

Waste prevention and the circular economy

Stakeholder Forum Report

08 April 2014

Project outline

Project overview

Waste prevention and the move to a 'circular economy' has been identified as a significant opportunity for UK business to contribute towards a resource efficient and low-carbon economy, to reduce costs and supply risks, and to generate value.

The BSI *Waste prevention and the circular economy* project aims to map the existing standards landscape and identify gaps and priority areas.

The project comprises two consecutive phases:

- Due diligence research into standards that (could) support and encourage waste prevention and closed loop approaches to production and consumption (see separate report); and
- Stakeholder forum to validate and prioritise results from the research and register interest in taking forward the key (most impactful) opportunities.

This report provides an overview of the stakeholder forum and the key findings of the event.

Stakeholder Forum

Overview

The BSI Waste Prevention and Circular Economy Forum was an open event where a wide range of stakeholders with an interest in waste prevention and the move to a circular economy were invited to explore opportunities for collaborative standardization initiatives.

The event comprised a series of highly interactive, participant-led discussions that brought out a wide range of insights, views and perspectives. These were fed into a concluding session that sought to identify some practical 'next steps'.

Objectives

The purpose of the forum was to:

- validate the findings of the draft Waste Prevention and Circular Economy due diligence research report;
- gather information about stakeholder views on waste prevention and the circular economy concept;
- explore the role of standards in encouraging waste prevention and a move to circular economy thinking; and
- identify practical recommendations and next steps that BSI can action in collaboration with interested stakeholders.

Logistics

Venue

The Stakeholder Forum was hosted on 08 April 2014 at etc Venues, Victoria, London.

Participants

A targeted approach was used to attract stakeholders from industry, government, academia, NGOs and other stakeholder groups, including the key organizations that are developing pioneering approaches to the circular economy. A full list of organizations that attended the event is provided in Annex A.

Agenda

The event was designed to be highly interactive. There were three main sessions to the day:

- Gallery walk through the main findings of the BSI Waste Prevention and Circular Economy due diligence research report
- World Café exploration of enablers and blockers to mainstreaming waste prevention and the circular economy, the role of standards and the role of BSI
- Burning issues conversations using Open Space facilitation techniques

The agenda is provided in Annex B.

Key outputs

Overview

This section outlines the key outputs from each of the sessions held on the day. A number of quotes are provided in this section of the report which are taken verbatim from the delegates.

Session 1 – Gallery Walk

The first session of the day was the gallery walk. Delegates were invited to review the key findings of BSI Waste Prevention and Circular Economy research which were presented on posters around the room.

The posters provided information on:

- Enablers (Annex D)
- Issues and needs (Annex E)
- Key standards - published and in development (Annex F)
- Recommendations and next steps (Annex G)

Participants provided observations and comments to the posters and a general feedback session was also held. The key points made during this session were:

- "these posters reflect the old language of 'waste management', we need a step-change and a new CE vocabulary, not a rebrand of what we've always done"
- "even when they're doing world-class work, the companies that I work with don't want to publicize that they remanufacture. What sort of standards can change this?"
- "I'm surprised by the large number of standards (more than 200), that already exist; this proliferation is an issue that needs to be addressed"
- "we need a unified effort/a framework that doesn't reinvent the wheel. We need a definition of the circular economy"
- "standards seem to be focused on individual organizations but we need systems thinking"
- "how do we bring the general public into the CE/can standards play a role in human behaviour?"
- "we hear a lot from think tanks, but not enough from people who buy, sell and make things."

The full list of verbatim comments on the posters are available in Annex C.

The comments provided in this session have been considered, and where relevant, reflected in the final BSI Waste Prevention and Circular Economy Due Diligence Report (a separate report).

Session 2 – World Café

World Café facilitation techniques were used for the next session. The attendees formed into groups for three rounds of discussions.

- Round 1: focused on the blockers and enablers to mainstreaming waste prevention and the circular economy.
- Round 2: focussed on the role of standards in mainstreaming waste prevention and the circular economy.
- Round 3: focussed on what needs to happen for standards to support and further the circular economy debate and the role BSI should play?

A general feedback discussion was held at the end of this session. The main stakeholder viewpoints raised are listed below:

Round 1: Blockers and enablers

- “How tightly do we need to tie this down?”
- “Legislation can be an enabler and lack of it can be a blocker”
- “Behaviour change is required – once change is implemented rarely do people go backwards”
- “We are seeking infinite growth with finite resources”
- “Standards are not applicable to leaders because standards should help others follow these leaders”
- “The key driver for leaders to be leaders is their reputation”
- “There is a lack of economic driver to recover materials from waste”

Round 2: The role of standards

- “Standards provide a uniform language – this gives us the ability to communicate”
- “Help organizations move forward to an economic model”
- “We don’t need a certifiable standard because the circular economy is so dynamic”
- “We need to understand that there are limitations of standards”
- “We need principles for the circular economy”
- “There should be a link with environmental management system standards”
- “There is a link between standards and legislation”

Round 3: Role of BSI

- “The need is broader than manufacturing”
- “Value should be more than cash profit”
- “Standards can provide confidence in the quality of claims”
- “The UK cannot do it alone”
- “BSI can use their position for legislation / standards for international use”
- “Informed process if the right stakeholders are involved – who are the right stakeholders?”
- “Do we focus on outcomes?”
- “Waste minimization is only one issue for the circular economy”
- “How do the existing 200 standards relate?”
- “There is a risk that larger organizations ‘club together’ and ‘close out’ SMEs”
- “Which type of circular economy models should be looked at? Does it make sense to look at more economically viable models eg zip car?”
- “Is there really a need for a standard”
- “BS 8900 is a useful precedent”

A full list of topics raised in response to these questions is listed in Annex H.

Session 3 – Burning issues

This session handed the conversation entirely over to the attendees by asking them to frame the burning questions they wanted to discuss.

Delegates volunteered to host round table discussions on topics of their choice. The remaining delegates then chose which roundtable discussion they wished to join.

The following questions were posed by the delegates in two rounds:

Round 1

1. What is the circular economy?
2. Who will own and manage the concept called the circular economy?
3. What would be a clear government action to promote a more circular economy?
4. Waste prevention seems to dominate the circular economy conversation; shouldn't we be focusing on finite resources instead?
5. Do households/consumers need to 'get' the circular economy, and can standards help?
6. Who needs to be involved in discussions regarding the definition of the circular economy?
7. What are the challenges that businesses need help with in respect of the circular economy?

Round 2

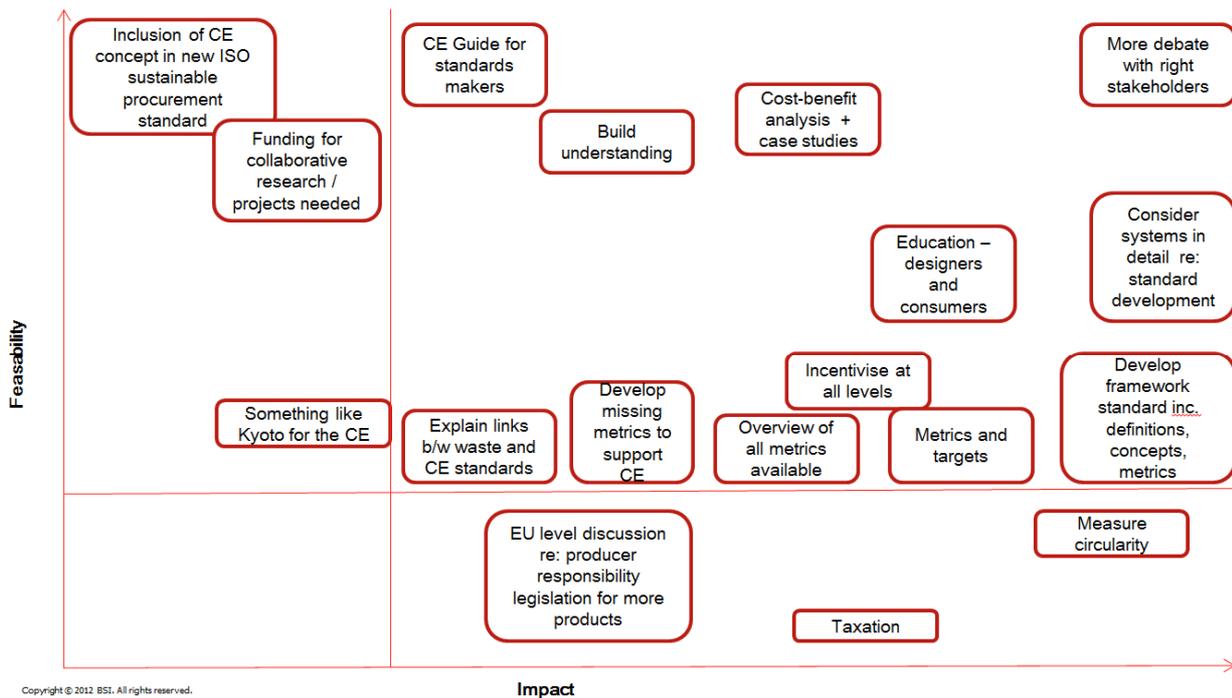
1. You have 15 PhD students available to you, what would you have them focus on / solve?
2. What are the business models and processes needed to support a circular economy?
3. What is the role of systems thinking in the circular economy?
4. Can we measure circularity and if so how, and would it be useful?

Attendees then chose the discussion they wanted to join. In round 1, question 3 attracted the highest number of participants and in round 2 question 3 also had the highest number of participants.

The key points made in each of the discussions were fed into the final plenary session. A full list of points discussed in this session are listed in Annex I.

Session 4: Plenary

The plenary session saw participants map the ideas that had emerged from the preceding discussions on a feasibility versus impact graph, as shown below:



The graph was divided into four quadrants. The ideas that were most feasible were placed at the top of the graph, and those that were likely to have more impact in mainstreaming waste prevention and the circular economy towards the right of the graph. The majority of the ideas fitted into the top right quadrant (high feasibility and high impact).

All of the ideas proposed require collaboration to take forward. Some were clearly ideas that BSI could lead on and others where it would be more appropriate for other organizations to take the lead, such as devising “something like the Kyoto Protocol for the circular economy”, EU legislation and taxation. The ideas that BSI are able to take forward are discussed in the Next Steps section.

Next Steps

Following the stakeholder forum, BSI reviewed the key outputs from the day, updated the BSI Waste Prevention Due Diligence Report and have decided to focus initially on the three areas of highest impact identified in the plenary exercise as a matter of priority:

- Look into developing a framework standard. Taking participants feedback on board, this would be a generic standard that identifies the principles an organization should consider in order to adopt and embed circular economy practices that correspond with, or alter its business models. The standard would include the much needed definitions for circularity and, more generally, the circular economy as a concept. It would outline the business case for embedding circularity at the organizational and/or product level and would have cross-industry application. It is expected that this standard would provide guidance rather than a certifiable set of requirements in order to reflect the very dynamic and nascent nature of the circular economy concept.

- Investigate the role of 'systems thinking' in standardization. Further investigation is required here to determine whether systems thinking could be embedded within a circular economy framework standard, as outlined above, or whether it is necessary to develop a separate standard. A number of stakeholders raised the point that businesses should be encouraged to think (including through standardization) in terms of ecological systems in order to increase our ability to measure and manage our impacts within given environmental limits. This would require organizations to collaborate so they can achieve positive (system) impacts, greater than the sum of their parts.
- More debate with the right stakeholders. BSI will continue to involve a range of stakeholders and end-users of standards to ensure that any standard developed is fit-for-purpose.

BSI will also:

- monitor progress on the development of metrics and targets for circularity, and provide support where possible;
- investigate the possibility for including the circular economy concept within the new ISO sustainable procurement standard in development; and
- investigate the possibility of the development of a circular economy guide for standards makers;
- further investigate the relationship between the 200 standards identified in the due diligence research when following up on the key activities highlighted above, including the development of any new standard(s).

Stakeholders interested in collaborating with BSI with regard to waste prevention and the circular economy should contact sustainability@bsigroup.com.

Annex A – Attendance List

The following list includes all organizations that attended the BSI Waste Prevention and Circular Economy Stakeholder Forum. There were a number of organizations that brought 2 or 3 representatives.

MyStadium Ltd.
ACO Technologies plc
BioRegional Development Group
British Gypsum
BSI
Carbon Saver Ltd
Construction Products Association
Cyber Associates Ltd
Dept for Business
Dudden
Granta Design Ltd
Grundon Waste Management
hatch mansfield
House of Commons Environmental Audit Committee
Keep Britain Tidy
Kingfisher plc
KROHNE Ltd
LexisNexis
London Re-use
Loughborough University
LRS Consultancy
Marylebone Cricket Club
Metropolitan Police Service
National Physical Laboratory
Oakdene Hollins
Peppermint Communications
Resource
Ricardo-AEA
Sustainable Procurement Limited
UK Sustainability Network for Standardisation
We All Design

Annex B – Agenda

Time	Session
09:30-10:00	Registration
	<p>Welcome David Fatscher, Head of Market Development Sustainability, BSI</p>
	<p>Gallery Walk Gallery walk through the key findings of BSI waste prevention & circular economy research. How can standards support waste prevention & the move to a circular economy?</p>
11:00-11:20	Morning Networking Tea & Coffee break
	<p>World Café A world café style exploration of the blockers & enablers to mainstreaming waste prevention & the circular economy. What role do / can standards play?</p>
13:00-14:00	Lunch (13.00 – 14.00)
	<p>Your Burning Issues (part 1) Participant led discussion topics using open space market place techniques.</p>
15:00-15:20	Afternoon Networking Tea & Coffee break
	<p>Your Burning Issues (Part 2) Continuation of participant led discussion topics using open space market place techniques.</p>
	<p>Plenary Mapping the needs / priorities for standards to support waste prevention and the circular economy and next steps.</p>
16:30	Close

Annex C – Gallery Walk Outputs

This annex provides the key observations and comments made on the key findings from the BSI Waste Prevention and Circular Economy due diligence report. The findings were displayed on posters. The original posters can be viewed in the following annexes:

Poster	Annex
Enablers	D
Issues and needs	E
Key standards	F
Recommendations and next steps	G

Poster 1: Enablers

The main points made about this poster were:

- EPD – multiple criteria – not single indicators
- Agree – consistent supply is important
- What about training / awareness
- Who and how will waste prevention culture be regulated
- End of waste is a mess
- Waste versus non-waste is a grey area
- Definitions
- Need to be clear on benefits to organizations
- Need definitions
- Is this all about the environment?
- What does circular economy actually mean?
- There needs to be an economic as well as environmental focus
- Agree there is a need for standards for secondary materials eg PAS 141
- Should a standard be product or material focussed
- Link standards with EMS's eg BREEAM
- Data? Owner? Audit? Certification?
- Concern – how is it possible for industry to self-regulate?
- Quality standards for reused materials is key

Poster 2: Issues and needs

The main points made about this poster were:

- How would a set of new standards change the mind-set of the public to reuse or to accept used product
- Mispriced risk – resource availability
- Companies do not want to publicize that they remanufacture – how do we change this?
- CE is counter to globalization = vested interests
- How much of this is 'new' thinking versus 'rebranding'?
- Stop 'greenwashing'
- Need to ensure concept

- Understand supply chain bottle necks
- Does it matter where a waste product is recycled? Does it really matter
- Need mind-set change from waste to resource
- Is it possible to create one standard that will cover the CE?
- Is there just one CE?
- Lack of government policy / support / position – this is concerning
- Need behaviour change
- Huge potential if CE can be achieved for British industry
- There needs to be more collaboration
- Does a CE standard need to be global?
- Is the CE disruptive? How do we manage this?
- Who will be responsible for action?
- Requires global effort
- Waste hierarchy is embedded in the waste regulations?

Poster 3: Key Standards

The main points made about this poster were:

- Remanufacture is key to closed loop
- Emphasis on packaging reflects 1`980s agenda, yet packaging is a minor issue in the circular economy
- End of waste standards are relevant
- Circularity requires more emphasis on components and products on just materials
- How do the standards work with our current ineffective infrastructure
- Minefield of standards to wade through
- Too many standards – how can SMES decide how to confirm? What will customers demand?
- How is success of existing standards measured?
- What about key private tools – these may provide stimulus / data
- Write a case study showing how BS 8905 can be a framework to look at the circular economy
- CEN mandated work on TC 352 – application of 14044 to nanotechnologies
- There are no circular economy standards yet
- Some specific and some general / generic standards exists
- Who are the standards for and who uses them?
- What are the drivers for using circular economy standards?
- ISO 26000 – Social Responsibility
- BS 8900 – Sustainable Development
- How effective are the standards?
- Circular does not necessarily mean sustainable
- Safety standards could be barriers

Poster 4: Recommendations and next steps

The main points made about this poster were:

- Homogenizing standards is key and would enable a quicker transition to the circular economy making it easier for business
- Need to consider how law and standards work together
- Does legislation on hazardous materials on new products need to be tightened? Like with batteries

- Need to differentiate between measuring circularity (process) and resource use (physical material consumption)
- Proposed actions seem to be what to do, not how to do it
- Critical question – how to we measure environmental limits
- Concerning that training is not mentioned
- Align with SCAP work and eSAP
- Review should consider reach and influence of existing standards
- Standard on systems thinking?
- Standard on supply chain transparency? Chain of Custody or similar?
- What is the role of consumers?
- Transformation role of procurement
- Has the 14001 revision done enough? It will be used into the 2020's
- Embed circularity into procurement
- Agree – a guide about CE for standards makers would be very useful
- A guide re: CE for standards makers is essential
- BS 8900 is a useful precedent at an organizational level
- Where does government's open data fit into this
- Ensure both products and their contexts/applications are covered together
- Sector specific should focus on waste prevention at source
- Need to involve third sector and citizen representatives
- Who will be the audience - need to be in a system
- What do you want to achieve and why? Impact!
- What does good look like?
- Circular thinking requires business models to change – are you taking businesses with you?

Annex D – Poster 1 : Enablers

Waste Prevention and Circular Economy – Enablers

THE ROLE OF STANDARDS

"... *Environmental product standards* are the tool we use to describe the changes we want to see in products, in order to deliver environmental outcomes. Government's top priority in relation to waste is to prevent it arising in the first place, and product standards are one tool we can use to help deliver this. Waste prevention criteria are already included in some product standards. Defra's policy objective is to *bring waste prevention criteria into the mainstream*, so they are routinely included in the range of minimum and best practice product standards...whilst ensuring that such standards support rather than stifle innovation and creativity..."

Defra

"...*Resources can be freed-up by leveraging industry self-regulation*, and by recognising in regulation, quality assurance schemes like that run by Recycling Registration Service Limited...*Domestic end-markets for recycled materials should be encouraged through green procurement and product standards...End of Waste Protocols should be accelerated* in order for the market to have confidence in the characteristics of secondary materials."

Environmental Services Association's policy recommendations to government

"Over the past year the notion of the "circular economy" has captured imaginations to the extent that it now takes centre stage in much discourse around sustainability. *Full realisation of its vision will demand joined-up system-level thinking and above all collaboration.*

... the Knowledge Transfer Networks (KTNs) have been informing and supporting a string of Technology Strategy Board competitions, representing an investment of over £10m, aiming to facilitate the circular economy. Each of the various competitions, which have all stressed the value of collaboration, has focused on a particular *enabler: Design (exploring the notion that waste is a design flaw); New business models (such as leasing and remanufacturing); Materials innovation; Supply chains.*"

Knowledge Transfer Networks

"... the main products that are being recycled now tend to be low value, short life, common items, such as packaging, or very high value products, such as precious metals. Products that fall in between these areas tend to be much harder to deal with. This may be something to consider when prioritising the key areas that BSI wishes to focus on.

From an environmental perspective it'd be good to consider other aspects as well, such as toxicity and embodied carbon. One way to do this would be *to link in ... proposed standards with existing standards for life cycle assessment (LCA) and environmental product declarations (EPDs)...*"

BioRegional

"*Develop quality standards for secondary materials to facilitate commoditisation, such as PAS 141.* The lack of an agreed standard for different grades of recycled material reduces reprocessors' willingness to pay higher prices for higher quality material as it has to be taken on trust. There is therefore little incentive to invest in improving the quality of recyclate. The government should work with industry in developing a set of agreed standards for secondary materials following a similar process as was used for the development of the PAS 141 standard on reuse.

Use standards for reuse and remanufacturing (such as PAS 141). To increase both business and consumer trust and demand for reused/remanufactured goods, companies should use certified processes that ensure their quality.

Develop collection standards for reusability. Poor handling of end-of-life products can limit their reuse potential... As with quality standards above, the government should work with industry to develop guidance on how to manage WEEE collections to maximise reusability."

Green Alliance, Resource Resilient UK, a Report from the Circular Economy Task Force

Annex E – Poster 2: Issues and needs

Enhancing Waste Prevention and Mainstreaming the Circular Economy

ISSUES AND NEEDS

- *There are no formal standards that focus on the concept of the circular economy in its entirety*, although some examples that encourage circular thinking, especially at the design stage, exist.
- Work to define and measure 'circularity' at the organizational and product level has started. For example, the European Commission's LIFE+ programme to deliver the first metric tool for measuring circularity, as well as some privately driven initiatives. However *this effort is yet to be brought into the standardization arena, which would help give it full stakeholder exposure, scale it up and encourage wider understanding and uptake.*
- There is extensive legislation covering waste prevention. This has been one of the key drivers for the emergence of waste prevention standards across the globe, particularly on the use of electrical and electronic equipment and recycling. However, *there is no UK or EU legislation that focuses purely on the circular economy concept*, although the EU is funding work in this area and has included 'circularity' in its policy agenda (e.g. Roadmap to a Resource Efficient Europe COM (2011) 571; European Resource Efficiency Platform; upcoming Commission Communication on the Circular Economy).
- The debate in the UK around the need for legislation to encourage circular economy approaches is on-going. To date, the focus has been on waste prevention and minimization. There is *currently a lack of measurable targets around 'circularity'*. UK Government has indicated that it is looking to collaborate with business to encourage business-led solutions for 'circularity'.
- More and more organizations are developing new initiatives around the waste prevention and circular economy concept. These include the Aldersgate Group; BioRegional; Business in the Community (BITC); DCLG; Defra; The Ellen MacArthur Foundation together with its global partners; Environmental Services Alliance (ESA); Green Alliance; IIED; Knowledge Transfer Networks (KTNs); Product Life Institute; Resource Revolution; RSA; Technology Strategy Board; WRAP.... A number of these organizations are moving towards a common approach to support the move to a more circular economy. However, *further, and more concerted effort is needed to define, agree, scale up, and promote the uptake of the circular economy model.*
- "... Now it is *necessary to take the circular economy concept ...from an idea to reality....* There is already some leadership towards this goal, from UK's devolved governments, the EU and businesses, but *progress is still partial and fragmented.*" (Green Alliance meeting of 'Designing Out Waste business consortium', May 2012)
- "... one of the big challenges to the development of a more circular economy is that *Circular Economy principles tend to run counter to the process of globalization.* In relative terms more 'durable' products, such as housing for example, have become relatively more expensive whilst more 'consumable' products, such as a microwave, have become relatively very cheap. ... This shift in prices works against the Circular Economy and has meant that it's cheaper to throw things away than to repair or reuse them. Globalization has meant that the location where products are manufactured is different to where they are being disposed of. This is something that would need to be considered carefully in any proposed standard." (BioRegional)
- "What prevents take up of circular opportunities? The trade-off between higher value circularity and lower value flexibility exposes *two types of barriers which prevent circular business models from becoming viable: those associated with markets and those associated with materials....* Scaling the circular economy up means tackling the three biggest market barriers faced by business: *Mispriced risk:* the assumption that, because material availability and cost have been unproblematic in the past, they won't be in the future...*Split incentives:*...open loop systems create different incentives for different actors that limit both the engagement with, and benefits of, circular systems...*Inadequate recovery infrastructure....Material barriers...the properties of materials and products create opportunities and barriers to effective circular systems...*" (Green Alliance, Resource Resilient UK, a Report from the Circular Economy Task Force)

Annex F – Poster 3: Key Standards

Key Standards

OVERVIEW

Our searches identified over 200 published standards that are relevant to the waste prevention and circular economy topics. The key areas that were supported by standards were recycling, materials and waste.

There are many standards that address waste prevention. However, there are no formal standards that focus on the concept of the circular economy in its entirety.

KEY INTERNATIONAL, EUROPEAN, BRITISH STANDARDS and PASs

BS 8903 Principles and framework for procuring sustainably – guide

Provides recommendations and guidance on how to adopt and embed sustainable procurement principles and practices across an organization and its supply chains. This standard is being used to inform the development of a new international standard on sustainable procurement.

BS 8895-1 Designing for material efficiency in building projects - code of practice for strategic definition and preparation and brief

The first in a projected suite of codes of practice that address specific and interrelated issues and processes of material efficiency in building projects. Gives recommendations for the process by which design and project teams seek to maximize material efficiency through design.

BS 8895 Designing for material efficiency in building projects, will eventually comprise the following additional parts: Code of practice for Concept and Developed Design (Part 2); Code of practice for Technical Design (Part 3); Code of practice for operation, refurbishment and end of life (Part 4).

BS 8887 Series - Design for manufacture, assembly, disassembly and end-of-life processing (MADE)

Provides context for the preparation of technical product specifications in accordance with Geometrical Product Specifications (GPS) principles. Subsequent parts of this standard will address specific requirements for various types of engineering manufacture. The series comprises the following parts:

BS 8887 - 1 General concepts, process and requirements

BS 8887 - 2 Terms and definitions

BS 8887-220 The process of remanufacture. Specification. Specifies requirements for the process of remanufacture and the steps required to change a used product into an as-new product, with at least equivalent performance and warranty of a comparable new replacement product.

BS 8887 - 240 Reconditioning. Specifies requirements for the process of reconditioning, i.e. returning a used product to a satisfactory working condition by rebuilding or repairing major components that are close to failure, even where there are no reported or apparent faults in those components.

BS 8887 - 211 Specification for reworking and remarketing of computing hardware. Provides IT sector remarketers with a vocabulary and procedures needed to accurately define their products.

Draft BS 8887- 210 Specification for reworking and remarketing. Gives remarketers the vocabulary and procedures needed to accurately define their products.

PAS 141 Reuse of used and waste electrical and electronic equipment (UEEE and WEEE). Process management. Specification.

Sets out the requirements to successfully manage the process of preparing used and waste electrical and electronic equipment (WEEE) for reuse.

Environment and packaging standards

ISO 18600 series - specifies requirements for reuse and recovery of packaging materials:

ISO 18603 specifies the requirements for a packaging to be classified as reusable and sets out procedures for assessment of meeting the requirements, including the associated systems.

ISO 18604 specifies the requirements for packaging to be classified as recoverable in the form of material recycling and sets out procedures for assessment of meeting its requirements.

ISO 18605 specifies the requirements for packaging to be classified as recoverable in the form of energy recovery and sets out assessment procedures for fulfilling the requirements.

ISO 18606 specifies procedures and requirements for packaging that are suitable for organic recycling.

Draft ISO 18616-1 Returnable transport system - Reusable, rigid plastics distribution boxes Part 1: General purpose application

Draft ISO 18616-2 Returnable transport system - Reusable, rigid plastics distribution boxes Part 2: General specifications for testing

Draft PD ISO/TS 18614-1 Packaging - Label Material Part 1: Questions for Material Determination

Draft PD ISO/TS 18614-2 Packaging - Label Material Part 2: Specification of Material

EN 13427 Packaging. Requirements for the use of European Standards in the field of packaging and packaging waste
 EN 13428 Packaging. Requirements specific to manufacturing and composition. Prevention by source reduction
 EN 13429 Packaging. Reuse
 EN 13430 Packaging. Requirements for packaging recoverable by material recycling
 EN 13431 Packaging. Requirements for packaging recoverable in the form of energy recovery, including specification of minimum inferior calorific value
 EN 13432 Packaging. Requirements for packaging recoverable through composting and biodegradation. Test scheme and evaluation criteria for the final acceptance of packaging
 EN 13437 Packaging and material recycling. Criteria for recycling methods. Description of recycling processes and flow chart

PD CEN/TR 14520 Packaging. Reuse. Methods for assessing the performance of a reuse.

EN 15343 – EN 15348 European plastic recycling standards

A number of European standards (EN 15343 – EN 15348) have been developed to support the plastic recycling industry that cover the characterization of various types of plastics and plastic wastes. E.g. EN 15343 specifies the procedures needed for the traceability of recycled plastics and gives the basis for the calculation procedure for the recycled content of a product.

PAS 105 Recovered paper sourcing and quality for UK end markets

Makes recommendations for, and gives guidance on, good practice for the collection, handling and processing of recovered paper intended for recycling within UK end markets. Aims to explain the key factors that influence the efficient recycling of recovered paper in order to promote best practice throughout the whole process chain.

PAS 402 Waste resource management - Specification for performance reporting

Provides waste management organizations with a specification for performance reporting, and the framework for the demonstration of performance against key areas of delivery, including landfill diversion and materials recovery. Its purpose is to increase reuse and recycling of waste.

BS 8601 Specification for subsoil and requirements for use

Specifies requirements for the classification, composition and use of subsoils that are moved or traded for creating soil profiles intended to support plant growth.

BS 8905 Framework for the assessment of the sustainable use of materials. Guidance

Provide a framework for the concepts, techniques, tools and methodologies that can be used to support decisions surrounding the sustainable use of materials. The framework can be applied to all parts of the supply chain and is intended to support decision making about the sustainable use of any type of material.

EN 62430 Environmentally conscious design for electrical and electronic products

Specifies requirements and procedures to integrate environmental aspects into the design and development processes of electrical and electronic products.

ISO 14040 and 14044 - Life cycle assessment - principles and framework and requirements and guidelines

ISO 14040 specifies the principles and framework for a life cycle assessment (LCA).

ISO 14044 details the requirements and guidelines for conducting an LCA.

Draft International Standard for cross-border trade of second-hand goods

New work on an International Standard for cross-border trade of second-hand goods has started within ISO. The re-use of consumer goods is viewed as a factor in good environmental stewardship because it is more resource efficient than manufacturing new items and diverts goods that might otherwise go to landfills and other disposal facilities.

KEY PRIVATE STANDARDS

Carbon Trust waste standard

International certification scheme to recognize firms that are effectively reducing their waste year on year.

Draft WRI global food loss and waste protocol

Aims to enable countries and companies to measure and monitor food loss and waste.

Draft WRAP re-use standard

Aims to enable organizations in the UK to offer products for re-use that have been subjected to a quality assured process.

Annex G – Poster 4: Recommendations and next steps

A Path Forward? RECOMMENDATIONS AND NEXT STEPS

OBSERVATIONS

Our research identified numerous standards that address waste prevention and a lot of activity in helping to define and implement the circular economy concept. There appears to be a desire to develop a common approach to the circular economy, and a number of key organizations are already collaborating to define such an approach. However, it appears that more concerted effort is needed to define, agree, scale up, and promote the uptake of the circular economy model.

Taking into account the role of standards in bringing various stakeholder groups together to agree a consistent approach to a given subject, it is recommended that BSI (as the UK's National Standards Body) work in collaboration with government and industry, to build consensus as to what good circular economy practice looks like, and further this work.

PROPOSED ACTIONS

Homogenize product and waste prevention standards focussing on specific industries and product groups

Revisit and/or align standards, where possible, to reflect recent approaches to waste prevention and moves toward 'circularity'. Create a product standards review programme, to include the mapping out of national, European and International standards; prioritizing these, and developing a revision schedule against each priority group.

Ensure all new and updated standards consider waste prevention and/or the circular economy

Develop a guide for standards makers that would be used in the development of British Standards.
Investigate the possibility of developing guides for national, European and International Standards makers.

[Note: Similar approaches are present in the wider environmental/sustainability arena and include CEN Guide 4 (2004) for the inclusion of environmental aspects in product standards in European standards and ISO Guide 82 (2014) Guidelines for addressing sustainability for the development of international standards.]

Develop overarching circular economy standard(s)

1. Develop a vocabulary of common terms and definitions to contribute to the better understanding and promotion of the circular economy.
2. Develop a framework or guidance to define the concept, the principles and benefits of the circular economy.
3. Develop standards that detail key requirements for embedding circularity within an organization, industry, community or a supply chain.

[Note: Similar approaches have proven successful in BSI's work around sustainability management, sustainable procurement, environmental and energy management, greenhouse gas management, biodiversity, and other areas of relevance.]

Develop standardized mechanisms for measuring circularity

Standards could be developed for measuring circularity at the national, organizational and/or product/supply chain level. This could be achieved by supporting and building upon existing initiatives such as the Life+ programme of work and other privately driven effort.

Develop further sector specific re-use and recycling standards; develop standards around other models that encourage circular thinking

Further standardization could extend to:

- specific products and materials to target as waste prevention priorities; and
- how to extend re-use, repair, and leasing business models.

Priority products and materials for waste prevention could include electrical and electronic equipment, clothing and textiles, construction materials, food waste, and packaging.

Annex H – World Café Outputs

This annex provides the key discussion points from the world café session which discussed:

Round 1: Blockers and enablers

Round 2: The role of standards

Round 3: Next steps and the role of BSI

Round 1: blockers and enablers

The key blockers to mainstreaming waste prevention and the circular economy were identified as follows:

- Culture – do consumers need to understand the circular economy? Yes, because consumerism is a blocker to change.
- PR can be a successful enabler (or blocker if you want it to be!).
- Legislation can be an enabler (lack of it could be a blocker?)
- Relative 'cheapness' of consumables makes it cost to be circular
- Circular economy trying to 'take on' globalisation – can it win?
- Government : U-turns in legislation e.g. construction industry
- Economic Blocker – Legislation
- Society of convenience
- Entrenched models – advertising, marketing
- Current economic climate
- Not enough capacity/competency of EA to regulate
- Mantra too much around innovation being a product
- Perception driven of 'old stuff' – Lifestyle
- People don't want to change so it's slow and hard. But once changes accepted we don't usually go back. 'What's the point'?
- Procurement power/consumers
- Lack of ownership of products (especially at end of life)
- Health and Safety Regulations
- Lack of targeted standards on material specification
- A linear product design
- Lack of economic driver to recover materials from waste
- Resistance to change
- Limited knowledge
- Stakeholder engagement problem
- Common definitions/clarify
- Economic variability
- 2 themes, waste prevention and circular economy
- No target setting
- No responsibility (share allocation)
- Lack of structure
- Lack of sharing

- System does not encourage companies to build something in-house.
- Sometimes blockers - consumer choice, public investment or commercial investment
- Viability of markets/Role of legislation in increasing
- Material security – Some restrictive

The key enablers to mainstreaming waste prevention and the circular economy were:

- PR can be a successful enabler (or blocker if you want it to be!). Legislation can be an enabler (lack of it could be a blocker?)
- Legislation – Education
- Tax incentives e.g. reduce landfill
- Links between individual companies, their sectors, their customers, reactive v proactive
- Linking top and bottom of supply chain
- Models have been used in the past e.g. milk delivery
- Some willingness from general public - B2B
- Landfill tax
- Resource efficiency (saves money). Total cost ownership
- Regularity framework
- IPR
- Infinite growth with finite resources
- Leaders – companies in this area – Standards are being set to help others to follow.
- Supply chain responsibility as a driver - Companies worried about their reputation
- New business models – enable sustainable growth
- Improve product ownership - Product passport
- New product designs
- New technologies to recover materials
- Improved standards on material specification
- Change management
- Shared users
- Mandatory regulations

Other general points made during the discussions include:

- Does circular economy have a specific/general term?
- 'Onion' model
- Importance of reduction as well as re-use
- Link with life-cycle analysis. What data will be needed. How dynamic?
- People need confidence in supply – Guarantee standards. Quality
- Remember progress on recycling – this is as big a challenge, 1990s – 2014
- Aim for waste prevention and circularity as 'normal'

Round 2: The role of standards

The following statements were made by stakeholders in the response to the question "what could standards play in helping mainstream waste prevention and the circular economy?"

- Standardise 'expectation' / Uniform language
 - Be used globally – facilitate sustained dialogues – over a common framework (linked to above)
 - Provide clarity / direction of travel / end goal / focus
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- Provide benefits to users/consumers/industry
- Create a level playing field
- Provide a framework to progress/move organizations through to becoming a 'CE' org
- Become a useful supply chain tool – encourage collaboration
- Could give clarity and definition
- Needs flexibility for individual circumstances
- Help supply chains work with common understandings
- Will set basic standards for materials and recycle
- Help consumers make purchasing decisions
- Effect on company image
- If they were statutory instruments – they could create a level playing field
- Why are there 200? Are they working?
- Enable clarity, communication, definition
- Provide quality assurance/risk management for the re-use of materials. Can standards ensure that re-used materials are of one quality – if they are coming from different ends of life – can a standard.
- Re-use has 'robustness' and an acceptability that re-use is ok – need a standard to
- Provide a commercial playing field/baseline – consistency
- Could they help to get a performance benchmark – key measurement areas
- Define what circular is
- 14001 and 9001 – at system level – Good foundation
- Need a clear business case
- Take account of LCA i.e. energy/water and social issues
- Question? – Sectors specific or Generic? – Overall better NOT to be sector specific
- Possible roles : Bring clarity how it's going to work, measure – metrics (confusion)
- Key drivers to circularity
 - o save energy
 - o save carbon
- Dismantling opportunities clarity – reuse eco-design
- Financial drivers
- Separation of material
- 'Re-use' standards : Safety and advice
- Certify- perception issues

The following statements were made by stakeholders in the response to the question "what role would you like to see standards play?"

- Help create stability
- Use as a tool to create buy-in/driver for senior management, provide a hook/legitimise/get recognition
- Standard – responsible/CSR possibilities
- Could be used to recognise and reward innovation and new ideas
- Principles based e.g. BS 8900
- Discussed Unilever and SO
- Principles NOT enough
- Align the pieces of legislation
- Standards must be enacted : behaviour change
- Not undermine competitiveness in global economy
- Trust – Confidence
- How the materials flow : What's in the product – ID, passport

- Traceability - supplier certified

The following challenges were also identified during the discussions:

- Could be just left on the shelf
- A standard can't deliver a circular economy itself
- Can become a barrier to innovation
- People can forget about the outcomes – just become process orientated
- Understand limitations of what can be achieved/what can't
- Companies could use the standard to jump on board with new trend but not meet the principles

The following general remarks were also made in this session:

- Waste Prevention – Specific
- Circular – General
- Different types of standards. Collection of standards/specifics different products/supply chain
- Marketable product – Confidence. Quality
- Habit in doing things a different way
- Awareness, best practice (dynamic), framework – what is successful
- Strategic objectives – Co-ordination, co-operation/quality/marketability
- Supply chain: Awareness, quality, integration
- Value of materials – understand process
- Composite standards – combination
- What is the driver for re-use and preserving value?
- Complexity in eco-design/innovate
- Legislation – What/how?
- Other market forces
- Dynamic models – Resource security
- Profitability – Driver
- Standards for durability / Disassembly
- Defining standard – Emphasising the credibility of the product
- Supply chain – influence
- Standards – can go all the way through (cradle to grave)
- UK, Europe, International – Right level of applicability
- Choosing key industries – Start with them – Go to their supplies - Replicate
- Was there anything specifically worthy of note about the conversation? (i.e strong views/few strong opinions/strong consensus/strong disagreements)
- Providing a quality assurance / robustness for re-using products
- Principles based e.g. BS 8900
- Discussed Unilever and SO
- Principles NOT enough
- Standards to protect the consumer

Round 3: Next steps and the role of BSI

The main discussion points that were raised by the question "what needs to happen for standards to support and further the circular economy debate?" were:

- Fewer standards or specific standards for specific products
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- Prioritisation – circular economy platform to enable focus in key areas and engagement with industry
- Define how to measure
- Needs to be informed – Engage with markets, procures, NGOs
- Set out outcomes to be sought
 - Focus on objectives
 - Enable dialogue
- Public sector investment/support in publicizing and enforcing
- Parts of UK (Eng, Sco,Wales, NI) to meet equally high standards
- Commercial drives (e.g. landfill tax) to support circular economy
- Better understanding of materials used in products
- Help to make reuse easy and convenient
- More manufacturing companies and consumers
 - Drivers and influence
- Role of rental disincentive
- Legislation
- Language – Core need
 - Design and end of life. Materials specification. Facilitation of agreed dialogue
- Understanding mechanisms and facilitation for change
- Role of industry and market is to
- Standard · move towards process
- Through supply chain by companies. National
- Standard – Business · Business Standards
- Re-condition/re-manufactured
- Durability guarantee
- Standard for consumers business model
- Need a standard to define terms
- International level agreement
- Need sectorial approach. ID key industries eg clothing
- Link up/understanding to waste regulation.
- Standards will lead the way
- What is the need for standard – agreed definition
- Format of standard and what trying to achieve? Technical/CoP/Specification
- Clarity of understanding
- Chicken and egg. What are we talking about and what trying to achieve
- BSI define scope of the supply chain and who/which sectors to engage with
- Is the end game a standard or is it as a leader in furthering the thought process
- Business interest – is it there? – Buy-in from the public/people – business
- How to put in the consumers mind? Eco-labelling – information and understanding
- Is the awareness and understanding there?
- Investment/finance/banking – not just about manufacturing
- Standards provide faith in the quality of the chain / confidence – tangible benefits
- Value – from cash to benefit
- UK can't do it alone – global markets
- Financing systems – loans/banking
- To support European standardization (CEN) work the following needs to happen:
 - o Awareness campaign
 - o Have a clear definition, owners and boundaries – Build framework to clarify boundaries for companies/businesses
 - o WRAP provides a measure of success

- Education – Knowledge dissemination
- Standards need to be more attractive
- Critical to get common understanding of CEN with particular supply chains
- Resolve question of whether a suite of standards are needed to address different supply chains
- Resolve issue of needing collaboration to make it happen – tricky
- Must make it accessible for small organizations; and address their needs

The following points were discussed in response to the question "what role should BSI play in furthering the circular economy debate?"

- BSI need terms and definitions
- Need to pin down concept – then revisit as concept evolves
- ID which standard types work for different sector/materials/resource flow
- Chain of custody of materials – Can standards help
- Revise existing standards to align with CE concepts
- Facilitator of UK CE framework
 - to enable businesses to carry out changes to CE and international weight
- Maybe to keep CE meaning - Keep idea of CE important and fresh – it is dynamic
- Provide a measure of success of CE
- Could BSI do more to 'lobby' for regulation to support implementation of standards
- Look at standard that is based on collaborative approach for CE?
- Please map out how the '200' standards on CE relate to each other!
- Simplification is needed to make it accessible
- Address issue of asymmetry between large and small organisations, in respect of ability to become closed loop internally – large could close out small ones
- What role does BSI see for itself?!
- BSI lobby government to push for legislation – one lever of many
- International lobbying
- Global collaboration – ISO
- Clarity of scope of CE and define outcomes sought
- Risk in materials reuse and changes
- Different circular eco models and should they be prioritised
- Lack of consensus
- Will a standard achieve industrial collaboration
- Legitimise 'champions' within a business
- Suite of standards and yet still applicable for business

Annex I – Burning Issues Outputs

This annex provides the key discussion points made on the feedback forms from each of the round table discussions. Note: there were no feedback forms collected for round 1 questions 5 and 7, and round 2 question 3.

ROUND 1

Question 1: What is the circular economy? Sustaining economic viability without compromising resources or the environment, including land, water, and living space.

The main themes discussed were:

- Individual sustainable business may not be sustainable within the economy at large.
- A global issue. Corporates such as M&S put obligations on suppliers.
- Resources. Cradle to cradle.
- Government legislation and incentives invest in innovation.

The key things to note from the conversation were:

- Need something like Kyoto for CE
- Is it any different from sustainable development?
- Fair shares and fair access to materials

The next steps discussed were:

- EU regulations – ECO design, material circularity and so on. Global action – government and companies.
- Education for designers and consumers. Improved design for re-use.
- Clear strategies, tools, research. Metrics and targets. Taxation
- More consumer and employee loyalty
- Does it apply to all sectors, all industries?
- Emerging economies are still at the landfill stage
- Overarching concept. Standards more local – components of the whole
- Definition will change as we move on and get tighter and tighter
- Yet another standard not needed
- How realistic is the definition on a total global scale? How are we going to bring emerging nations up to speed? Probably more quickly than developed nations originally did, but developing nations make better use of resources.

Question 2: Who will manage/own the concept?

The main themes discussed were:

- Management is an inappropriate term. 'Circular economy' can mean many different things. No one needs to take responsibility for the 'meaning', this will be done through a coalition of the willing. It

may be chaotic but that's fine. Standards are one element of this and the review process will keep it relevant.

The key things to note from the conversation were:

- Global supply chains – so 'circularity' needs to be meaningful beyond UK.

The next steps discussed were:

- This discussion leads into the 'business model' discussion – and into 'definition' discussion.

Question 3: A clear government action to promote a more circular economy?

The main themes discussed were:

- Global environment
- Complexity of standard
- Can be used to help promote what the UK is good at
- Must not stifle innovation
- Can government address built-in obsolescence?
- Can Government help affect culture change?
- TSB priorities
- Procurement requirements
- Requirement to obtain funding

The next steps discussed were:

- HMG set standards that should be met to get access to procurement and funding opportunities
- HMG should lead by example
- HMG should help by funding voluntary collaborations on circular economy for sectors

Question 4: Waste prevention seems to dominate the circular economy conversation? Should we not be talking in terms of finite resources?

The main themes discussed were:

- What will capture the appeal of consumers – business to a circular economy? Will finite resources make more sense than waste prevention?
- Analogy with consumer behaviour on free range eggs
- Consideration of business reputation by using poor factories in the East to produce very cheap clothes
- Understanding planetary impact on buying goods.

The key things to note from the conversation were:

- What will be the triggers to change behaviour?
- Waste might not be the right trigger

The next steps discussed were:

- Widen the link of the Circular Economy from waste prevention
- Continued discussion to find actions

Question 6: Who needs to be involved in defining CE?

The main themes discussed were:

- Lots of stakeholders – Architects, Designers
- Producers
- Commissioners
- Policy matters
- Regulators
- Budget holders
- Waste companies
- Media
- Comms
- 3rd Sector
- Buildings
- Standards
- NGOs
- Sustainability leads
- Finance
- Consumer Groups
- Good practice examples – Japan etc.

ROUND 2

Question 1: If you had 15 PLD's what would they do?

The main themes discussed were:

- Procurement could be focus
- Policy level research needed
- Prioritize key areas/products to look at (Scenario) Planning
- SMEs need attention
- Placements (in industry/government).

The next steps discussed were:

- Need funding for collaborative R&D projects on CE

Question 2: What are the business models and processes needed to support a circular economy?

The main themes discussed were:

- Drivers – Cost of raw materials – Resource risk. Where's the money?
- What is the benefit of CE's (When do I move; early or later).
- Managing risk
- Educate - show the business benefit or case
- Producer responsibility – you can't disown a product once it leaves your gate.

The key things to note from the conversation were:

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- Lengthening the life of material is the current momentum. What is the cost benefit of being here?

The next steps discussed were:

- Build understanding creation of a standardized language
- Showcase least proactive and cost benefit

Question 4: Can we measure circularity? If so, how? Would it be useful?

The main themes discussed were:

- Clarify meaning again of Circular Economy (see Round 1, Group 3)
- We should measure circularity
- Yes, we can measure it by looking:
 - o Finite resources – materials, water, land
 - o Need objectives, targets, benchmark
 - o Sensible energy use, CO2 footprint
 - o What are we trying to achieve with CE? This could be our target
 - o Measure waste, type of waste
 - o Environmental databases needed
 - o Company product developed
 - o Material flows from start (mining)

The key things to note from the conversation were:

- Need a benchmark – target
- Are we measuring a product, company, sector?
- Several parameters needed to understand
- Need to know supply change/flows

The next steps discussed were:

- Look at current measures available
- Circular Economy definition, and see what overlap, and what methodologies are missing
- Overview of all metrics under Circular Economy overarching definition