governments are developing policies on legal and sustainable timber procurement, typically including:

- Identification, documentation and respect of legal, customary and traditional tenure and use rights related to the forest;
- Mechanisms for resolving grievances and disputes including those relating to tenure and use rights, to forest management practices and to work conditions;
- Safeguarding the basic labour rights and health and safety of forest workers.

“Only wood blends into the landscape so seamlessly where other materials create sometimes stark contrasts diminishing the harmony in the surrounding landscape and the environment at large achieved by using wood.”

TREATED WOOD AS A SUSTAINABLE MATERIAL

Cultural aspects of forestry and use of wood in structures are also important elements of the social aspects. They are somewhat intangible and least open to characterization but should not be avoided in considerations of sustainability.

They include:

- **Health and well-being**
- **Social contacts**
- **Personal pride: (physical achievements, personal knowledge)**
- **Education**
- **Inspiration**
- **Spiritual well-being**
- **Economic benefits (recreation and tourism, local economic activity)**

Examples include treated wood used for decking, walkways and landscaping in woodland, forests and parks. Only wood blends into the landscape so seamlessly where other materials create sometimes stark contrasts diminishing the harmony in the surrounding landscape and the environment at large achieved by using wood.

Forest certification schemes such as Forest Stewardship Council (FSC) and the Programme for Endorsement of Forest Certification (PEFC) support these policies and contribute to environmental and economic aspects of wood use. Wood supplies should always be accompanied by accredited certification to ensure compliance with sustainability aims.

Other options to use of biocides exist for the protection of wood.

Natural Durability

Different wood species vary in their resistance to attack by wood-destroying organisms such as fungi, insects and marine borers. The term naturally durable is however used only to refer to the resistance of heartwood to attack by wood-destroying fungi when placed in contact with the ground. The sapwood of all species has no natural durability and it is generally uneconomic to remove sapwood from supplies of commercially useful timber.

The durability classifications of woods of commercial importance within Europe are listed in EN 350 and are used to indicate suitability for Use Classes 2, 3, 4 and 5. These classifications must however be viewed with caution as durability varies within a species. To rely on a natural durability rating, it is essential that durability is established on wood whose provenance is the same as that to be used commercially, otherwise the lowest durability classification for the species must be assumed. This contrasts with treated wood, the performance of which is consistent and reliable being derived from the characteristics of the treatment rather than the wood itself.

A small number of tropical wood species, whose heartwood is sufficiently durable, are suitable for specialised uses such as sleepers in certain rail situations and for decking.

Sustainable supplies of such material however, remain challenging considering for example, impacts on transport energy and cost, the forest environment where exceptionally long renewal cycles may be involved together with social impacts on local economies.

> **“Inconsistincies in natural durability contrast with treated wood whose performance is consistent and reliable being derived from characterisitics of the treatment rather than the wood itself.”**

OTHER APPROACHES TO WOOD PROTECTION

Modified Wood

Wood modification processes include physical (for example exposing wood to high temperatures), chemical and biological processes that change the nature of wood to improve or change its natural characteristics.

Some changes may degrade modified wood and make it less suitable for certain uses. Modified wood that has been produced by chemical processes differs from preservative treated wood in that the chemicals used have no direct effect on fungi or insects though such chemicals will have their own toxicity characteristics that should be considered when such modified wood is used.

Mainly suitable for Use Classes 1, 2 and 3, modified wood is currently not as cost-effective as the use of an effective wood preservative and some elements of life cycle analysis of alternatives are not as favourable as those of preservative treated wood. For example in energy use during production and chemicals used in manufacturing processes.

BEST PRACTICE AND EDUCATION OF DESIGNERS, SPECIFIERS, INSTALLERS AND USERS

Each part of the circular economy of treated wood should play its part in ensuring optimum benefit from the sustainability characteristics of treated wood.

Regulators and suppliers of treated wood have established a firm foundation for sustainability.

Treated wood should be specified correctly to ensure that the most appropriate form of treated wood is used in each situation. This involves selecting appropriate treatments according to use class and service life. Guidance is available to designers and specifiers in the form of national and European standards and from industry itself.

Where training and Continuing Professional Development (CPD) is available all supply-chain actors, especially designers and specifiers should take part to support sustainable objectives.

For installers and users, wood treated with preservatives in Europe will carry labels, either on the wood itself or as part of point-of-sale information to guide the selection of the most appropriate material for each project. Industry associations across Europe publish guidance on use of treated wood via their literature and their websites.

> "Treatment should be specified correctly to ensure that the most appropriate form of treated wood is used in each situation."

BEST PRACTICE AND EDUCATION OF DESIGNERS, SPECIFIERS, INSTALLERS AND USERS

Choose Treated Wood – the sustainable choice

Building on a strong foundation of research and testing, together with regulatory control of health, safety and environmental characteristics treated wood delivers on its sustainability claims.

Careful independent assessment of life cycle impacts shows that the addition by treatment of service life reliability transforms wood, the only truly sustainable construction material, into the material of choice for designers, builders and consumers.

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This document has been produced by a joint task group representing the European Wood Preservative Manufacturers Group (EWPM) and the European Institute for Wood Preservation (WEI).

Edition 1 - May 2019

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