

Construction Sector

Timber and the Circular Economy

Charlie Law

March 2022



Timber and the Circular Economy

Workshop Outline

- What is the Circular Economy
- Timber and the Circular Economy
- Responsible Timber Sourcing
- Designing in timber for the Circular Economy
- Circular Economy Business Models



Timber and the Circular Economy



Anticipated Outcomes

By the end of this CPD session you will have an understanding of:

- the background to the circular economy
- where timber fits within the circular economy
- how to source your timber responsibly
- designing in timber for a circular economy
- the business models that could help deliver timber into a circular economy



Timber and the Circular Economy



What is the Circular Economy?

What is the Circular Economy?



Take



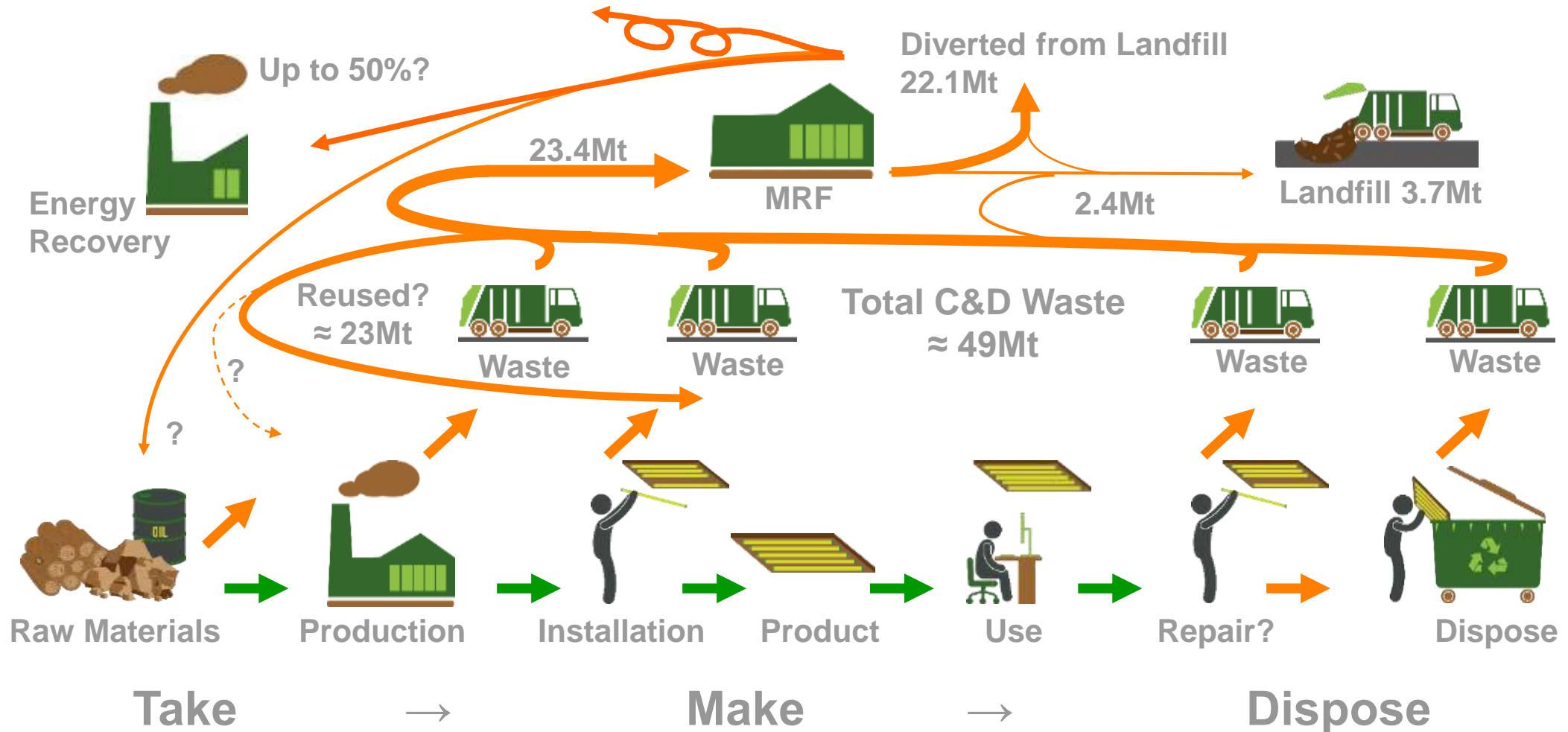
Make



Dispose

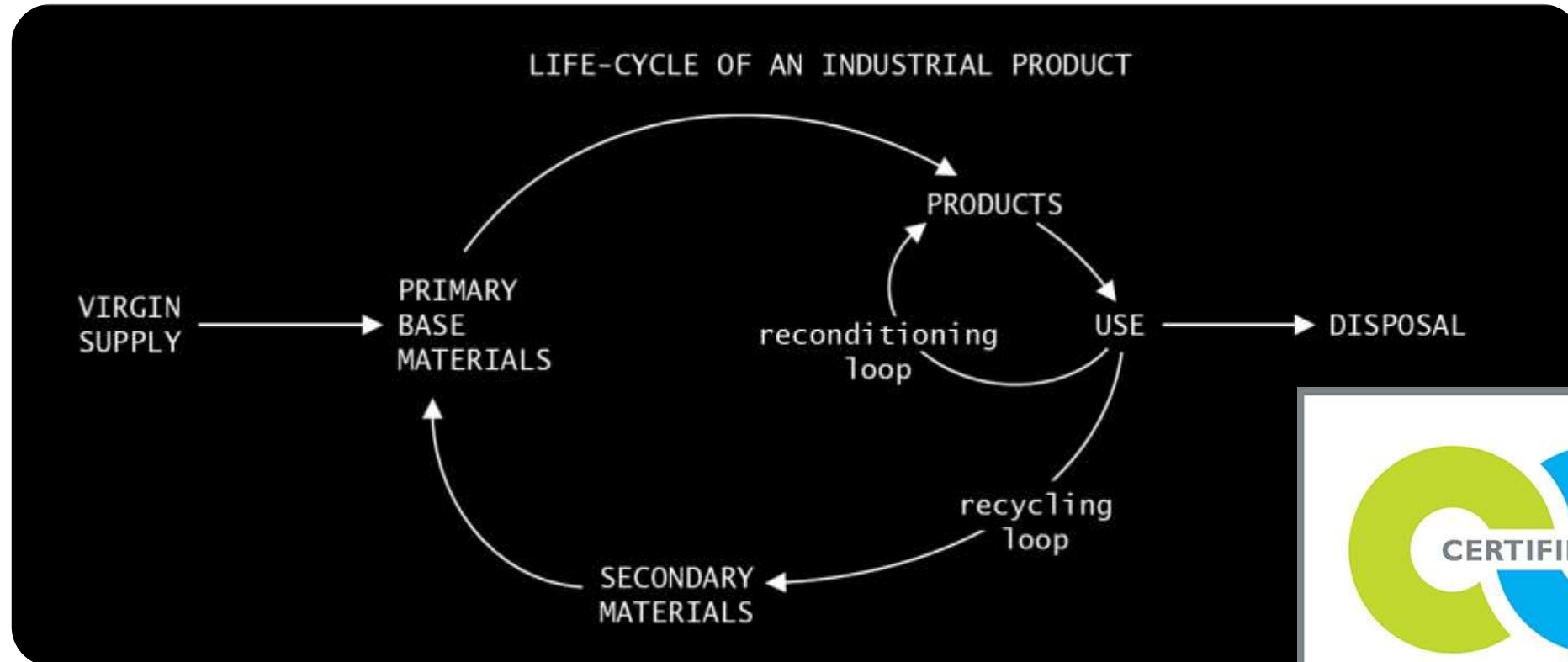
What is the Circular Economy?

Current Model (2014 C&D Waste)



What is the Circular Economy?

Birth of the Circular Economy



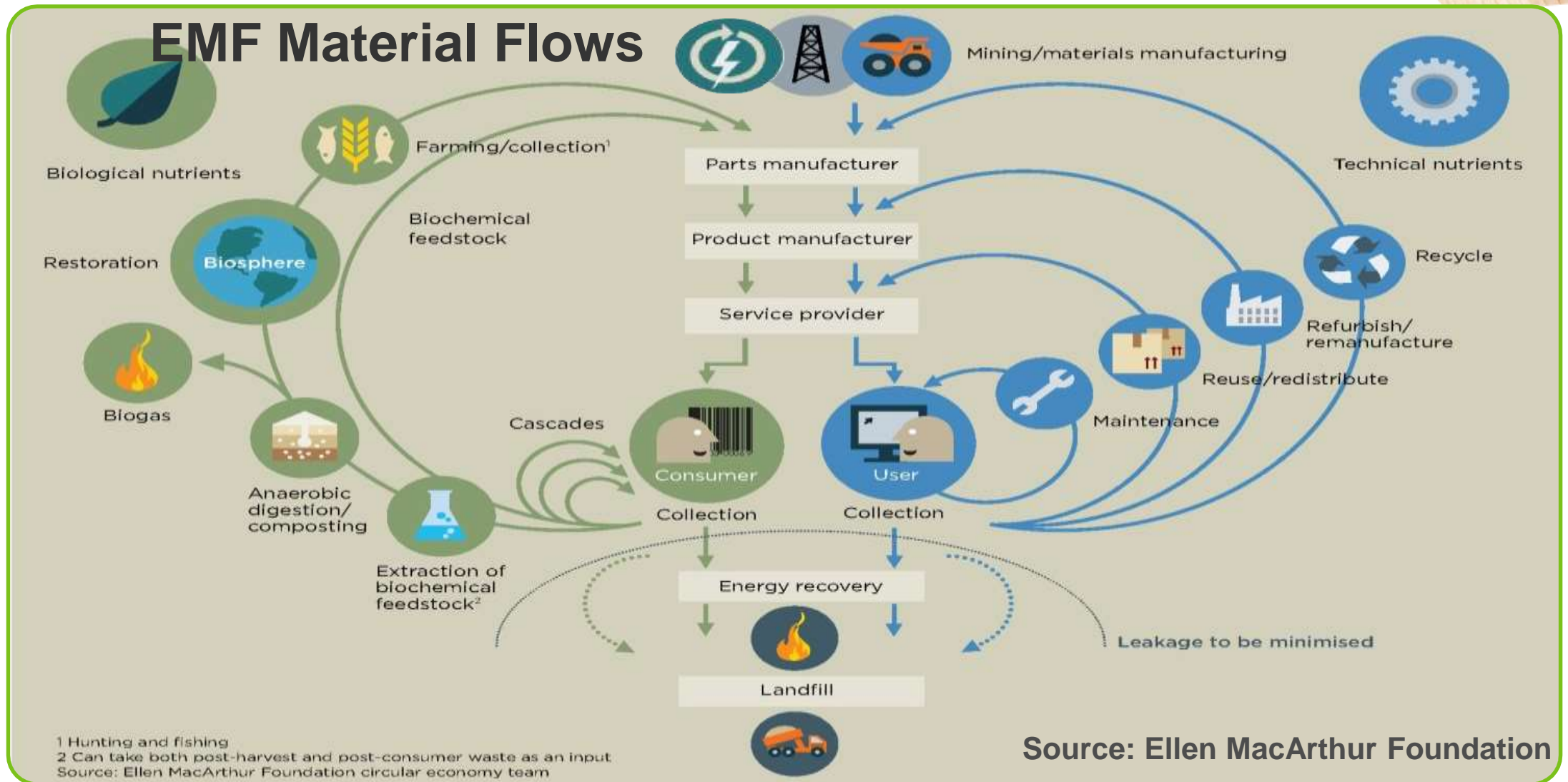
Walter Stahel 'The Product Life Factor' 1981



C2C Standard 2010

© Sustainable Construction Solutions Ltd

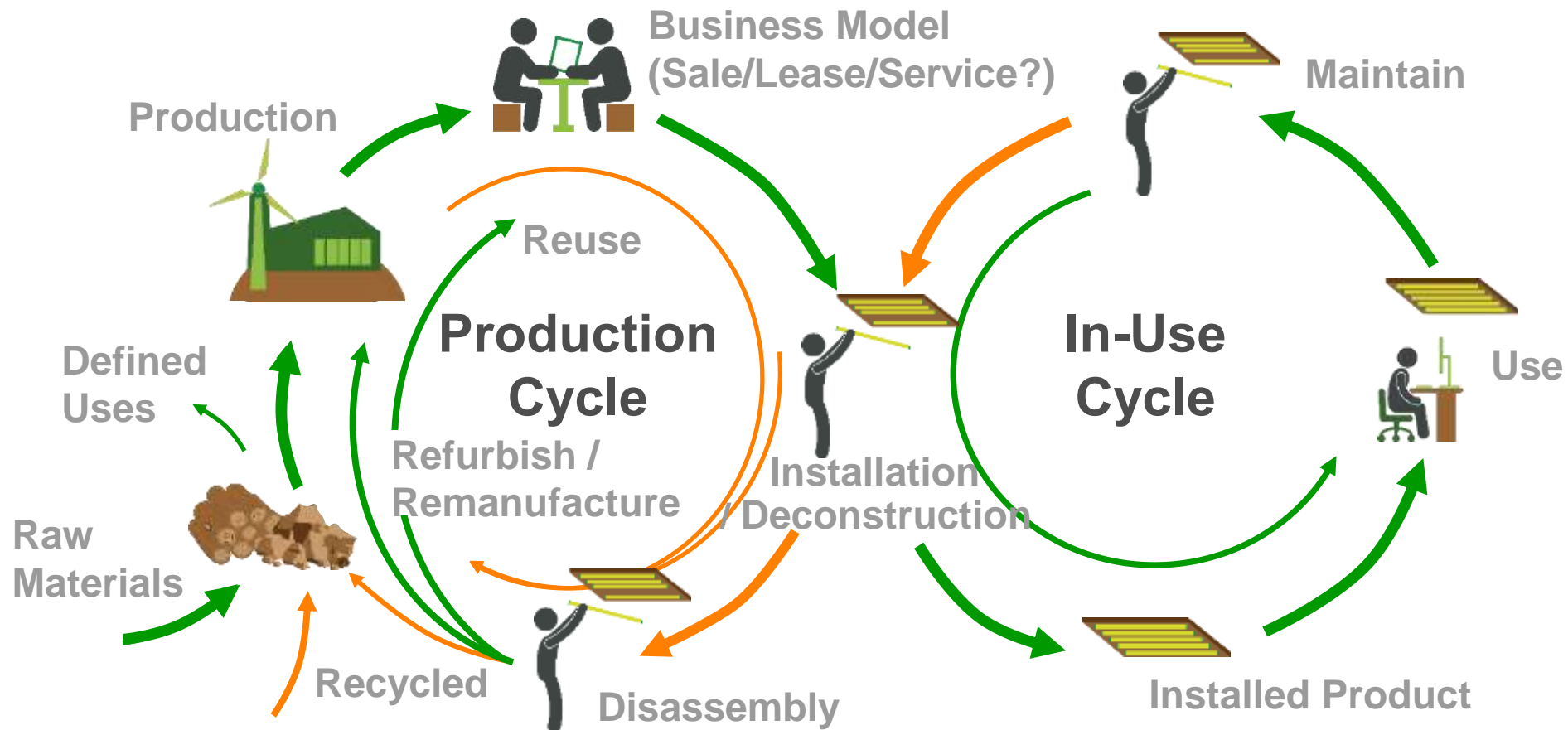
What is the Circular Economy?



Source: Ellen MacArthur Foundation

What is the Circular Economy?

Possible Construction Circular Economy Model

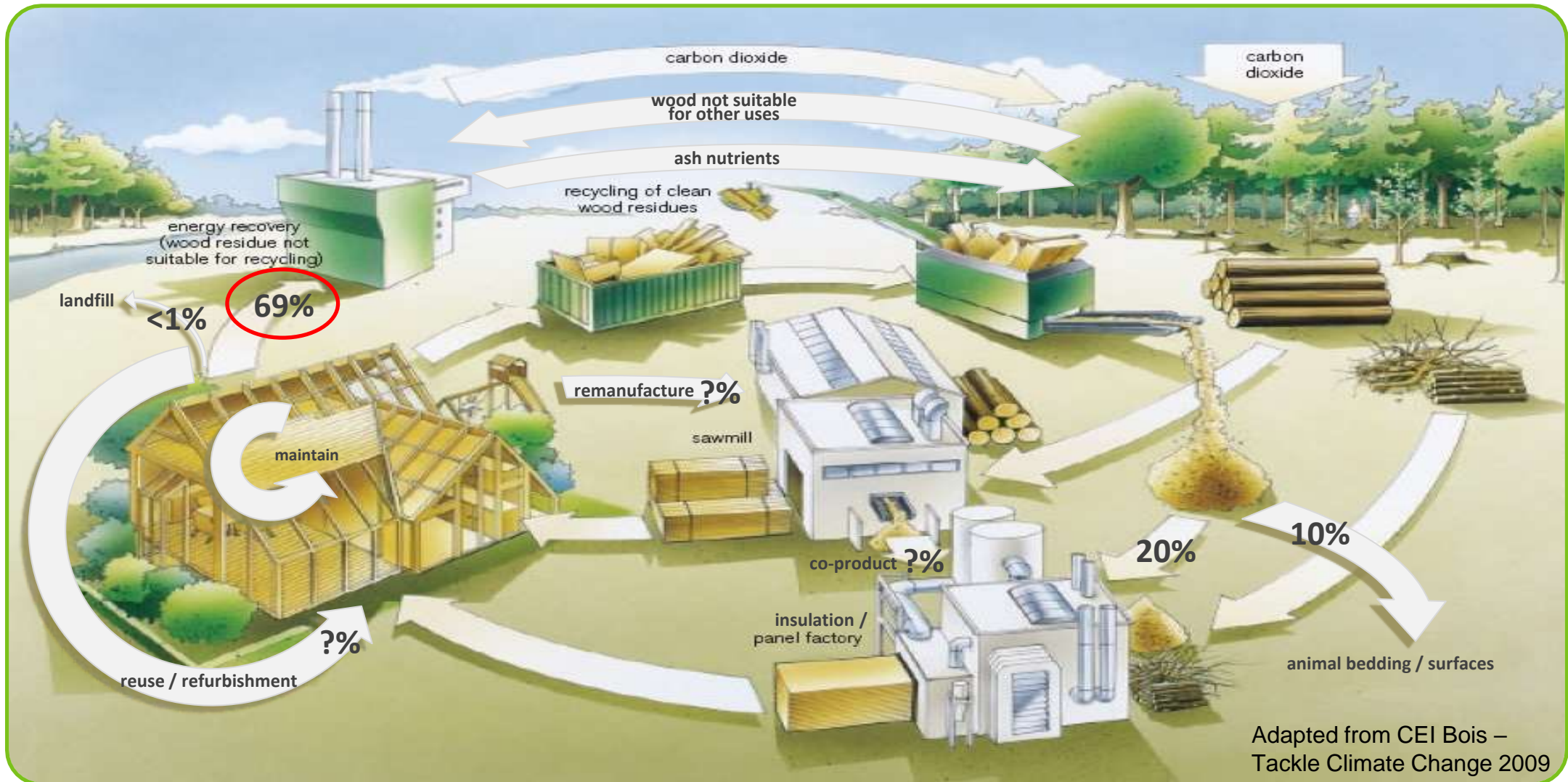


Timber and the Circular Economy



Timber and the Circular Economy

Timber and the Circular Economy



Adapted from CEI Bois – Tackle Climate Change 2009

Timber and the Circular Economy



Increased Timber Demand

How timber frame and offsite construction meet housing demand

April 23, 2020



Simon Horn discusses why offsite construction utilising timber frame as the external wall fabric and overall structural solution is key to meeting sustainability targets

PCB Today

Argent unveils first office blocks at £5bn Brent Cross site

Grant Prior 2 weeks ago



Argent Related has revealed designs for the first three office buildings at its £5bn Brent Cross Town development in north London.

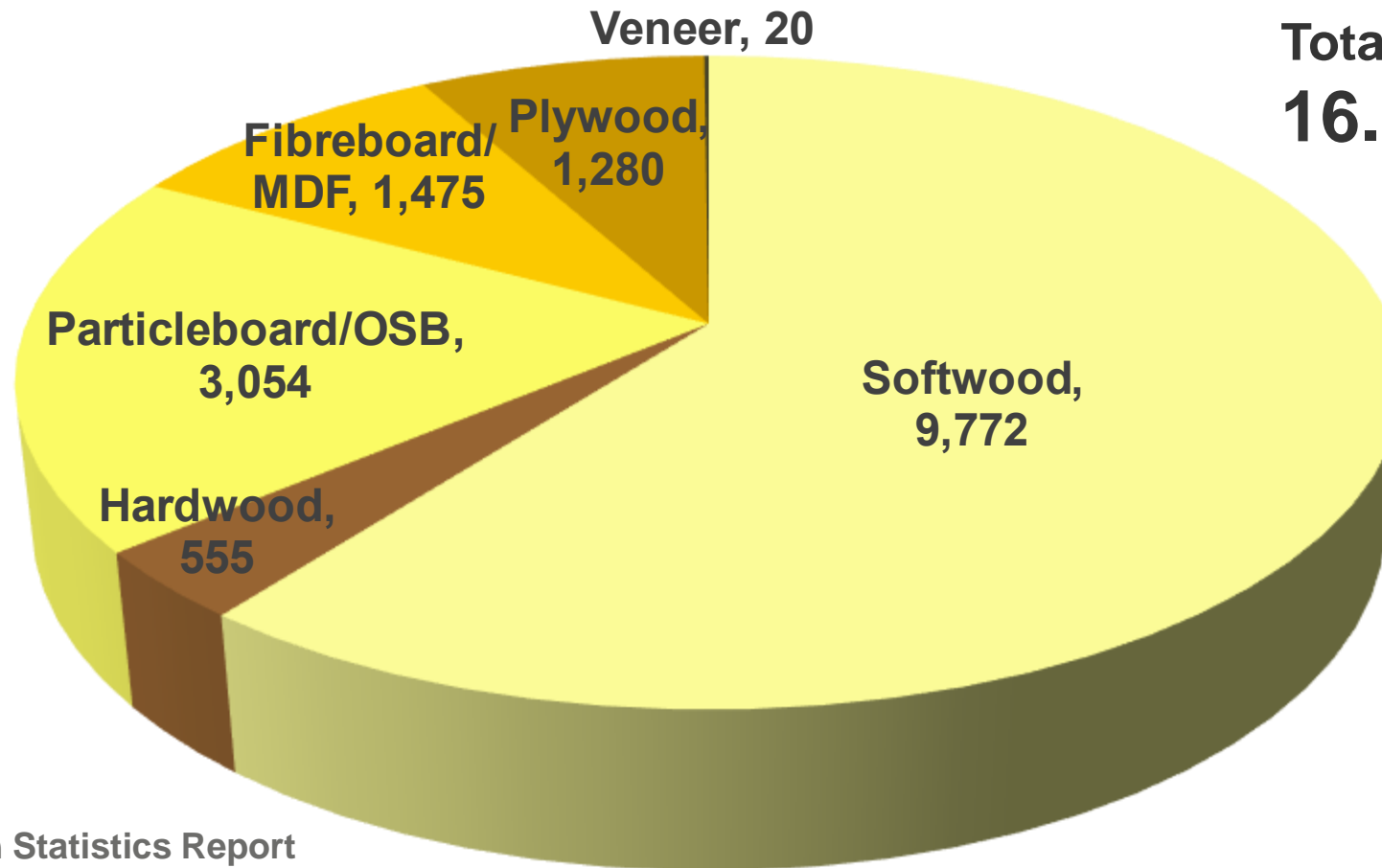


Construction Enquirer

Timber and the Circular Economy



2020 UK Timber Consumption (Thousand m³)*

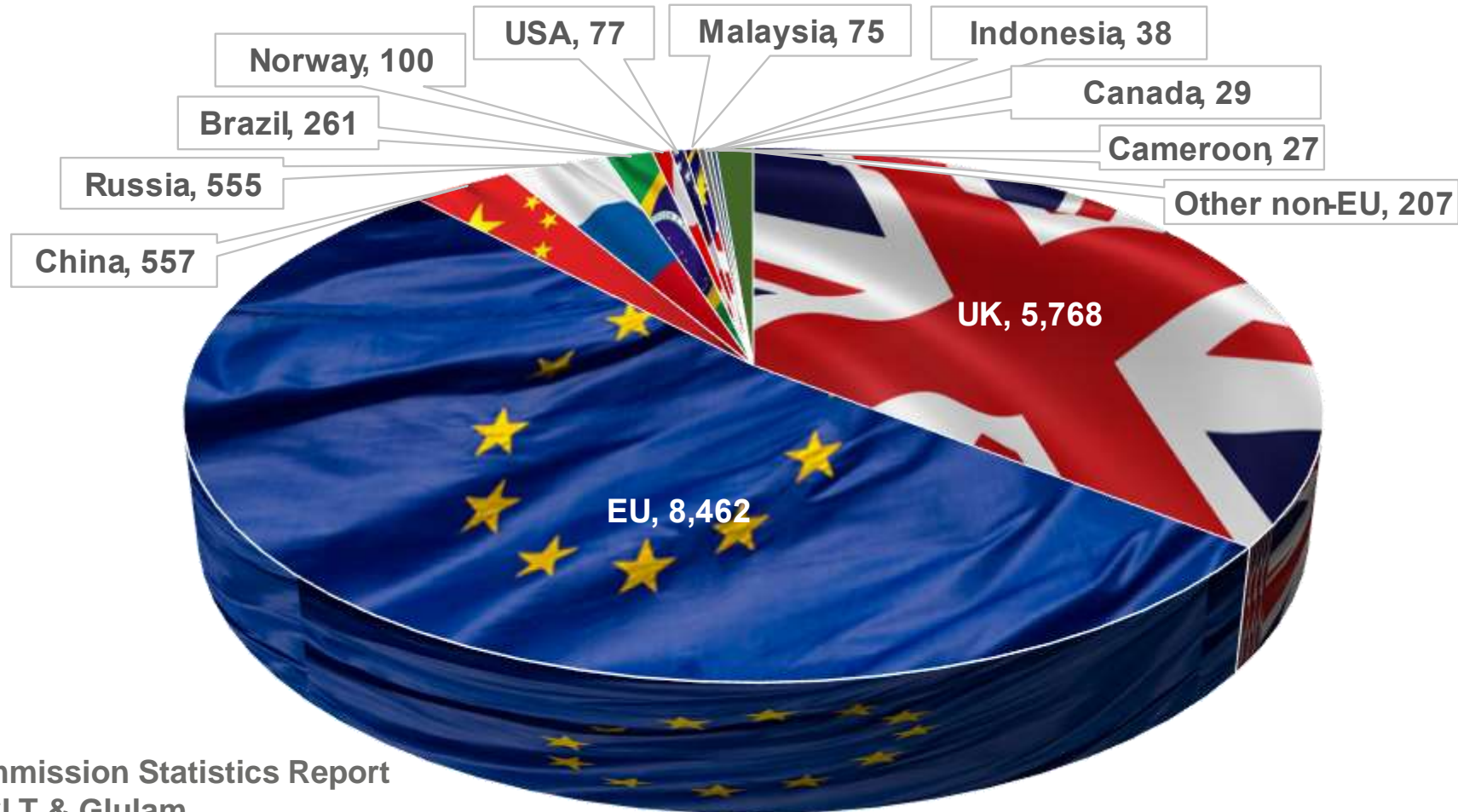


**Total UK Consumption:
16.16 million m³**

*2021 Forestry Commission Statistics Report
Figures exclude CLT & Glulam

Timber and the Circular Economy

2020 UK Timber Sources (Thousand m³)*

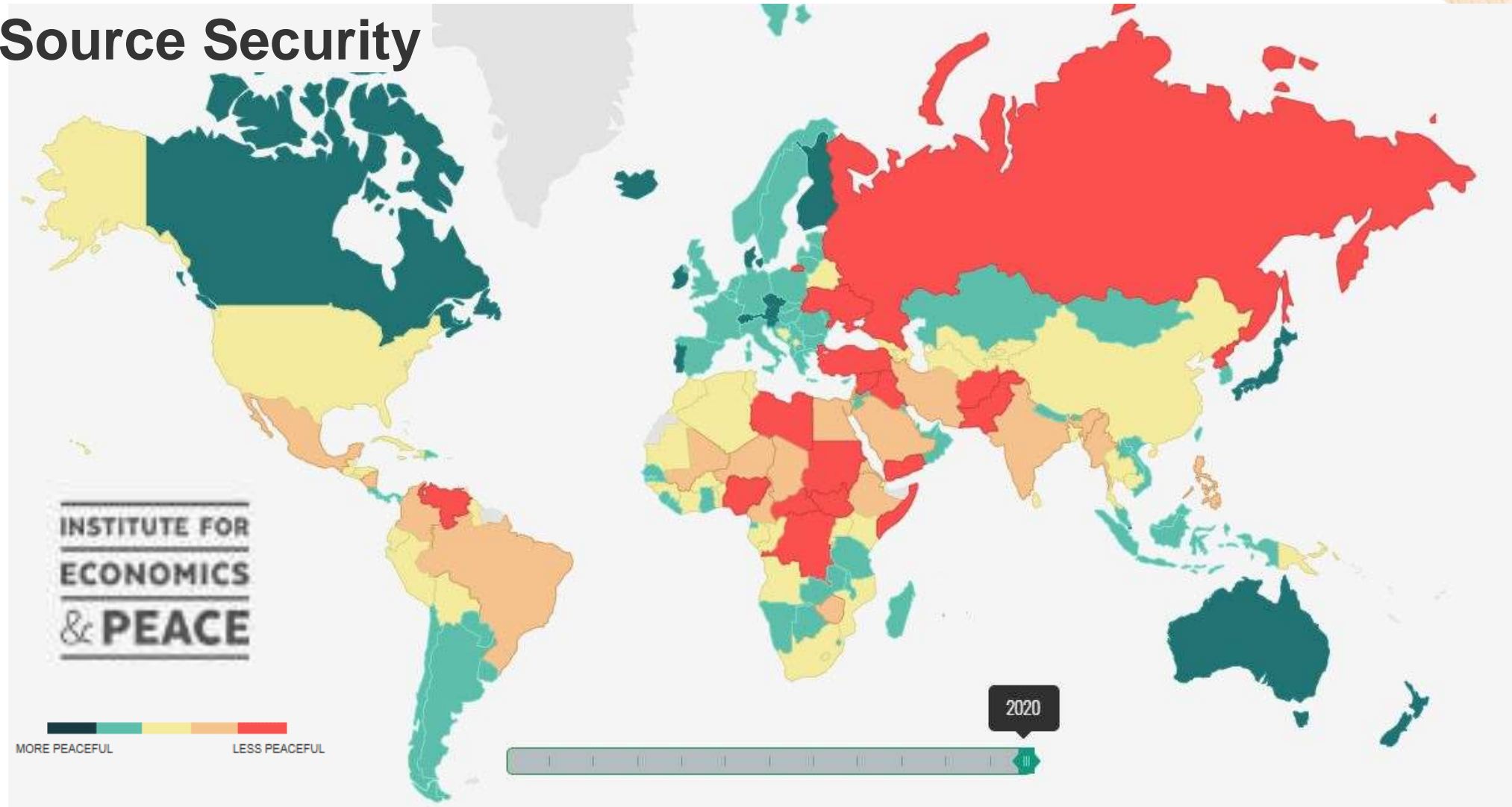


*2021 Forestry Commission Statistics Report
Figures exclude CLT & Glulam

Timber and the Circular Economy



Source Security



Timber and the Circular Economy

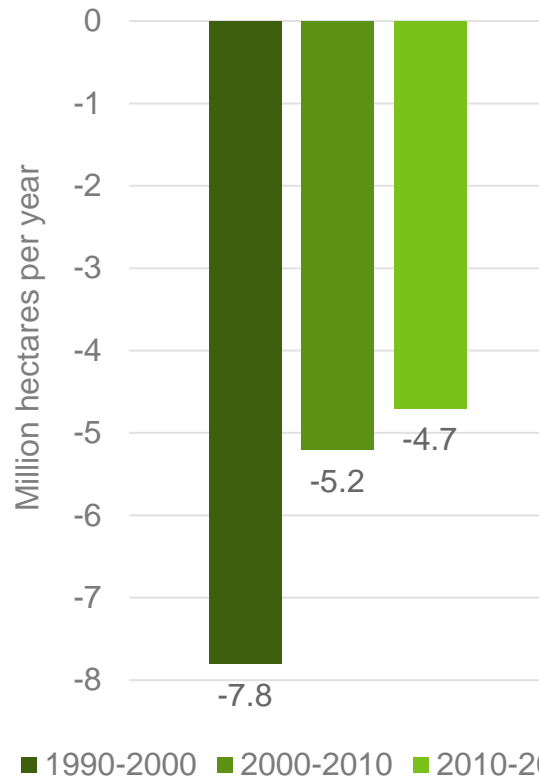


Maintaining a Sustainable Supply

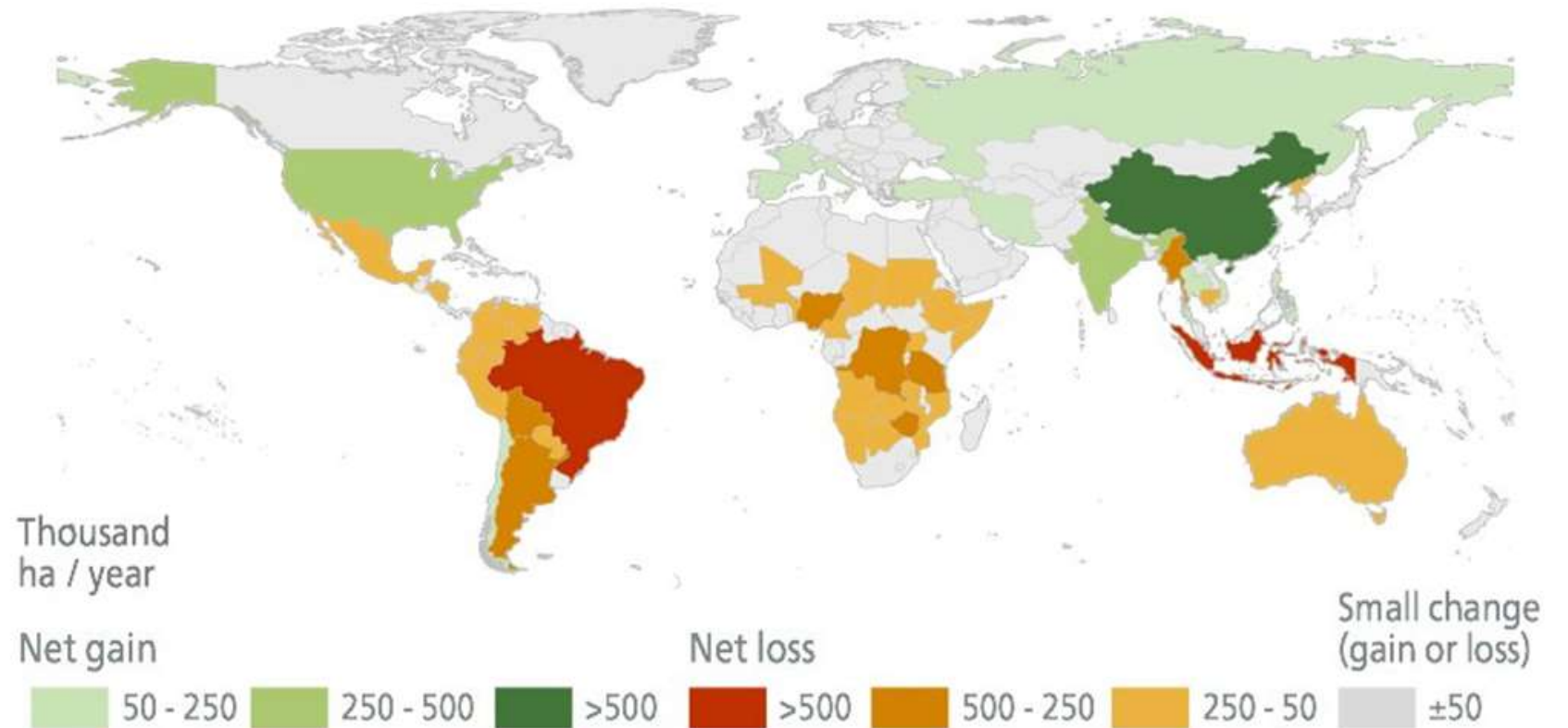


Food and Agriculture
Organization of the
United Nations

Forest area annual net change 1990 - 2020



Forest area annual net change 1990 - 2015



Timber and the Circular Economy

Building Certification Standards

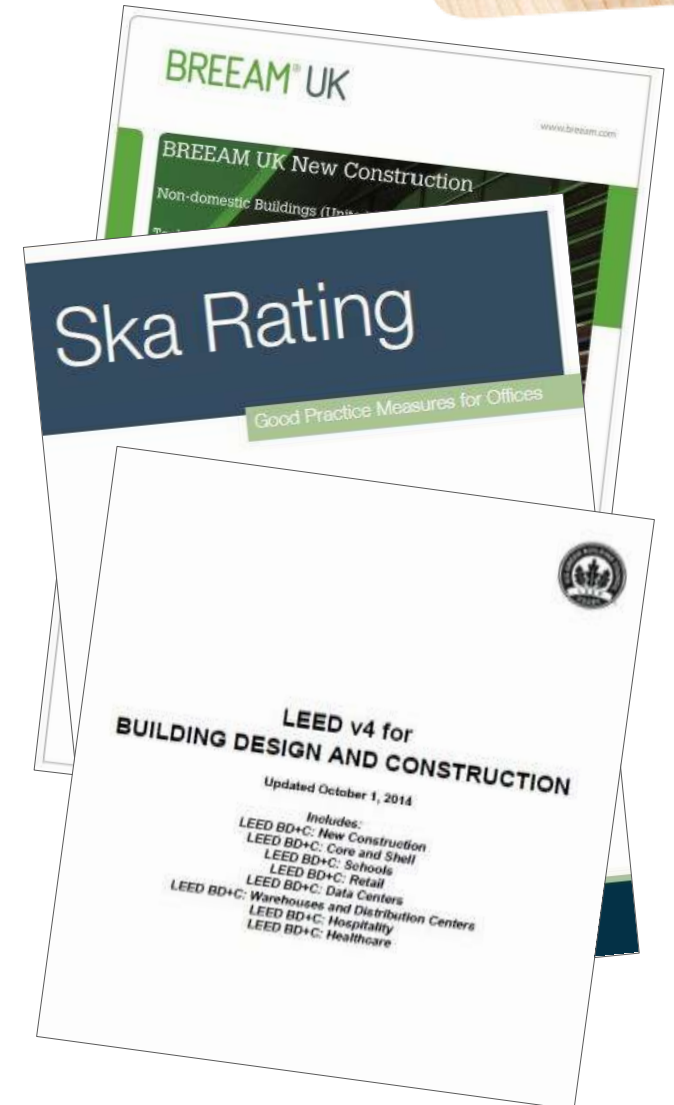
Widely used in the UK:

BREEAM[®]
delivered by **bre**

CEEQUAL[®]
delivered by **bre**



LEED
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN



Others worldwide: DGNB, Estidama, Greenstar

Timber and the Circular Economy



Responsible Timber Sourcing

Responsible Timber Sourcing



Sustainable Forest Management



Photo: SusConSol



Photo: PEFC UK

Responsible Timber Sourcing



Government Timber Procurement Policy

The UK Government's Timber Procurement Policy (TPP) states that:

- 🌱 **Only timber and wood-derived products originating from an independently verifiable Legal and Sustainable source (which can include from a FLEGT partner) will be demanded for use on the government estate;**
- 🌱 **Appropriate documentation will be required to prove it;**
- 🌱 **Applies to all virgin timber and wood-derived products used on the government estate, including temporary site works and material supplied by suppliers.**

Responsible Timber Sourcing



UK Government's Central Point of Expertise on Timber (CPET)

Advises Government departments and their suppliers on how to meet the UK Government's Timber Procurement Policy (TPP).

Category A evidence (Independent forest certification schemes)

- 🌱 Programme for the Endorsement of Forest Certification (PEFC)
- 🌱 Forest Stewardship Council (FSC)

Category B evidence

- 🌱 UK Forestry Standard source (e.g. Grown in Britain Certification (GiB))
- 🌱 Forest Law Enforcement, Governance and Trade (FLEGT) licenced
- 🌱 Compliance with the 'Framework for evaluating category B evidence'

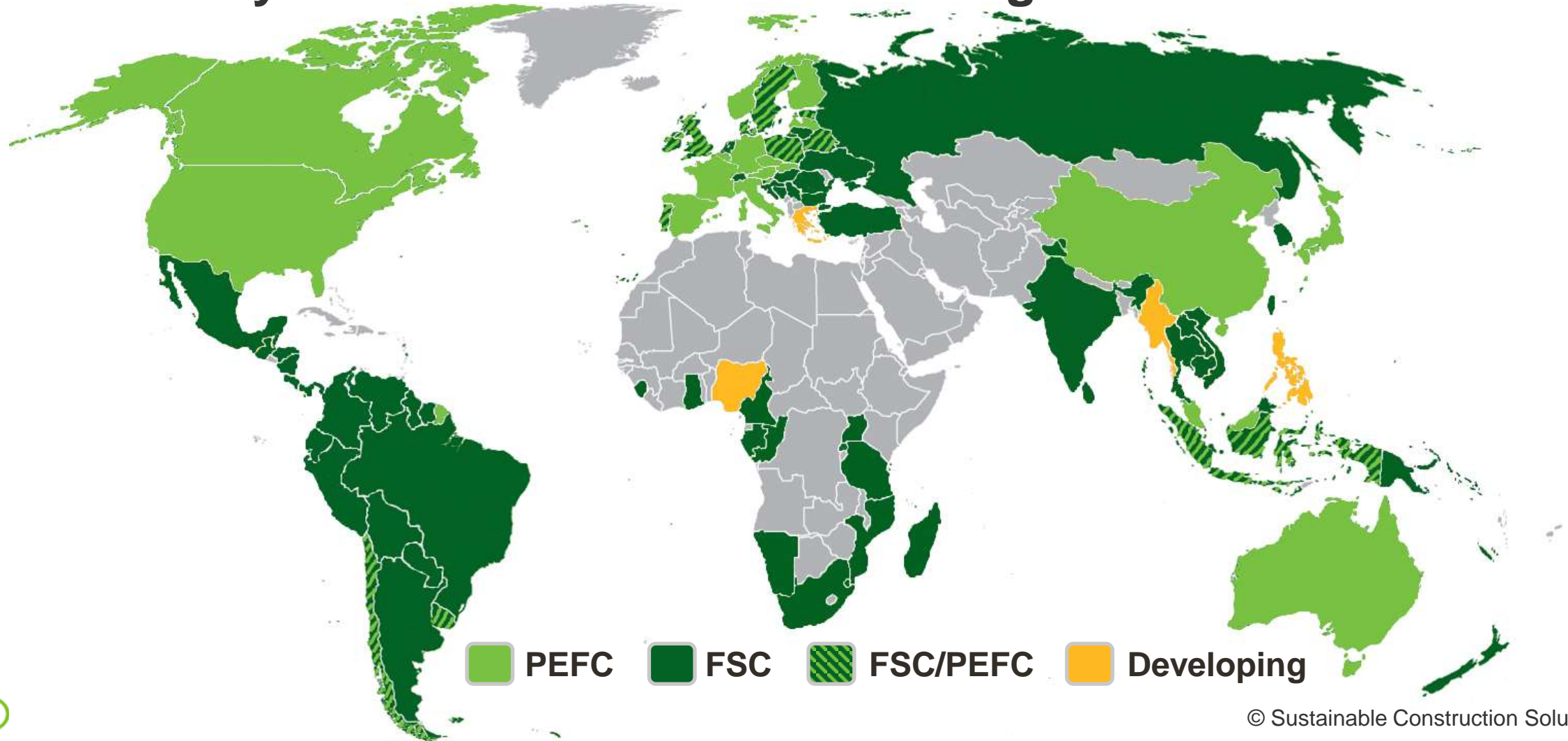


See PEFC Responsible Timber Sourcing CPD

Responsible Timber Sourcing



Forestry Certification Scheme Coverage



Timber and the Circular Economy



Designing for the Circular Economy

Designing for the Circular Economy



Design

Need to consider the following when designing for the Circular Economy:

- 🔄 Design for Resource Optimisation
- 🔄 Design for Low Embodied Carbon
- 🔄 Design for Optimum Service Life
- 🔄 Design for Ease of Maintenance
- 🔄 Design for Flexibility, Deconstruction & Disassembly
- 🔄 Design for Remanufacture and Reuse

Designing for the Circular Economy



Designing for Resource Optimisation

This can be interpreted in a number of different ways:

- 🌱 Best use of the existing resources available on the site, e.g. use of existing structure and materials from the existing building
- 🌱 Best use of resources from the forest, e.g. OSB, which uses fibre from forest thinning, and co-product from primary processing e.g. chipboard
- 🌱 Best use of resources bought to site, e.g. designing to standard product dimensions to reduce waste

Designing for the Circular Economy

Alliander HQ, Netherlands

23.000 m² for 1600 workplaces + workshops + storage

DUIVEN, 1980-2012

RAU

Designing for the Circular Economy



Designing for the Circular Economy



Photo: Marcel van der Burg



Designing for the Circular Economy



Photo: Marcel van der Burg



Designing for the Circular Economy



Sheet Materials



Stirling Board Zero StrongFix - Photo: Norbord



Smartply Propassiv- Photo: Medite Smartply

Designing for the Circular Economy

Engineered Products



I-Joist - Photo: Metsä



Laminated Veneer Lumber (LVL) - Photo: SusConSol

Designing for the Circular Economy



Short Rotation Crop Products



Bamboo Worktop - Photo: Wickes



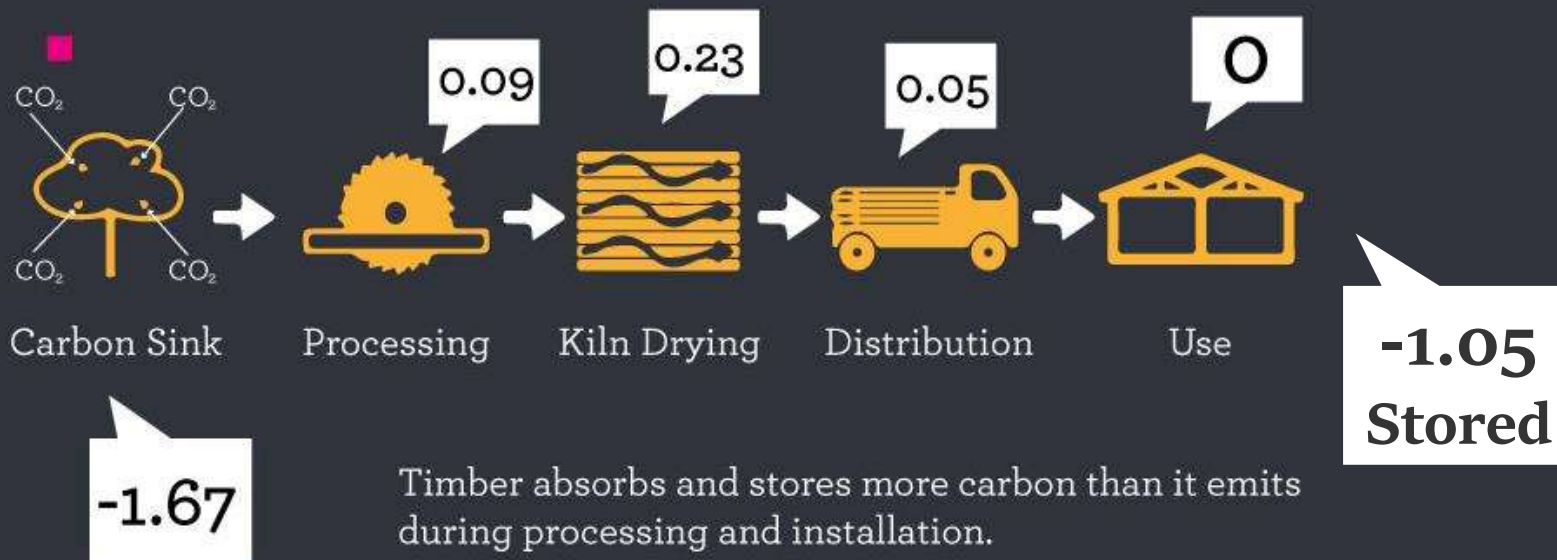
Hempcrete Blocks - Photo: IsoHemp

Designing for the Circular Economy

Designing for Low Embodied Carbon

TIMBER IS CARBON NEGATIVE CRADLE TO GATE:

kg CO₂e per kg dry wood as consumed in UK 2013



Designing for the Circular Economy



Designing for Low Embodied Carbon



Timber instead of steel or concrete?

Savill Gardens, Windsor - Photo: SusConSol

Designing for the Circular Economy



Wiehag Factory, Altheim, Austria



Designing for the Circular Economy



Designing for Optimum Service Life (Replacement Cycles)



10 Years

Service Life

120 Years

Designing for the Circular Economy



Designing for Optimum Service Life – Timber Selection



Durable Softwood Species - Photo: SusConSol



Durable Hardwood Species - Photo: BAM

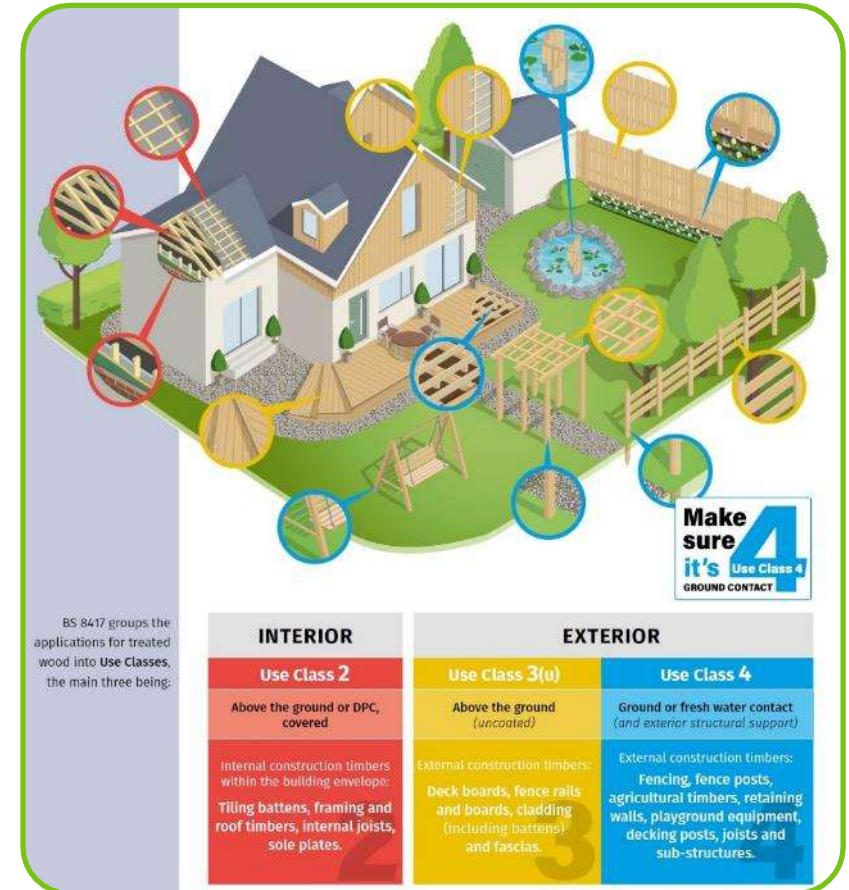
Designing for the Circular Economy



Designing for Optimum Service Life – Chemical Treatments



Tanalised Timber - Photo: JAS Timber



Use Class Locations - Photo: WPA

Warning - Chemical Treatments Could Limit Future Reuse!

Designing for the Circular Economy



Designing for Optimum Service Life – Chemical Modification



Kebony Furfuryl Alcohol Timber - Photo: Kebony



Accoya Acetylated Timber - Photo: Accoya

Designing for the Circular Economy

Designing for Optimum Service Life – Thermal Modification



Hardwood Brimstone - Photo: SusConSol



Softwood Thermowood - Photo: Beaumont

Designing for the Circular Economy



Designing for Optimum Service Life (Intensity of Use)



Single Use

Service Life

Multi Use

Designing for the Circular Economy

Designing for Ease of Maintenance



Brimstone Cladding, Sylva Wood Centre - Photo: SusConSol

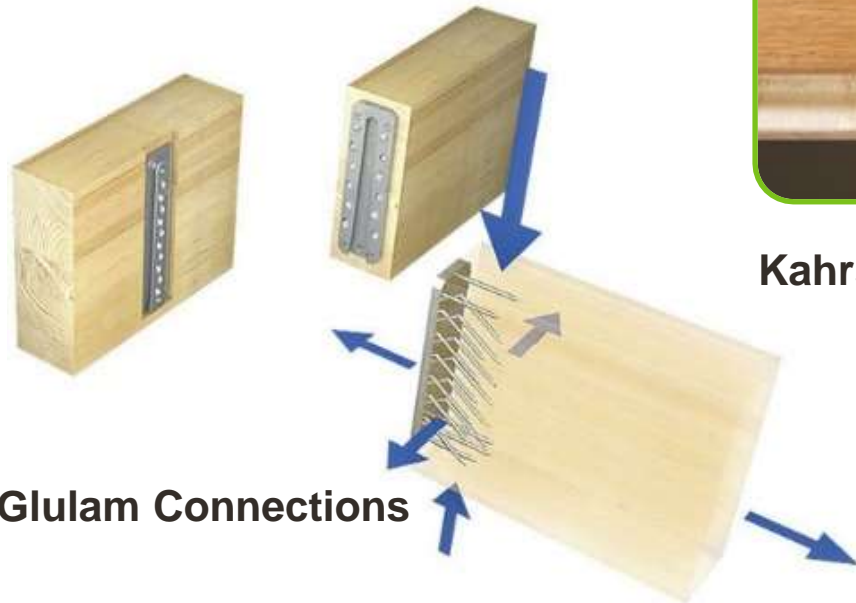


After 12 months weathering - Photo: SusConSol

Designing for the Circular Economy



Designing for Flexibility, Deconstruction & Disassembly



Sherpa Glulam Connections



Kahrs Flooring Woodloc® 5S Connection



SIPS Panels?

Designing for the Circular Economy

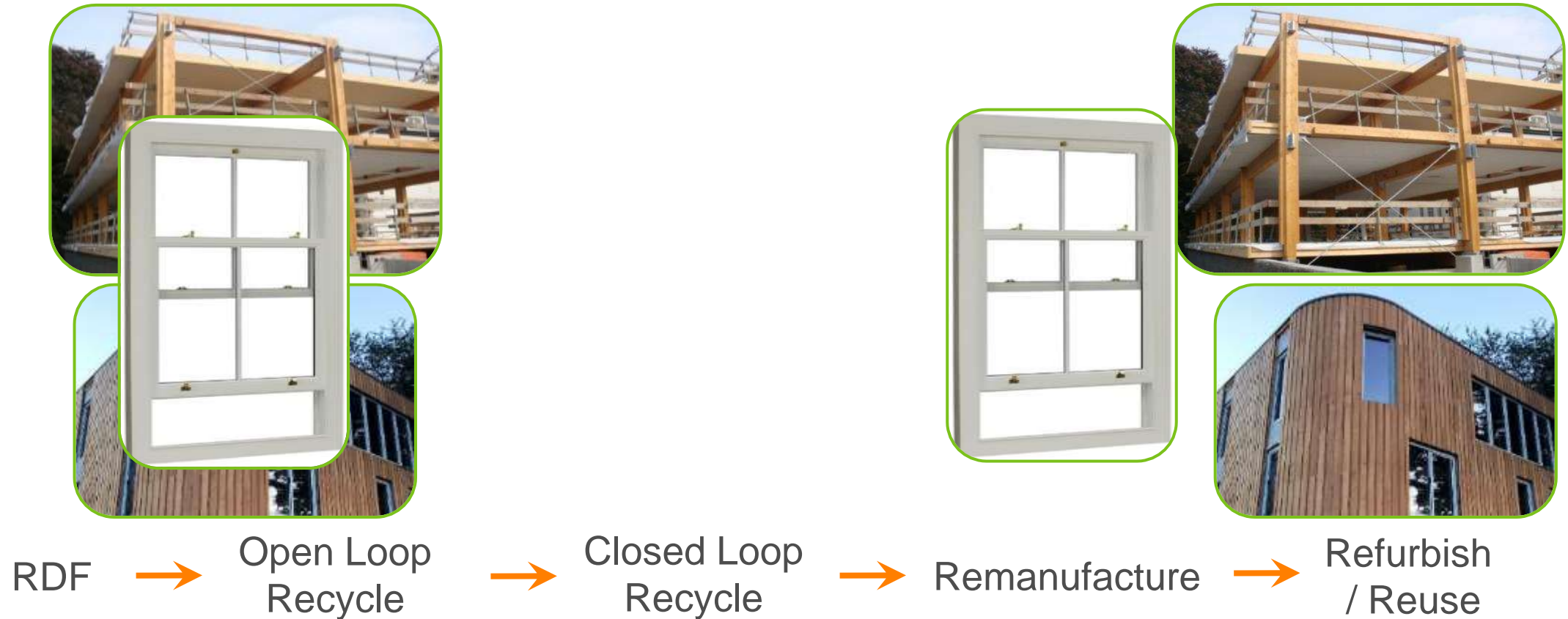


Vitsoe Factory, UK



Designing for the Circular Economy

Designing for Remanufacture and Reuse



Designing for the Circular Economy

Relocatable Houses - Heijmans ONE



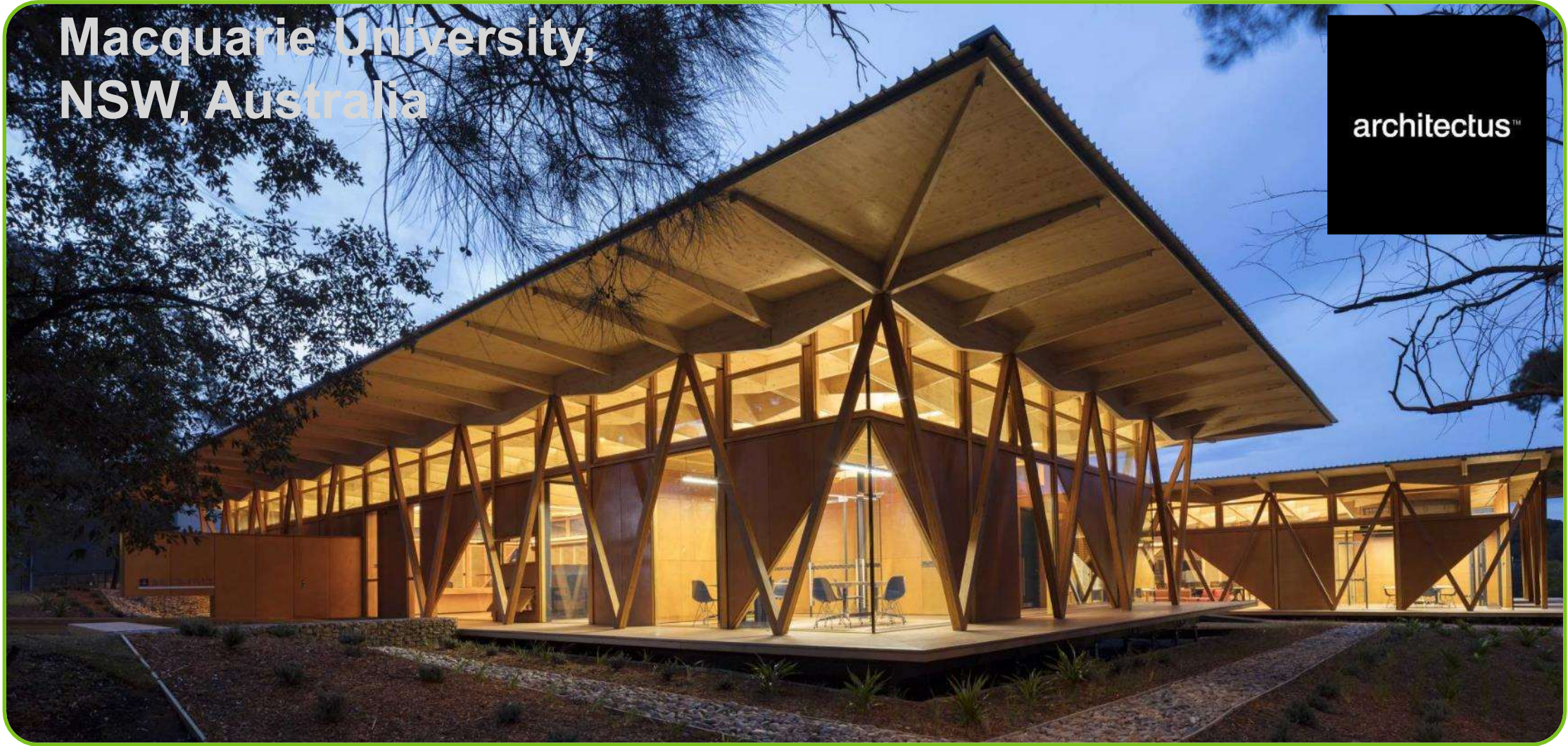
Heijmans ONE - Photos: Heijmans N.V.

Designing for the Circular Economy



Macquarie University,
NSW, Australia

architectus™



Timber and the Circular Economy



Circular Economy Business Models

Circular Economy Business Models



Raw Materials Source

Raw material source for your revised product (5Rs)?

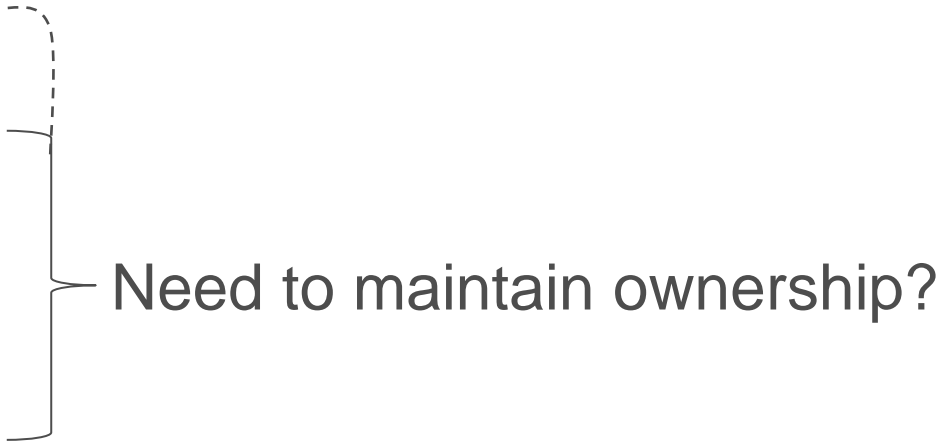
♻️ Reused

♻️ Refurbished

♻️ Remanufactured

♻️ Recycled { Closed
Open

♻️ Renewable



Circular Economy Business Models

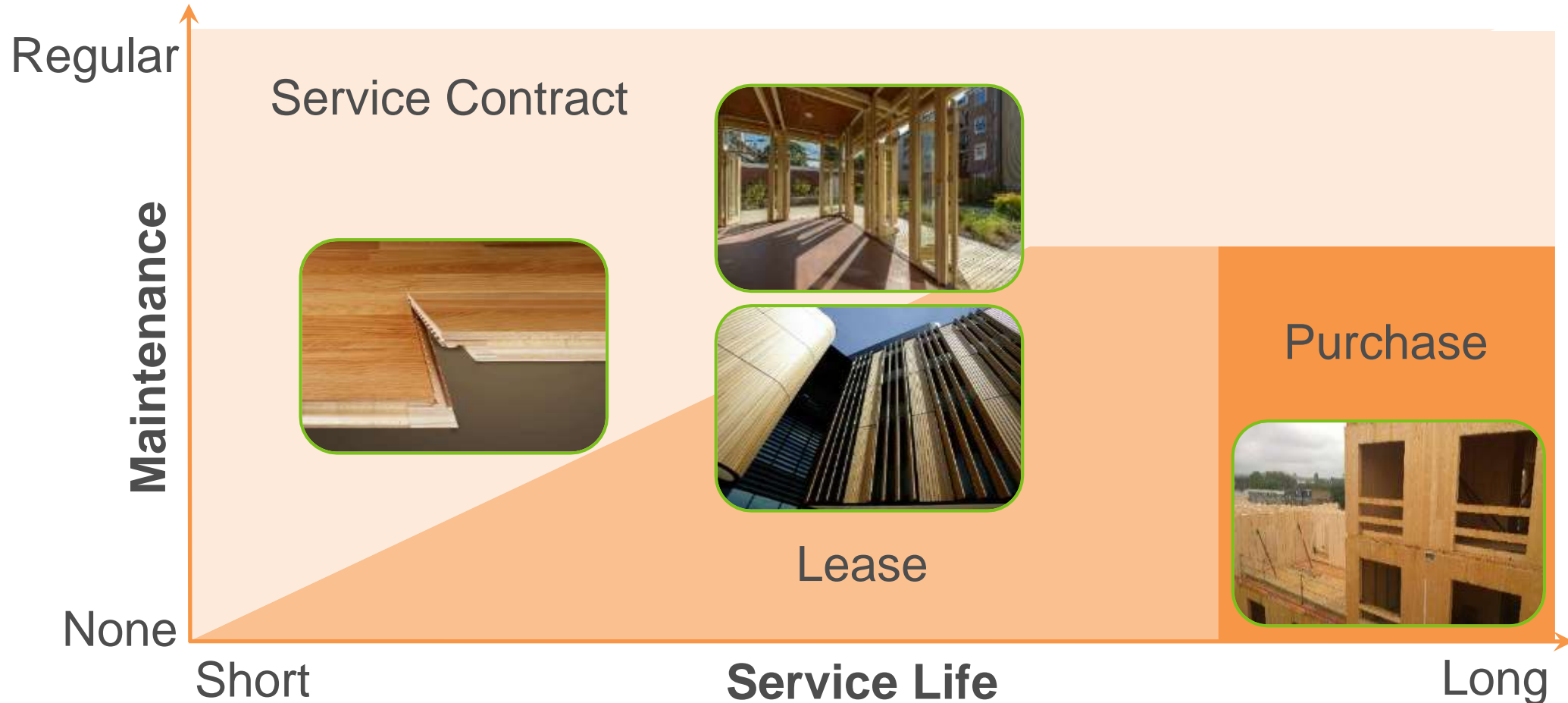
Business Model Examples

- 🔄 **Asset Management** – Tracking of all assets through life
- 🔄 **Collaborative Consumption** – Shared use by group
- 🔄 **Service** – Product maintained for a defined use period
- 🔄 **Hire/Lease** – Product returned after defined use period
- 🔄 **Incentivised Return** – Reward for returning at end of life
- 🔄 **Purchase** – Long life, but designed for open loop recycling

Circular Economy Business Models



Choosing a Business Model



Timber and the Circular Economy



Call to Action

We trust you now have a better understanding of how timber could help deliver a Circular Economy and ask that you action the following:

- Ensure the circular economy is part of your sustainability agenda
- Source your timber responsibly (e.g. PEFC, FSC, GiB)
- Incorporate circular economy design principles
- Consider the business models that will aid your circular design

Thank You. Please complete our online feedback at:
<https://forms.office.com/r/ZZWJeKebuk>

Timber and the Circular Economy



Photo: Hawkins Brown



Photo: Robertson and Rogers Stirk Harbour + Partners



Photo: Stora Enso

Questions?

Timber and the Circular Economy



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Thank You



Timber and the Circular Economy

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@CharlesLaw_SCS

Thank You

