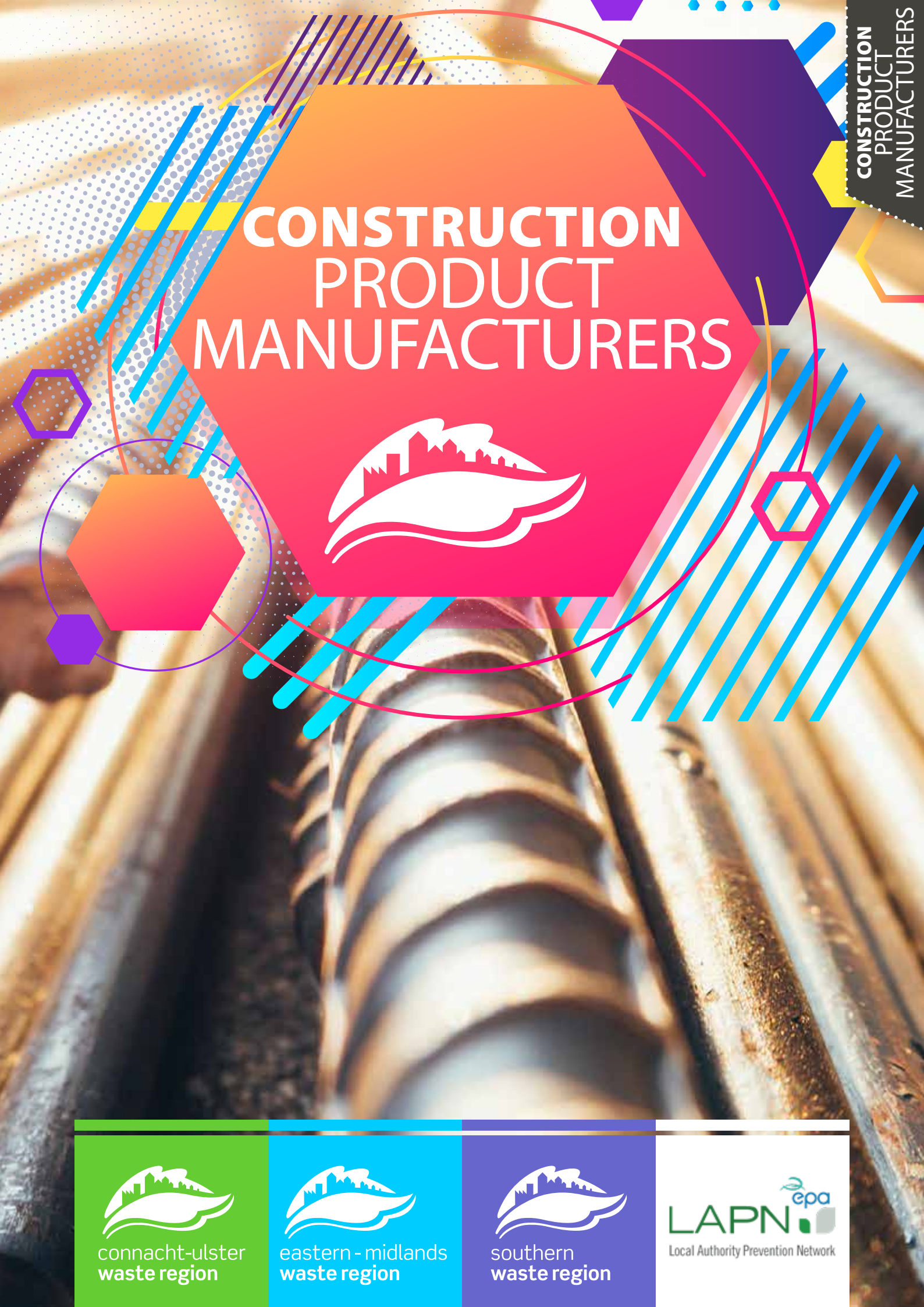
CONSTRUCTION PRODUCT MANUFACTURERS



connacht-ulster waste region
eastern - midlands waste region
southern waste region
epa LAPN Local Authority Prevention Network

Introduction

This series of Circular Economy 'beginners' checklists has been developed by Resource Futures Ltd at the request of the Southern Waste Region using EPA grant funding and with peer review input from the Build360 Group in GMIT led by Dr. Mark Kelly. The aim of the checklists is to raise awareness of the Circular Economy with key actors within the construction sector who all have a role to play in making the sector more circular and provide some early considerations to contemplate.

What is circular construction?

The construction sector is responsible for half of all extracted materials. In 2017, an estimated 4.7Mt of Construction and Demolition (C&D) waste was collected by authorised waste collectors. This represented approximately 31% of Ireland's total waste production making it the largest waste producing sector in the country.

Whilst most of this waste is diverted from landfill into other recovery options, it is recognised that a large proportion of this waste could have been prevented altogether and recovered into higher value products if Circular Economy thinking were embedded at all stages.

The Circular Economy can be summarised into 3 key principles:

1. designing out waste and pollution;
2. keeping products and materials in use; and
3. regenerating natural systems.

Circular Construction seeks to eliminate waste production at all stages of the build process, from procurement and design through construction and into operation and then eventual end of life destinations. Circular Construction also seeks to reduce the demand for virgin materials by keeping products and materials in use for as long as possible and using recovered materials.

What should I do?

The shift to a Circular Economy requires innovative business models that either replace existing ones or seize new opportunities. Businesses who are involved in the design, construction, maintenance, repair and deconstruction of the built environment all have an opportunity to explore new circular business models by increasing their appreciation of the value of the materials they are involved with.

A number of business models for Circular Economy have been proposed. These can be used independently or in combination. Each organisation must decide which model suits their own needs and can best help them gain competitive advantage. Manufacturers can take back more materials and process it into new materials, offer supply and maintenance contracts, and increase the durability, repairability and recyclability of their products.

To help construction product manufacturers know where to start, here are our recommended first steps to consider circular alternatives for your products:

1. Extend product lifecycles

When a business releases a new product, it will have a particular life cycle. Product obsolescence is due to the creation of cheaper components, advances in technology or changes in marketing strategies. Products also get discarded by consumers when they go out of fashion, break, the technology becomes outdated or they are replaced. This is particular applicable to heating, lighting and ventilation equipment which is designed for the built environment and new technology is continually being released and updated.

Construction product manufacturers can counter product obsolescence by ensuring products are designed and built to last. Construction product manufacturers should consider:

- A modular design approach where parts can be created independently and reuse can be implemented – as seen with bathroom pods in hotel construction which are manufactured offsite;
- How products can be designed to last longer or be more durable – as demonstrated by flooring specifications suited to high traffic areas;
- How parts can be designed to fit more than one product – as can be seen in the design of lighting bulkheads which can be reused time and again; and
- How parts can be designed to allow easy disassembly and reassembly for repair and maintenance – as demonstrated by the use of screw piles in foundation construction.

2. Consider products as a service

This type of Circular Economy business model concerns items that were traditionally sold as a product moving to being sold as a service. In this model, the construction product manufacturer gets a regular income from charging the user, while users (customers) benefit from lower upfront costs, enhanced support and flexibility.

For example, if a customer leases a car, they have the freedom to change the make and model periodically, they have less concerns about maintenance and there are fewer upfront costs than are levied when someone purchases a car.

The manufacturer benefits by developing longer relationships with customers than they would with a one-off purchase relationship. The manufacturer can also service the items and make the items more robust, durable and can advise on the right way to use or time to upgrade the product. This type of model is being developed by LED lighting manufacturers who want to provide light as a service as clients become aware that what they actually want is light, not lightbulbs.

3. Increase product recycled content and reusability

In this model, opportunities are taken by tackling waste materials by either reusing materials before they become wastes or create higher value uses through upcycling into new products or closing the loop by re-incorporating the waste into the original product and therefore increasing the recycled content.

These approaches can help to reduce primary material demand, avoid expensive, inefficient waste disposal and can often provide localised community benefits in many cases. Examples of this include:

- Implementing takeback schemes to return excess materials for resale as a typical mixed waste skip can contain up to 13% of unused materials which are perfectly reusable according to previous studies;
- Working with waste management companies to secure supplies of materials which can be turned into new products – as demonstrated by Kennoteq Bricks made from construction and demolition waste; and
- Providing reusable packaging instead of single use such as reusable pallets instead of the wooden ones, reusable tarpaulins instead of shrink wrap and metal stillages for glazing deliveries instead of wooden ones. These measures will still ensure products arrive safe and intact but reduce packaging material costs for the manufacturer and disposal costs for the customer.

4. Consider remanufacturing

Remanufacturing is a key strategy within the circular economy. It is typically applied to complex manufactured products that possess significant embedded material, energy and labour resources, most of the value of which can be recovered by suitable remediation techniques.

Often, remanufacturers take the opportunity to upgrade the products from old to current performance standards of energy efficiency or productivity. This is one way that they can be differentiated from products which have simply been repaired or undergone other end-of-life treatments.

Remanufacturing has the following benefits:

- Uses less raw materials than a new product. A significant proportion of the weight of remanufactured product is from used parts. This is not just beneficial to the environment but to a business whose products are seeing a shortage of raw materials and increasing costs.
- Significantly less energy is used remanufacturing a product compared to a new product.
  For example Caterpillar calculates that the remanufacture of a cylinder head in one of its machines leads to a 61% reduction in greenhouse gases, a 93% reduction in water use, 86% reduction in energy use, 99% reduction in waste to landfill and 99% reduction in material use compared to making a new product.[1]
- Between 50% and 80% less energy is used remanufacturing a product compared to a new product.
- For Original Equipment Manufacturers (OEMs) remanufacturing provides a closed loop system, improving their product design and quality based on the collection of failure mode information.

Why should I seek to make my projects more circular?

Widespread adoption of Circular Economy principles would dramatically reduce the quantity of new material imported, and the amount of waste needing to be managed including that
exported. By moving towards the Circular Economy, businesses can capture significant benefits including:

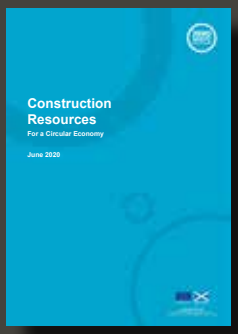
- increased growth,
- competitive advantage,
- cost reduction,
- reduced energy consumption; and
- increased supply chain security.

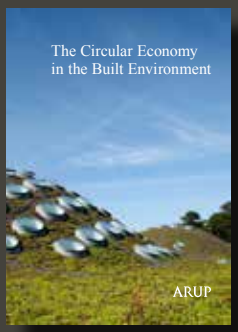
[1]https://www.policyconnect.org.uk/apsrg/sites/site_apsrg/files/apsrg_-_remanufacturing_report.pdf

Key resources

The following recommended resources will help you to continue your circular journey and embed the above mentioned tips within your projects:

- Irish Green Building Council (IGBC)
  Towards a circular economy in construction: Assessing low carbon, healthy, responsible products for the construction sector
- UK Green Building Council (UKGBC)
  Circular economy guidance for construction clients: How to practically apply circular economy principles at the project brief stage
  Circular Economy Implementation Packs for Products as a Service and Reuse
- Zero Waste Scotland
  Construction Resources For a Circular Economy
  Procuring resource efficient construction projects
  Design out waste in construction Guide
  Maximising re-use in construction
  Improving waste management on construction sites
- ARUP
  Circular Economy in the Built Environment





Support available

Should you wish to learn more or have a pilot or demonstration project which you would like support with to explore circular construction approaches then please get in touch with:

Southern Region Waste Management Office,
Lissanalta House,
Dooradoyle Road,
Limerick
Phone: 061 556596
E-mail: info@srwmo.ie
@preventwaste