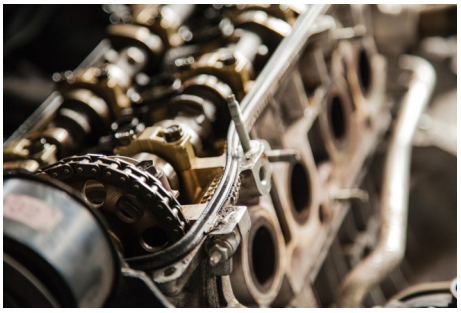
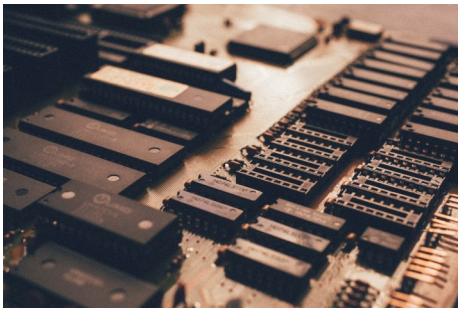
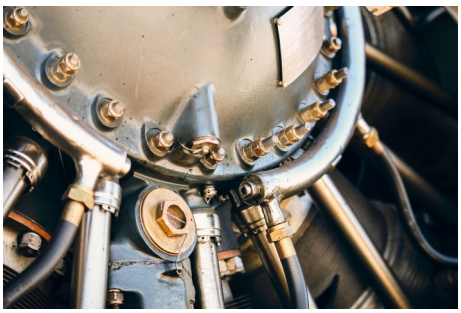
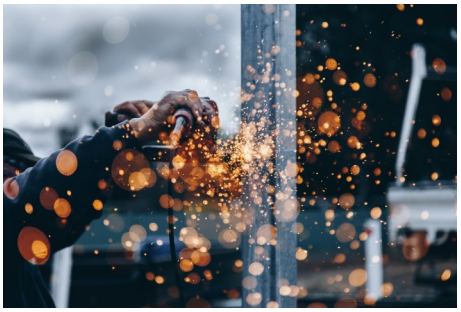
Remanufacturing: a primer

(What you really need to know in under 1,500 words)



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Introduction

In this short introduction to remanufacturing: you will learn what it is, how much is going on, where it is taking place, who is doing it and – most importantly – why it is worth knowing about.

By 'worth knowing about', we mean the economic, societal, material and environmental benefits of remanufacturing to you.

What you will take away is an understanding of how remanufacturing differs from other Circular Economy actions. You will see its power to keep valuable and useful products in use for longer, often with upgraded capabilities, with as-new quality and sometimes sold in unconventional ways.

Throughout the remanufacturing cycle there are opportunities for manufacturers and remanufacturers, purchasers, recovery agents and service providers to create value. This primer touches on all these aspects, and will enable you to engage in debate on the current and future of remanufacturing in the Circular Economy with knowledge and confidence.

What is remanufacturing?

Remanufacturing is:

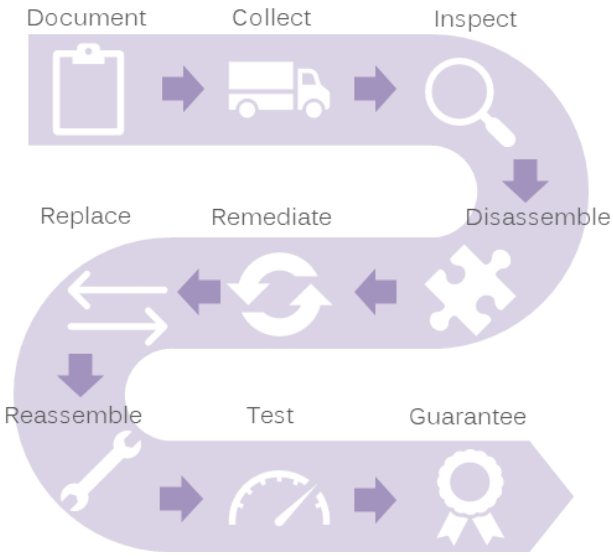
"the industrial practice of returning a product to at least its original performance…"

Source: BS 8887-Part2

Remanufacturing is a process as rigorous and qualified as manufacturing.

With roots in the early 20th century, remanufacturing has been quietly adopted into the life-cycle of complex and expensive machinery: at first, into military equipment, and later - after World War II - into consumer products such as cars. In our technology-driven world, the scope for remanufacturing has increased so that now ICT, medical equipment, tyres, renewables technologies and many other types of product can be successfully remanufactured.

The essential process steps include: disassembly, cleaning, repair/replacement of damaged components, reassembly and testing, although the emphasis on each step will vary by product. The must-have feature for a remanufactured product is the assurance that the quality and performance of the item is like that of a new product. This is where it differs from repair: in repair, only the apparent fault is rectified while in remanufacturing the whole product performance is guaranteed – for a new life.

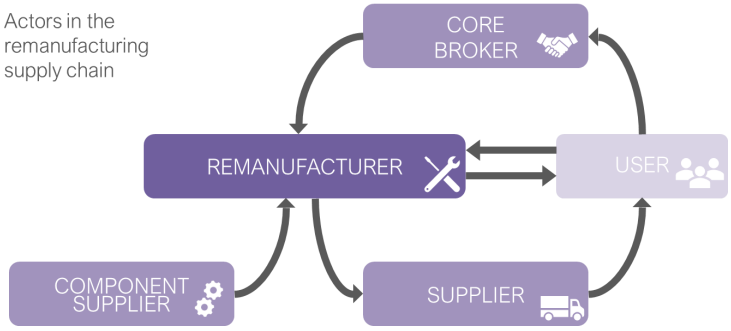


Not all remanufacturers look the same.

Some Original Equipment Manufacturers undertake their own remanufacturing and some contract it out. For some products, independent third-party remanufacturers set up their own operations, particularly to service the "aftermarket", or out-of-warranty products.

These might include focussing on the services provided rather than on physical products and promoting the residual value of products and their materials rather than writing them off.

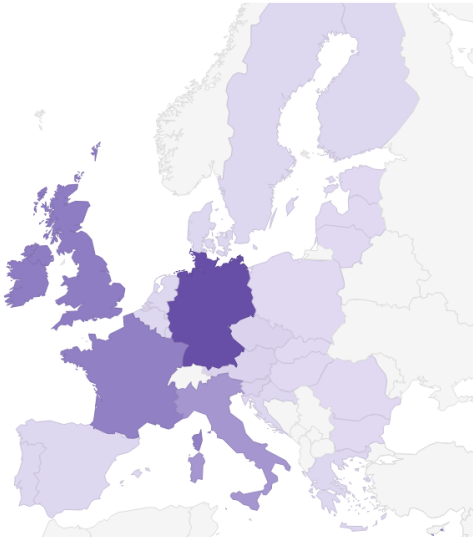
The map below shows where remanufacturing currently takes place in the EU.



Whatever remanufacturers look like, a critical part of their business is taking back 'core' - end-of-life products to remanufacture - either directly from the user, or through brokers. They also need access to components to replace worn or broken parts. Finally, the remanufactured product can be returned to use, either through a supplier, or directly to the user.

Because the supply chain creates greater opportunities for interaction with the user throughout and at the end of a product's life, remanufacturers can explore more unconventional business models.

Current 'hotspots' include Germany, the UK and Ireland, France and Italy.



Why the interest in remanufacturing?

News about the Circular Economy is everywhere.

The 'Circular Economy' is an approach to creating profitable businesses that involves keeping materials and products in circulation rather than throwing them away and replacing them with newly mined resources. It doesn't dispense with the concept of the old waste hierarchy, but instead prefers business models that can mix and match reuse, recycling, etc., in the most beneficial way.

One of the Circular Economy approaches now explicitly recognised as being of extremely high economic value is remanufacturing. This is because remanufacturing can maintain a large amount of the material, energy and labour invested in complex products and keeps them at 'as-new' quality while using a fraction of the resources needed for a new product.

In contrast, recycling preserves most of a product's materials, but still requires nearly as much of the energy, labour and time as is needed to make a new product. Of course, direct reuse would need even less resource input, so, if something is still working, carry on using it! But with remanufacturing, when a product fails or becomes obsolete, it may not need to be thrown away: remanufacturing can return it to 'as-new' - and even elevate it to 'state-of-the-art' - for a fraction of the price of new - typically saving 30-50% of the as-new costs.

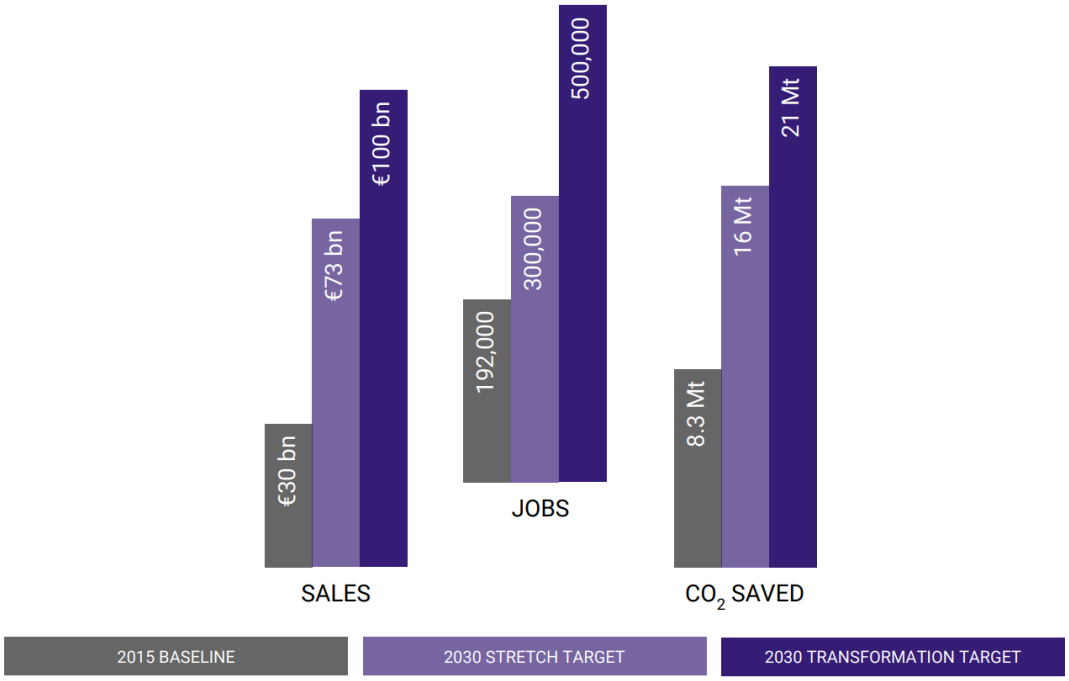
Remanufacturing impact, current and future

Remanufacturing has real benefits for the environment, the economy and jobs.

There are no government statistics for remanufacturing as an industrial sector so any figures you see are based on surveys. Genuine, grass-roots research in this area is sparse.
Much of the data you will see is based on early work by Professor Walter Stahel and Dr Nabil Nasr (see 'Sources and resources' at the end of the primer), or on reports from the EU-sponsored Horizon2020 project *European Remanufacturing Network* (ERN) in 2015-17.

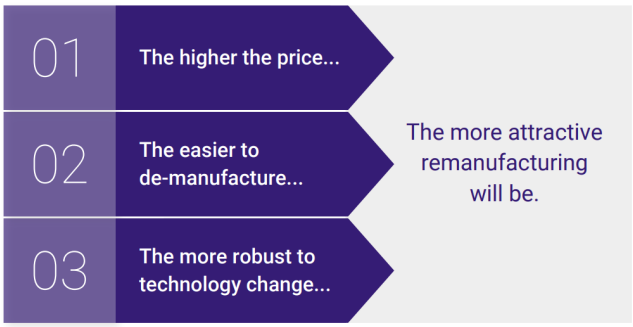
At €30 bn, the estimate of the current EU activity level may seem large, but it's still only around 2% of equivalent manufacturing activity. Considering this, the ERN project set targets for expanding remanufacturing activity, focussing on areas with high potential such as aerospace, automotive, ICT and marine. The most ambitious 'transformation' target requires a range of concerted actions by a range of parties.

The ERN project also calculated the associated saving in CO_2 emissions: since remanufacturing preserves most of the physical product, it avoids using the energy associated with material extraction, refining, melting and manufacturing. So along with the economic benefits of remanufacturing, many remanufactured products can boast environmental savings - another benefit for both remanufacturer and customer.



Fit for remanufacturing?

The ERN 's targets are for product groups with high remanufacturing potential. However, there are many other opportunities. Our work has identified three common factors that show whether remanufacturing is an attractive proposition: price, simplicity and robustness.



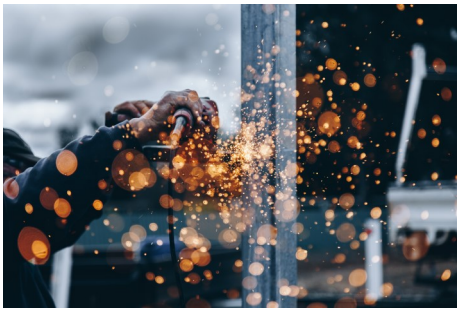
These three factors encompass many others: for example, 'simplicity' includes disassembly, remediation, assessment and diagnosis, while 'robustness' takes account of novel technologies, the potential to upgrade, and changes in legislation.

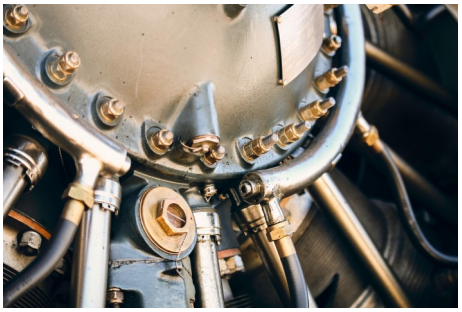
This framework is based on evaluating the 'remanufacturability' of existing products. However, it can just as well be used to assess where products - or their supply chains - might be re-designed to make them more suitable for remanufacture; for example, by making modular products with reversible fastenings to aid disassembly.

Remanufacturing: where next?

This primer has given an overview of what remanufacturing is and shown its clear contribution to the Circular Economy. Remanufacturing has been largely invisible for much of its history, with its potential recognised by the few. We believe it has a much greater part to play in extracting the maximum life and value from products and lowering their overall environmental impact.

We've hinted at - but not fully explored – remanufacturing's potential in this primer, but hope you're interested in continuing the journey, discovering the opportunity areas and finding out what needs to happen to realise the opportunities.





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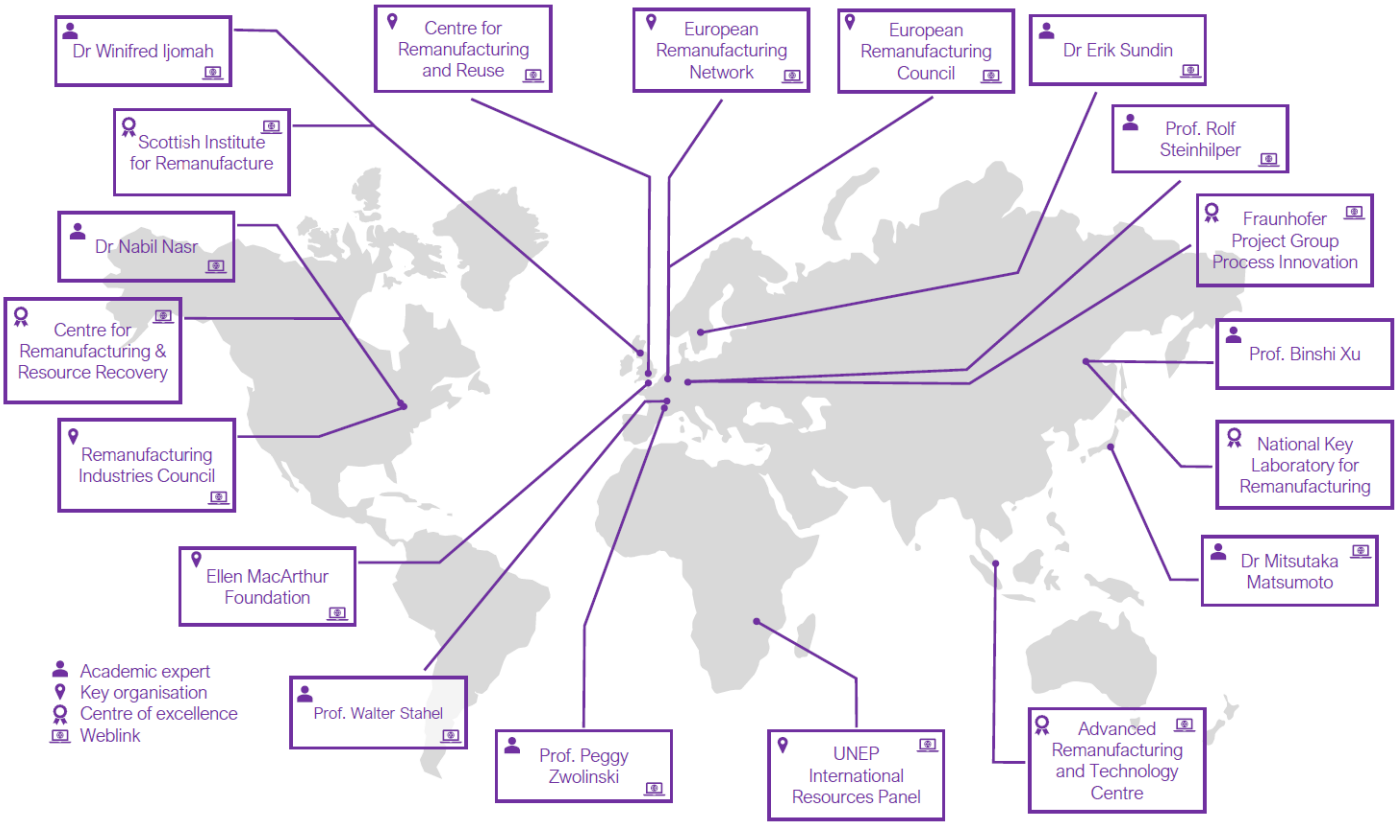
Join in

If you are a remanufacturer, potential remanufacturer or other agent for change, join the Council to make a difference. Find out more here

Sources and resources

Statistics quoted in this brochure are extracted from the 'Remanufacturing Market Study' and 'Recommendations Report' reports produced by the ERN project, available here. For more information and resources on remanufacturing, please explore our map of remanufacturing expertise, which highlights some of the sources we would recommend.



Centre for Remanufacturing and Reuse

Established in 2007, to promote the remanufacturing and reuse industry in the UK, initially through funding from the UK government, Oakdene Hollins subsequently continued its work, developing an international reputation for knowledge on remanufacturing and reuse in the UK and beyond.

European Remanufacturing Network

The European Remanufacturing Network Horizon 2020 project in 2015 – 2017 aimed to understand the shape of remanufacturing in the EU, help existing remanufacturers improve their operations and encourages new business to take up remanufacturing.

European Remanufacturing Council

The enduring legacy of the ERN is the European Remanufacturing Council which aims to bring together businesses from every product sector, to share knowledge and seek changes to policy to make remanufacturing a normal part of the product life cycle.

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