

Sustainable Maritime Interiors

Cruise&Ferry

2022 REPORT



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Tel: +44 116 2229900
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Compiled by

Jon Ingleton
Michele Witthaus

Design

Libby Sidebotham

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Foreword



Jon Ingleton, Executive Editor, Cruise & Ferry

We are all obliged to try to design, develop and promote sustainable solutions, embracing change ourselves and encouraging others to follow. And despite the often challenging outlook, our industry is clearly up for the challenge. During the six or more months that we've been planning and collecting content for this report from companies, industry experts and international organisations, I've been inspired by the enthusiastic responses that we've received. Over 180 willing collaborators helping us find a roadmap to more sustainable maritime interiors.

The most prevalent interpretation of sustainability has three pillars – social, economic and environmental. While we touch on social and economic sustainability topics, the significant and intended focus of the content that follows is on seeking environmental performance improvement. It is within this pillar that our community can have the greatest impact.

There's more being done within the passenger shipping interior community than you might expect given the relatively low profile that this subject gets in the media. It's time that we started celebrating successes loudly to motivate continued sustainability performance improvement and to reward those who have invested their knowledge, time and money for the benefit of our industry and the planet.

Thank you to all of our contributors, who are listed on [page 8](#), and also to our partners and sponsors. We couldn't have produced this report without you! Huge thanks to My Nguyen too – this was your idea; we are grateful you shared it with us. We hope that it has the impact you envisaged when we first spoke about it.

Individually, the people and organisations that we've engaged with have accomplished so much – just imagine what we could achieve if we worked more collaboratively. That's just one of the many recommendations put forward at the end of this report.

Introduction



My Nguyen, Director of Interior Design, Holland America Group

Sustainability has always been a personal passion of mine. I don't know if it's from growing up in Seattle, having similarly minded friends with environmental awareness in their DNA, or simply appreciating the outdoors and being inspired by nature. I wouldn't call myself an activist, but I am certainly an advocate and am very aware of our human responsibilities – both in our personal lives and at work.

I've been in the industry for over 20 years and environmental issues have always been in my mind to address, but as with many things in life and in business, it's always about finding something that triggers positive action. A couple of years ago there was a window of opportunity that started with small conversations and occasional action that's now grown into something much bigger. It didn't take much for the topic to gain some serious momentum within the ship interiors community – a few conference sessions, a variety of conversations and the occasional dinner. And it's going to grow into something much bigger, which is really exciting.

In the past, I would have conversations about sustainability with colleagues and we would take one or two steps forward. There was an underground hive of activity with individuals and companies doing a lot in isolation, but often going unnoticed. Now, we're starting to connect meaningfully and a group of like-minded individuals and companies is coming together. This November, we will be meeting up in London for Elite Exhibitions' Sustainable Design Summit, where we will discuss the ideas and insights shared in this report and start to develop a unified strategy. It feels like we are ready to take bigger steps now and there's so much excitement about what's to come from every stakeholder group.

We must talk collectively about how to crack the sustainability code because it's otherwise too overwhelming. If we can correlate ideas and find some consistency in our approach, we can bring engaged minds together to establish a plan of action. I certainly advocate things that I'm personally very passionate about and if it happens to influence people to get them excited about an important topic then I'm confident that we can achieve great advances together.

It is hard to embark on a project like this because there is no consistent definition for sustainable interiors. If you ask 10 people what a sustainable interior is, you will get 10 different answers. We need to start by taking a bunch of different ideas and perspectives and narrowing down the definition to help guide people.

Getting started with something like this can be really intimidating and it's easy to shrink away from the conversation and begin to believe that our business is just fundamentally not very sustainable. However, the reality is that humankind isn't sustainable; we're consuming natural resources at an alarming rate. While it's easy to frighten ourselves out of action, we must find the courage to embrace these fears and make a difference now. We don't need to solve every problem today; we just need everyone and every business to become a little more sustainable today and then a little more tomorrow, which will ultimately add up to a lot more in the future.

It's not possible to suddenly become sustainable but what we can do is work out how we can be more sustainable than we are today. If it is wired into our DNA and constantly in our thoughts and conversations, words and actions will follow. For example, what do we as designers prioritise when we partner with vendors? If we let suppliers know that sustainability is a high priority for us then our buying power can motivate them to make good choices – perhaps shifting how they spend their research dollars.

Our industry is doing some amazing things on sustainability. In our last town hall meeting, there was a 30-minute session by our environmental group telling us about all of the sustainability initiatives they were involved in. I was so proud to hear all about it and it made me think that we need to share what the interiors team is doing with other brands and industry groups so that together, we can start to build up a massive repository of best practices that we can all follow.

From humble beginnings in countless little silos, we're gathering momentum. There are so many things that individual brands are doing today that perhaps other brands haven't considered. If we could somehow collect and curate that knowledge and share it freely, we'd be taking a giant step forward. Openly sharing ideas is an easy next step. Then, if we can get a really big group together that's well-organised and supported across brands with association and legislative support, we have the potential to do something massive. And that's just in our interiors sector. What if every other passenger shipping department had the same trigger and then we all grouped together? That's how you make really big change.

Now is the time for groups to get together and start cracking this code – I wouldn't feel so passionately about it if we were far enough ahead right now. When any cruise or ferry company works through a retrofit project, it's easy to see opportunities for improvement. Finding workable solutions is much more challenging, especially when changing out spaces and trying to decide what can be done with usable furniture that is being replaced. I'm motivated to find solutions and yet over the last nine years that I've been in this new role, I would say that I've only been able to recycle or donate maybe 5 per cent of what might be possible. And this isn't a problem unique to us, every brand has the same challenges. There's such a great opportunity for us to recycle and reuse so many products but nobody has really found a way to do it at a scale that's really making a difference – yet.

We now need to have conversations that make us, other designers, shipyards and suppliers question their responsibilities. And we have to take those conversations to governments, industry associations and other stakeholders that can legislate change. Getting those stakeholders to cooperate to find solutions is going to take a lot of work. These are industry-wide problems and they are not small.

INTRODUCTION

There needs to be some leverage with government regulations to enable us to offload material and upcycle it. Right now, most regulations require us to offload furniture and ensure it can't be stolen or end up in a restaurant or someone's home – which means we must be sure it's broken down as garbage. The current situation is heartbreaking and there must be a better way.

We've found ways to do little things in the past and we will continue to search for new opportunities, but we need a big solution and this depends on persuading the decision makers to understand our problems and be engaged in helping us in this regard. This has been difficult to do because there hasn't been a centralised organisation that is focused on setting industry-wide sustainable interiors best practices and that works towards solving our biggest challenges.

As they return to business following the Covid-19 pandemic, brands are now more eager to retain perfectly good material that might have previously been discarded from their ships. We are more motivated to avoid spending cash on things if we can – and suppliers are similarly motivated. Some are now talking about finding temporary storage at the yard so they can take back their worn materials and ship them back to their factories for repair, reuse or recycling. But they need help to set up the logistical framework, with whatever legislative support it needs.

There are numerous supplier-motivated initiatives underway and conversations are happening on a small scale. But we need to inspire more people to have these conversations and solve the problems that are preventing us from achieving really positive results for the environment.

Everyone applauds what IMO does to protect lives and prevent pollution but it too can have a role in supporting our efforts to build more sustainable maritime interiors. If we can find a way to have dialogue with IMO about the unique circumstances of passenger ship interiors, the organisation will very likely have some important guidance about how we can find an easier path to both big and small sustainability wins.

The built environment on land is supported by international building schemes like US Green Building Council, BREEAM and others. The cruise industry doesn't have a consistent, standardised best practice framework to build sustainable ships and IMO would be an important partner in setting one up. Likewise, the Cruise Lines International Association (CLIA) has an important role to play as a cruise industry body as does Interferry for the ferry sector.

We're emerging from the pandemic with so much more in common with land-based and aviation design. Residential, commercial, hospitality and healthcare design are all merging now and we're sharing principles and ideas, resources and materials, and much more. Good design is good design, wherever it is found. And good sustainable design is the same on land, at sea or in the air.

The reality is that industry decisions, not just in shipping, are driven by regulation and money (cost or revenue). There are very few people now that would disagree with our efforts to become more sustainable, but a big response will only come if it's supported by regulation and money.

Shipyards are starting to adapt quickly. We're bringing multibillion-dollars worth of business into yards and if sustainability is important to our passengers, it is to us and so it will be for shipyards too. We are also seeing a supplier community that's motivated to start doing things and we see little pockets of action which are going to continue growing, particularly as companies start specifying those sustainable suppliers to reward their efforts.

One of the big priorities for the brands is to get interior designers and specifiers together on a regular basis. We need to find and adopt a consistent voice and use it to communicate with our leadership and to the entire community. Innovation starts with an idea but it doesn't go anywhere if it doesn't inspire other people to start working on it too.

We are at the beginning of a journey and now groups are forming, initiatives are underway and we're talking. But actually, the best way for all of us to come together is under the umbrella of an organisation that can turn talk into action. A sustainable design group charged with putting together a series of recommendations for the industry to adopt together would be more impactful and more useful than anything we can achieve individually today. I'd want to be in that group, with other brands, designers, shipyards, classification societies and policymakers.

Billions of dollars are spent by cruise lines on materials, carpet, furniture, laminates, plastics and all of the other things that are the responsibility of the interior team. I think we could easily make a business case to warrant the formation of a coalition to advance sustainability topics for this side of the business. We need to engage with other departments in the business too so that we can see what entertainment, revenue management, food and beverage, shore excursion and other teams are doing. There will be great ideas within these teams that we can adopt too.

For now, let's keep talking about sustainability, keep doing it and keep encouraging others to do it. And I think the greatest response that you'll get will be from suppliers when they see sales of their most sustainable products grow and grow. Of the last dozen suppliers that I've met in person, nine have shown me a sustainable product – I'm sure that's because they've heard me speak at a conference or seen one of my posts on social media. If every supplier showed every designer their most sustainable products it would transform the sustainability of the ships that we build.

The industry is working hard on major sustainability gains like clean fuels and zero emissions. If we take inspiration from these initiatives, there are many little things that we could do in interiors that would add up to a big thing too. It would be a very worthwhile effort. We can get there by working together to deliver a new framework that will enable the significant changes we need going forward.

CONTRIBUTORS

We are sincerely grateful for the enthusiastic support for this report from so many passionate and knowledgeable individuals who are eager to contribute to the improved sustainability performance of maritime interiors. Thank you all.

Adriana Rivas	Catarina Fant	Hanna Långström	Kirsi Orava	Robert Walton
Adrienne D'Annunzio	Catherine Dick	Hanny Wentink	Krystian Kolakowski	Roger Frizzell
Alan McVitty	Chloe St George	Hans Lagerweij	Laurel Christensen	Sara Ferguson-Brown
Alan Stewart	Chris Colvin	Harald Schnepfleithner	Lauren Sullivan	Sarah Scoltock
Alberto Aliberti	Christian Schönrock	Harrison Liu	Linden Coppell	Shorlagh McConville
Alessia Genova	Christina Budd	Hege Sævik Rabben	Lisa McCabe	Simon Dawkins
Alexa Paoletta	Christof Ehrenfeuchter	Helen Blantz	Lisa Olufson Klæsøe	Stephen Donnelly
Alexandra Synefia	Christopher Stopes	Helena Sawelin	Lone Difter	Stephen Fryers
Alison Clixby	Constantine Venetopoulos	Holly Hallam	Luigi Portelli	Steve Born
Anja Ringel	Courtney Smaha	Iain Burns	Maciej Zemfler	Tamara Helt
Andrea Bartoli	Dan Bridgett	Ingeborg Wegge Amtedal	Maddalena Gamna	Terry McGillicuddy
Andrea Zito	Daniel Beals	Isadora Cordazzo	Marco Castagnoli	Thomas Westergaard
Andreas Ullrich	Daniel Schäfer	Ivana Otero	Maria Kafel-Bentkowska	Timothy O'Brien
Andy Smith	Daniela Herget	Jaakko Mäkikalli	Mario Bounas	Toby Walters
Angus Morton	Danielle Smith	Jacco van Overbeek	Marigold Norman	Tom Sadan
Anita Tønnessen	David Mahood	Jack Xiong	Mark Henderson	Torill Myren
Anja Ringel	David McCarthy	Jamie Douglas	Martin Townsend	Vesa Marttinen
Ann Bada-Crema	Davide Roller	Jason Clark	Mathieu Petiteau	Vito Arh
Anna Koutsoukosta	Deborah Marshall	Jean-Francois Aumont	Matthew Easton	Vittorio Garroni
Anna Lüftner	Diana Galimberti	Jeffery Brault	Max Tan	Viv Lebbon
Anne Kofoed Vilsøe	Dion Bosch	Jeremy Spear	Michele Andjel	Wassim Daoud
Anne Mari Gullikstad	Dirk Spoor	Jesse Aalto	Michelle George	Yasamin Nikoosimaitak
Annie Knight	Engel-Jan De Boer	Jessica Smith	Mike Corrigan	Zoe Merry
Antara Phookan	Erik Elvejord	Jimmy Ahlgren	Mogens Kjærgaard	
Aras Karul	Erik Lewenhaupt	Joanna Knight	My Nguyen	
Arturo Escarfi	Espen Sandvik	Joe Conde	Naomi Harper	
Barbara Bressemer	Fabianna Alvarez	Johan Nordberg	Nichola Absalom	
Barbara Wiethoff	Fiona Nevin	John Gunner	Nick Farrell	
Bartosz Kisiel	Francesca Bucci	Jonathan Dougherty	Nicoletta Laudisio Di Bonito	
Bente Medelbye Hansen	Francesca Henley	Jukka-Pekka Tuominen	Niels-Erik Lund	
Bert van Grieken	Francesca Panatta	Juliana Ruiz	Nina Herrmann	
Beverley Petzing	Francesco Contini	Julie Giraud	Olivia Bargman	
Bob McGowan	Francesco Galli Zugaro	Julie Higgins	Paul Ellis	
Boris Ruskovsky	Francisco Dousdebes	Kai Bunge	Peter Joehnk	
Bree Louie	Frosso Zaroulea	Kamile` Balnasovie`	Peter Ståhlberg	
Brent Van Campenhout	Gary Anslow	Karen Argue	Petra Krücken	
Brian Badura	George Koumpenas	Karen Lauvålien	Petra Ryberg	
Bryony Gammon	Giacomo Mortola	Karine Bouttier	Petu Kummala	
Callie Tedder-Hares	Gijs Streppel	Kathryn Scollie	Pilar Boix Escolies	
Camilla Caroline Horn	Greg Walton	Kelly Mooney	Ralf Claussen	
Carine Equeter	Guy Genney	Kent Johansson	Robert van Tol	

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Sustainability through partnerships and collaboration



Helen Blantz, Conference Director,
Sustainable Design Summit & Cruise Ship Interiors Expo

The business case for sustainability must include the purchasing power of the passenger. Multi-generational cruises and cruises which are designed for next-generation guests ignore the heightened sustainability awareness of their younger customers at their peril. Customers want to know that their holiday isn't going to cost the earth and are broadly open to paying a premium for an authentically sustainable cruise experience. By authentic, think vessel, interiors, embodied and operational carbon, and any operational aspects of the guest experience, like waste and recycling.

We don't yet have a mandated system for ensuring maximum environmental gains from interior design projects, which is something our industry needs. There are however legislative developments for larger corporations in both the United States and the European Union around the reporting of Corporate Social Responsibility risks for investors, indicating a direction of travel towards transparency and a level playing field. Both the Corporate Sustainability Reporting Directive and the U.S. Securities and Exchange Commission require businesses to have sight of their entire supply chain.

We are all ultimately connected by one planet. In design terms, project teams are connected from the initial design stage right through to the onsite implementation team, with associated supply chain, logistics and transportation. Designers, manufacturers, outfitters, yards and owners are all partners with influence. And it's in partnership where the opportunities for sustainability gains lie. It's worth noting that conversely, failings in partnerships are often the cause of negative environmental impacts. For instance, delays in delivery can mean last-minute air freight for inventory.

Every partner in the connected project community can make a meaningful impact. Sustainability partners work consistently towards sustainable outcomes in all aspects of a project. They make sustainable choices through knowledge sharing, communication and collaboration. They have an understanding of which materials, processes and project practices make for intrinsically green outcomes and are constantly educating themselves and their partners on how they evaluate their options. Achieving environmental gains through quality design isn't the hard feat of the eco-warrior, nor should designers allow overwhelm to inhibit their environmental efforts. Education, collective learning and collaboration of the design community will instigate the biggest sustainability wins.

About the Sustainable Design Summit

This is a highly interactive event for designers across cruise interiors, aircraft cabin interiors and hotel interiors, alongside their suppliers. The aims of the event are to share knowledge and experiences across sectors, and to make sustainable choices easier for interior designers. Features include networking opportunities, a product showcase, and a 'Chatham House Rules' session in the afternoon for the community to apply what they are learning to their own niche, whether that be cruise, aircraft, hotel brands or supply chain. A roundup session shares priorities, key challenges and next steps. Join us – 29 November 2022, The Brewery, London.

Green is a trend – sustainability is a mindset



Lone Ditmer, Marketing Manager and Sustainable Business Development,
Dansk Wilton

Sustainability is a core part of the business

There are two reasons why sustainability is at the very top of the agenda at Dansk Wilton: purpose and future-proofing our business. We want to be part of the solution and not part of the problem. Our operations cannot be justified if we do not meet the demands of future generations. Therefore, it is a common task to create a more sustainable cruise industry.

At Dansk Wilton, sustainability is integrated into our core business and we take a holistic approach that embraces a wide variety of aspects, from material health to carbon management and social fairness. This is a complex but necessary practice, otherwise we risk creating even greater problems.

Made for tomorrow – Cradle to Cradle and circular economy

Our tool for sustainable business development is Cradle to Cradle; a philosophy and an ambitious certification which drives continuous development. Sustainability is a journey, not a destination. And ambition is an important driver, as is the need for action.

Our ambition is to create a circular business model with a focus on material health and to keep the materials in use for as long as possible, both by virtue of durable solutions and opportunities for recycling after use. We are working specifically on various options to ensure an end-of-life solution for our carpets in the form of exciting new materials. We feel like modern-day explorers on a quest into uncharted land – we know where we would like the journey to end but not necessarily the way to get there.

Aesthetic design, high quality and sustainability

Interior designers and shipowners choose our carpet solutions because aesthetic design, high quality and sustainability are part of the same solution. We believe that all innovations must contribute to a more sustainable development and we need to be bold, experiment and learn while doing.

To succeed with a sustainable transformation within cruise ship interiors, all stakeholders in the industry need to join forces as solutions must be found in cooperation across the value chain.

Sustainability guides every decision



Barbara Bressemer, Partner and Managing Director,
DFI Dauerflora DFI International GmbH

At Dauerflora we take a comprehensive approach to sustainability, considering different aspects. Our guideline is the comprehensive United Nations definition, which includes aspects like health, poverty prevention, gender equality, clean energy, fair labour practices and the reduction of inequality as sustainability goals.

We take every chance to add more sustainability to all processes. Every single action may be small, but it contributes to the big picture. We use motion detectors for electric light and water so there is no waste. We use refillable writing instruments, recycling products for writing paper and packaging. Cleaning products are environmentally friendly. We practice strict waste separation and order food for our canteen from a supplier that uses compostable packaging. We buy secondhand furniture whenever possible. We have ordered electric cars, use green electricity and are considering options such as the use of recycled water and solar energy.

When fulfilling our customers' orders, we encourage them to choose environmentally friendly solutions by offering sustainable material and explaining the advantages. We prefer local suppliers and products manufactured in an eco-friendly way and try to bundle orders and deliveries wherever possible. Dauerflora has two sites, one in Hamburg, Germany, and one in Florida, USA. This ensures short transportation and travel distances.

Quite a few of our employees are mothers and most of them work part-time and from home whenever possible. Our management team consists of two men and six women. Of course, the women and men working in our company get equal pay for equal work. We support training projects to enable our employees to expand their professional knowledge.

The different nationalities of the people working for Dauerflora Germany and Dauerflora USA guarantee a lively exchange of views and enrich the creativity of Dauerflora. For us, this is one way of supporting the idea of equal rights.

We pursue high occupational safety and health standards and examine our various working areas regularly so we can improve working conditions continuously. Safety shoes, back-friendly office chairs and regular training courses are a common standard for us.

It is not always possible to put everything into practice the way we imagine right away. But working together and staying attentive always takes us further in our efforts to enforce sustainability in everything we do.

A truly natural circular economy



Elmo Leather

Leather is one of the most sustainable and oldest materials known to man. Leather itself is a by-product made by nature and eventually, after a long and productive life, it goes back to nature.

Rawhides: At Elmo the rawhides are 100 per cent locally sourced from Scandinavia which has a low carbon footprint in terms of transportation. The animals enjoy a life of the very best animal welfare and the hides are traceable back to eco farms.

Upcycling waste products: Elmo generates zero waste from production. Instead, our waste products are sold as fertiliser and gelatin or turned into energy. Paper, plastic, metal and cardboard are recycled.

Energy: By using 100 per cent renewable energy and biofuel-based steam for heating, Elmo has become fully carbon dioxide (CO₂) neutral on energy.

Water: The production process 'borrows' water from the nearby river. Water usage is low at 16.5m³/ton of rawhide, less than half of what is used by conventional tanneries. At the company's own cleaning facility, levels of nitrogen, chrome, phosphorus, chemical oxygen demand (COD) and biochemical oxygen demand (BOD) are reduced before the water is discharged back into the river. Elmo's wastewater becomes drinking water.

Air emissions: Many years ago, the company moved from solvent-based to water-based finishing. This enabled the reduction of air emissions to a fraction of European limits. Elmo has a particularly low CO₂ footprint due to locally supplied rawhides.

Long life: Leather is a naturally long-life material compared to other surface materials and it is highly durable, aging gracefully and developing a rich patina. With durability comes an extended life, reduced need for replacement and cost efficiency.

Biodegradable: Very often leather furniture is passed on to the next generations. Unlike many other materials, it is also fully biodegradable.

Responding to the three pillars of sustainability



Mark Henderson, Chief Executive, Magicman

According to contemporary wisdom, sustainability comprises three pillars: social, economic and environmental. Magicman interprets sustainability in the same way and we offer the industry a compelling economic and environmental service. We focus on sustainable production, reducing waste and decreasing costs of keeping ship interiors in good condition.

Damaged surfaces are repaired in the most environmentally friendly way – removing greenhouse-gas (GHG) emissions and energy consumption in the manufacturing, assembly, transportation and distribution of replacement products.

Although there has been a growing push towards sustainable sourcing, in many cases it is just not practical, often because such methods can be more expensive and/or items or surfaces have reduced durability or functionality. Most surfaces and products require composite materials or parts that may also require further composite parts or materials. These may be manufactured anywhere across the globe and most often, because of price, in areas where environmental impact and GHG emissions are not a top priority. This means that products which at first may appear either cost effective or environmentally friendly can be significantly less so when the manufacturing transportation and distribution process is examined. Labour must also be considered as cheap labour often conflicts with the aims of the social pillar.

Magicman's services also enable clients to reduce waste and our trained staff are equipped to travel worldwide to repair a wide variety of damage and restore surfaces that would otherwise need to be replaced at greater cost, leading to lengthier projects and significant disruption. With an exemplary reputation for delivering beyond expectation, Magicman can assist all departments in better utilising their budgets, while maintaining high design standards and being kinder to the planet.

Periodic maintenance and regular repairs improve the overall economic and environmental cost and long-term viability or lifespan of an item and is the least disruptive method of upkeep. Economic and environment costs associated with sustainable maintenance and repair are limited to manpower, travel to the vessel, spares and equipment, shipping costs and material costs. Magicman services require lower personnel, equipment and material costs, all achieved in less time and with minimum disruption. A single product or surface can be repaired frequently to enhance and prolong its original useful lifespan by many years.

Product quality is a cornerstone of sustainability



Karen Lauvålien, Sales and Marketing Director, Gudbrandsdalens Uldvarefabrik AS

At Gudbrandsdalens Uldvarefabrik, we design and produce the highest quality of crafted IMO-certified wool textiles. We've been perfecting our trade for well over a century. Quality is reflected in our craftsmanship and our responsible production processes. Our vertically integrated mill gives us total control of the entire production process. Through sustainable production and product longevity, we can demonstrate that our products stand the test of time and value. But working together and staying attentive always takes us further in our efforts to enforce sustainability in everything we do.

Specifying for the environment



Alan McVitty, Founder and CEO, M Studio

It is essential for us at M Studio to ensure that the impact of the work we do and the selections that we make are not harmful to the environment. We believe it is ethical to select products and materials that support environmental sustainability.

By specifying sustainable products, we can attract customers, and in turn end users, who are invested in the goals of sustainability and share these values. There are many short- and long-term benefits to sustainability and we all have a part to play in making the right decisions to ensure a better future for everyone.

The sustainable value of fabric coatings



Carine Equeter, Morbern

With EvoHide Mistral we have achieved 75 per cent sustainable content, which is already a huge step forward in comparison to other coated fabrics. But we will continue to evaluate innovative raw materials to increase this level if possible.

Coated fabrics are extremely durable (20 years+) and following clean and care instructions will extend the product's life further. EvoHide Mistral is part of the MorGreen collection which also includes Eden FRee and Geo FRee – both Oeko-Tex approved, offering a “greener” alternative to other artificial leathers by reducing the level of chemical additives.

A family business with a sustainable heritage



Chris Colvin, Marine Sales Manager, Ulster Carpets

We can create carpets in any colour imaginable but each one is also green! From the natural wool used in every carpet to the 100 per cent renewable electricity used in our manufacturing, we have demonstrated our commitment to protecting the planet.

We can do this because we control every aspect of the process. From the spinning and dyeing of the yarn to the design and manufacture of our luxury carpets, everything is carried out by us. This level of control allows us to manufacture in an ethical manner that reduces the impact on our planet. This is enhanced by a quality service, high levels of expertise and an innovative approach that results in luxury, IMO-certified carpets.

The sustainability agenda

The need for businesses to shoulder environmental, social and governance (ESG) responsibilities has never been greater. Since the late 1980s, the human footprint has exceeded Earth's biocapacity, causing an ecological 'overshoot'! In 2021, Earth Overshoot Day fell on 29 July – the date by which humans had used up the Earth's biocapacity for that year.¹

Published in 1987, The Brundtland Report issued a call to protect the environment, situating development as 'what we all do' in any given environment. The report criticised the 'unsustainable' development paths of the industrialised nations for their effect on generations to come, stating: "Sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs."²

Fast forward to 2022 and the issues identified by the report are as relevant and urgent as ever. According to the April 2022 report by the Intergovernmental Panel on Climate Change (IPCC), "Human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability." The report warned that the rise in weather and climate extremes has already led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt.³

Countries, sectors and businesses need to work together to address the wide range of sustainability threats facing the world, including climate change, biodiversity loss and pollution. While industry looks to the regulatory framework to address sector-specific impacts, basic compliance with regulations is no longer enough, especially in the context of fresh challenges arising from the rise of digitalisation, nanotechnology and artificial intelligence (AI). The need for rapid uptake of alternative fuels and renewables, driven by geodemographic crises, adds to the existing sustainability pressures companies face.

The United Nations Foundation warns that rebounding carbon emissions, extreme weather events and biodiversity loss are among the biggest threats facing countries in 2022.⁴ These impacts are compounded by the added stress on all earth's systems caused by the Covid-19 pandemic and its environmental, social and governmental consequences.

¹ Source: www.overshootday.org/about-earth-overshoot-day

² Source: Gro Harlem Brundtland, 1987, The Brundtland Report

³ Source: Intergovernmental Panel on Climate Change, [Climate Change 2022](#)

⁴ Source: United Nations Foundation, [5 Global Issues to Watch](#)

THE SUSTAINABILITY AGENDA

The 17 Sustainable Development Goals (SDGs) were adopted by all UN Member States in 2015, as part of the 2030 Agenda for Sustainable Development which set out a 15-year plan to achieve the Goals.

Business has a crucial role to play in ensuring the achievement of the SDGs. Unlike their predecessor, the Millennium Development Goals, the SDGs explicitly call on all businesses to apply their creativity and innovation to solve sustainable development challenges. The SDGs have been agreed by all governments, yet their success relies heavily on action and collaboration by all actors.¹

Sustainable Development Goals



Source: United Nations, [The Sustainable Development Agenda](#)

¹ Source: Sustainable Development Solutions Network, [SDG Compass Guide](#)

The United Nations Global Compact enshrines 10 principles, three of which apply specifically to the environment. These are that business should: support a precautionary approach to environmental challenges; undertake initiatives to promote greater environmental responsibility; and encourage the development and diffusion of environmentally friendly technologies.¹

Even before the Covid-19 pandemic, countries and organisations were grappling with the climate emergency and the countdown to the 2030 deadline for achievement of the SDGs. For the global recovery to be sustainable, there needs to be a focus on developing resilience against future shocks, not least those that the shift to green and renewable technologies will bring.

As part of the travel and tourism sector, passenger shipping companies have a unique opportunity to participate in cross-cutting sustainability initiatives, thanks to diverse global supply chain connections, which the World Tourism Organization has referred to as ‘positive multiplier effects’. Tourism is entering a period of unprecedented interest in sustainability among its customers. The World Travel & Tourism Council’s Trending in Travel report notes that: “While sustainability has been a priority for the Travel & Tourism sector for some time, it became even more prominent through the pandemic. Indeed, consumers pay closer attention to their human impact on the environment and seek more sustainable options in how they live and travel. Increasingly, the private sector is offering sustainable alternatives, and the public sector is more eager to finance sustainable tourism and development.”²

Having a sustainability policy is a good first step but the Travel Foundation warns that sustainability efforts cannot be effective in the long-term if they are not genuinely rooted in the company’s philosophy. Its Best Practice Guide says: “Management should not only strive to set an example but set up the structures and procedures to facilitate a company culture committed to sustainability. Every employee should be aware of the underlying ‘why’ and want to be a part of it.”³

The passenger shipping sector has unique opportunities to take the lead in terms of sustainable ship design and operations that achieve SDG targets and go above and beyond current and imminent IMO requirements. Newbuilds in particular offer the chance for designers to leverage new materials and technologies in order to clean up aspects as diverse as fuel choice and catering equipment, or lighting and waste impacts. As the world grapples with the challenges of climate change, there has never been a better time for cruise and ferry companies to commit to leading the necessary changes for the sector.

There is evidence that cruise and ferry companies are increasingly considering the impacts of their design decisions when planning newbuilds or refurbishments, in particular regarding how they manage the materials and fittings they choose in ways that meet the needs of the present without compromising the ability of future generations to meet their own needs (one of the key definitions of sustainable development).

¹ Source: United Nations Global Compact, [The Ten Principles](#)

² Source: World Travel & Tourism Council, [Trending in Travel](#)

³ Source: The Travel Foundation, [Best Practice Guide](#)

THE SUSTAINABILITY AGENDA

What is a Green Economy?

According to Germany's Federal Environment Ministry and Federal Environment Agency, "The Green Economy characterises an innovation-oriented economy in harmony with nature and the environment, which:

- avoids damaging emissions and the input of pollutants in all spheres of the environment;
- is based on the further development of the circular economy and closes regional materials cycles as much as possible;
- decreases the net use of non-renewable resources, especially by a more efficient utilisation of energy, raw materials and other natural resources and the substitution of non-renewable resources with sustainably produced, renewable resources;
- attains an energy supply exclusively based on renewable energy sources in the long-term; and
- maintains, develops and restores biological diversity and ecosystems and their performance.

Source: Umwelt Bundesamt, [Towards a Green Economy](#)

Naval architects and designers are already helping shipping companies mitigate and adapt to the sustainability challenges they face, by developing sustainable and climate-resilient designs that prioritise energy efficiency, supply chain transparency, waste reduction, and other sustainability strategies that conserve resources and reduce carbon emissions.

The global impacts of the passenger shipping sector require attention to all of the SDGs at various points along the value chain. The intention of making ship interiors more sustainable is no exception in this regard. For ship owners and operators, architects and designers, several of the SDGs offer targets that are relevant to their business. These include SDG 8 (Decent work and economic growth), SDG 12 (Responsible consumption and production), SDG 13 (Climate action), SDG 14 (Life below water – conserving marine ecosystems), SDG 9 (industry, innovation & infrastructure) and SDG 17 (partnerships for the goals).

Landmark international agreements driving the sustainability agenda

Climate change and protection agreements	<ul style="list-style-type: none">• 1979 Geneva Convention on Long-range Transboundary Air Pollution• Vienna Convention for the Protection of the Ozone Layer (1985)• Montreal Protocol on Substances that Deplete the Ozone Layer (1987)• United Nations Framework Convention on Climate Change (1992)• Kyoto Protocol (1997)• Paris Agreement (2016)
Environmental impact assessment agreements	<ul style="list-style-type: none">• Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention, 1991)• UNECE Protocol on Strategic Environmental Assessment (Protocol on SEA, 2003)
Waste management agreements	<ul style="list-style-type: none">• Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)• Basel Protocol on Liability and Compensation (1999)• Decision of the OECD Council concerning the Control of Transfrontier Movements of Wastes Destined for Recovery Operations (1992)• Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (2009)

Corporate social responsibility

Corporate social responsibility (CSR) programmes and sustainability reporting initiatives provide ways for businesses to set green targets and measure progress towards them. Benchmarking is another way in which organisations can compare their sustainability achievements with those of their peers. The World Benchmarking Alliance has analysed which industries could make the most substantial contributions to achieving each of the SDGs and their corresponding targets. The organisation explains: “While every industry can be linked to each of the 17 SDGs, this map focuses on where a given industry can have the greatest impact, both positive and negative.”¹

Sustainability reporting is enabling companies to gain unprecedented insights into the impacts of the full range of their activities, and to share this information with their stakeholders. As the provider of the world’s most widely used sustainability disclosure standards, the Global Reporting Initiative (GRI) envisions a sustainable future enabled by transparency and open dialogue about impacts.²

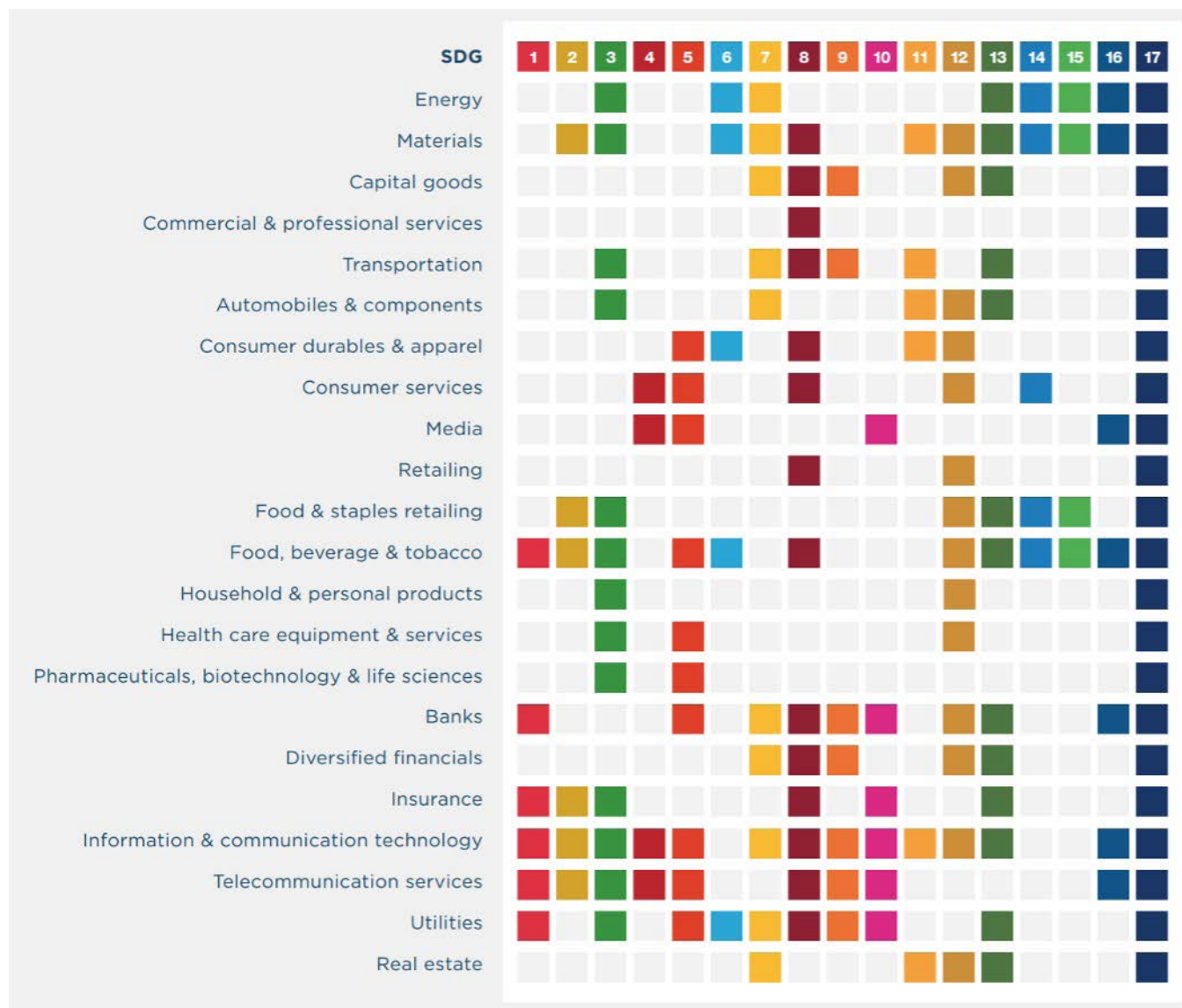
International standards are crucial in enabling businesses to track their progress towards sustainability. As can be seen elsewhere in this report, a growing number of ship operators are certified for specific aspects of their performance by the International Organization for Standardization (ISO) according to their standards that support the climate agenda.

¹ Source: World Benchmarking Alliance, [Measuring What Matters Most](#)

² Source: Global Reporting Initiative, [Our How, Why and What](#)

THE SUSTAINABILITY AGENDA

WBA SDG Industry Intersections Map



Source: World Benchmarking Alliance, [Measuring What Matters Most](#)

Digital solutions are becoming popular for manufacturers in particular, with product life-cycle management (PLM) platforms helping businesses tackle product sustainability thanks to the enhanced visibility such platforms bring to value chains.

Regionally, the European Commission has adopted a proposal for a Directive on Corporate Sustainability Due Diligence, which aims to foster sustainable and responsible corporate behaviour throughout global value chains.

Is carbon offsetting a cop-out?

Carbon offsetting has become a popular way for organisations to ‘balance the books’ on their climate impacts. However, Breana Wheeler, Director of US Operations for the Building Research Establishment (BRE), points out: “If the first step for organisations is becoming carbon neutral, transforming our over reliance on offsetting carbon is also essential. The Net Zero Climate programme found that of the 4,000 major private entities globally that have made commitments, only 53 will be able to achieve net zero without the use of carbon offsets – that’s 1.33 per cent of all total commitments. Realistically, there aren’t enough carbon offsets to go around.”

Source: [Why we must act now on net zero](#)

Science-based targets can help organisations ensure that they are working with accurate information in their sustainability activities. The Science-based Targets Initiative says: “We need a race to the top, led by pioneering companies. This will empower peers, suppliers and customers to follow suit and drive governments to take bolder action.”¹

The Textile Exchange emphasises that the Science Based Targets Network (SBTN) provides a framework of action and guidance for companies across all sectors “to set science-based targets (SBTs) for nature and stay within the planetary boundaries of biodiversity, freshwater, land, and oceans”.²

Maritime industry commitment

IMO is supporting greater use of sustainable technologies in shipping and the theme of its World Maritime Day for 2022 is ‘New technologies for greener shipping’. It says: “The theme provides an opportunity to focus on the importance of a sustainable maritime sector and the need to build back better and greener in a post-pandemic world. IMO actively supports a greener transition of the shipping sector into a sustainable future, and showcases maritime innovation, research and development, and the demonstration and deployment of new technologies.”³

While the primary focus is on GHG emissions from maritime transport, which IMO says account for a modest but rapidly growing source of global GHG emissions, the environmental impacts of shipping extend well beyond the impacts caused by fuel use. Ship design, building and renovation all present challenges to sustainability. To achieve lasting results that enhance shipping’s green credentials, industry bodies must work together on shared goals and challenges.

¹ Source: Science Based Targets, [About us](#)

² Source: Textile Exchange, [Biodiversity Insights Report](#)

³ Source: International Maritime Organization, [World Maritime Day Theme 2022](#)

THE SUSTAINABILITY AGENDA

Waste reduction in the cruise industry

The Cruise Lines International Association (CLIA) says its member cruise lines and shipping industry partners have demonstrated a commitment to the development and implementation of environmentally responsible technologies, policies, and practices. The organisation says: “While cruise ships comprise less than 1 per cent of the global maritime community and the cruise industry has been one of the most acutely impacted industries by the global pandemic, cruise lines remain at the forefront in developing responsible environmental practices and innovative technologies, which benefit the entire shipping industry.”

Environmental officers working on cruise ships have in some cases enabled the repurposing of 100 per cent of all waste generated onboard, by following five key methodologies:

1. Working with suppliers to reduce materials and use more sustainable materials
2. Improving the reusability of materials, such as opting for aluminium or reusable glass bottles over single-use plastics alternatives
3. Donating discarded materials to vulnerable communities throughout the world
4. Maximising recycling onboard by hand-sorting trash and storing the recyclable waste onboard in appropriate facilities until a recycling hub is reached
5. Converting waste into energy through numerous potential avenues, such as repurposing food waste into energy for onboard use and recycling hot water to heat passenger cabins.

Source: CLIA, [Environmental Commitment, Innovation and Results of the Cruise Industry](#)

Classification societies are seizing the opportunities that a move to greener tech brings, with industry body the International Association of Classification Societies (IACS) working with regulators and industry on initiatives to “promote maritime safety, protection of the environment and sustainability, provide practical real-world guidance to regulators and industry, and appropriately address maritime safety and environmental concerns.”¹

¹ Source: International Association of Classification Societies, [IACS Vision and Mission](#)

COMMITMENT

Cruise industry commitment to sustainability

Newbuilds and retrofitting programmes in the cruise sector are enhancing the sustainability of the industry through an impressive array of innovations. These advances are mainly felt below decks and back of house, from cleaner fuels and more efficient propulsion to wastewater treatments and hull modifications. But while the emphasis continues to be in the engine room, meaningful progress is being made elsewhere, including interiors.

According to CLIA, the organisation's member cruise lines and shipping industry partners around the world "have demonstrated a commitment to the development and implementation of environmentally responsible technologies, policies, and practices."¹

CLIA says that, despite comprising less than 1 per cent of the global shipping fleet, the industry has led in developing responsible environmental practices and innovative technologies in its newbuilds. This includes the introduction of LNG-propelled vessels.

Implementation of CLIA's Environmental Policy is a condition of the organisation's membership. CLIA members also often exceed the regulatory structures set by IMO, in particular its International Convention for the Prevention of Pollution from Ships (MARPOL).

The 2021 Environmental Technologies and Practices (ETP) inventory conducted by CLIA covers 242 oceangoing ships representing 96.7 per cent of existing CLIA passenger capacity as well as build specifications for 62 ships currently on order. Two significant trends are for new ships being built to more sustainable specifications and retrofitting of existing ships to replace and improve existing technologies.

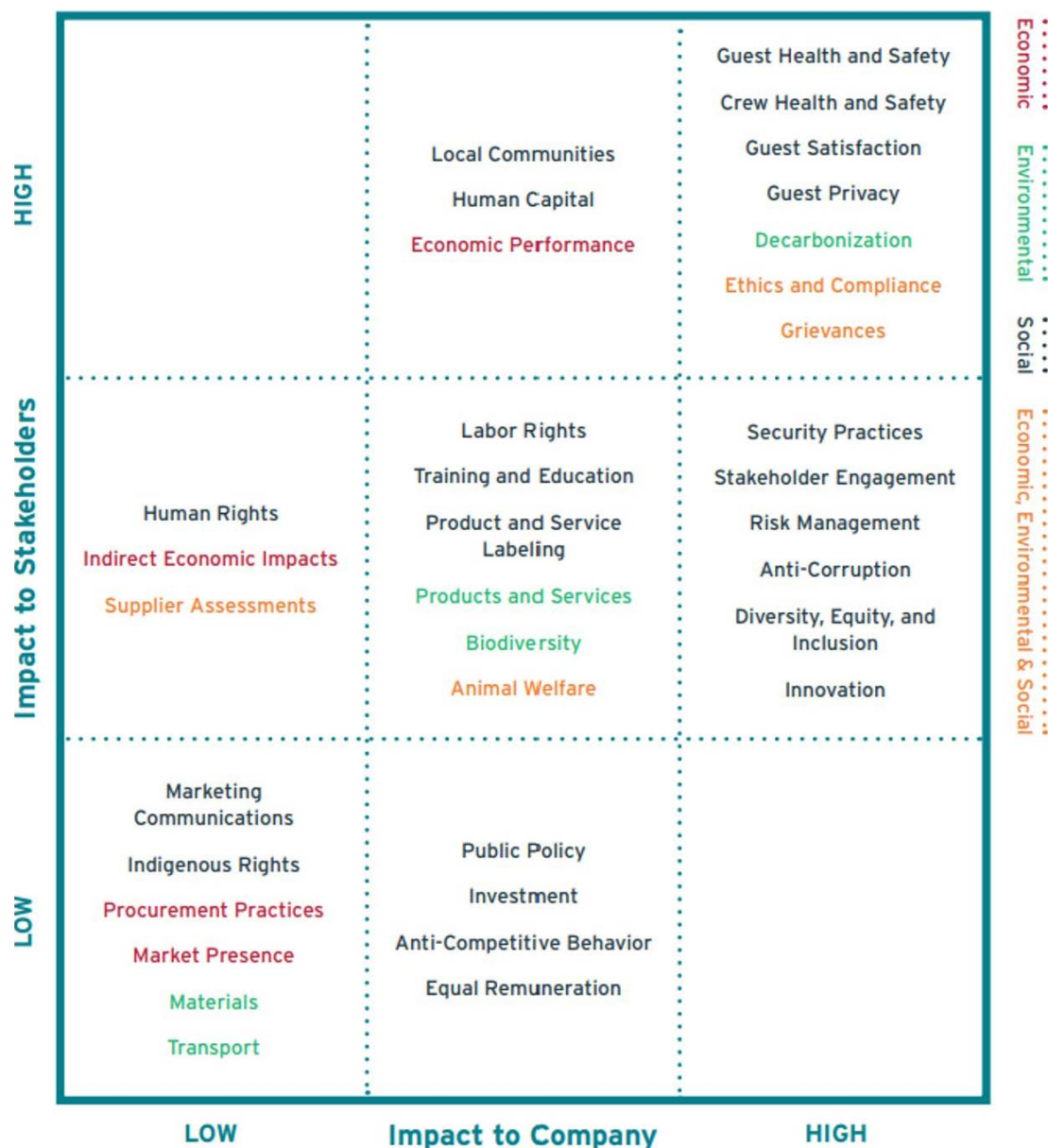
To date, much of the information available from cruise operators regarding their sustainability commitments focuses primarily on the operations side of their business, with the emphasis on CLIA's list of the primary areas for improvements (air emissions, wastewater, recycling, carbon reduction and fuels of the future).²

However, investments in sustainable materials, methods and priorities in these aspects of ship construction often have spillover effects in the interiors and other public-facing side of the ships. At the very least, companies' sustainability statements provide a demonstration of intent in regard to the topic and are a good indication of corporate support for sustainability improvement across their operations, including interiors.

¹ Oxford Economics and CLIA environmental report

² CLIA, environmental technologies table

Carnival Corporation's Materiality Matrix is recalculated every two years to set new priorities



Source: Sustainable from Ship to Shore, 2020

The statements gathered in this report are all taken from the public domain, with 101 of the 127 cruise brands reviewed having made a prominent public commitment to sustainability on their websites and/or contributed to this report. In this regard, it is important to note that the lack of a prominent sustainability commitment statement does not necessarily mean that a cruise operator is not dedicated to the topic. Similarly, if a cruise line has a particularly eloquent statement this does not imply that they are more committed than a company that covers the subject with fewer words or less well constructed prose.

Statements of intent

When it comes to sustainability, it is easy for statements regarding corporate intentions to be so broad as to be effectively meaningless. Who doesn't want to save the planet? However, it has never been more important for cruise operators to articulate how they plan to respond to challenges such as climate change and the urgent need to decarbonise transport. We found a wide range of commitment statements in the public domain from cruise operators both large and small.

Jason Liberty, President and CEO, Royal Caribbean Group says the company's values are "underpinned a conscientious review of our environmental, social, and governance efforts, resulting in a revamped ESG framework that better reflects our innovative and pioneering spirit."

"We are very aware of our responsibilities regarding sustainability and environmental protection"

Karl Pojer, CEO, Hapag-Lloyd Cruises

Pierfrancesco Vago, Executive Chairman, MSC Cruises comments: "I look forward to achieving greater resilience through sustainability. Now, more than ever, we must seek to be a leading force for good in the world." Tom McAlpin, CEO & President, Virgin Voyages, says: "Caring for our environment and the wellbeing of our communities, sailors and crew is just part of who we are. For us, these initiatives are not only responsibilities but business imperatives. We wouldn't know how to do this any other way."

Many cruise lines emphasise the duty of cruise lines to reduce their adverse environmental impacts. Karl Pojer, CEO, Hapag-Lloyd Cruises, states: "We are very aware of our responsibilities regarding sustainability and environmental protection." Hervé Gastine, CEO, Ponant, says: "For more than thirty years, we have taken our guests to the most secret places on the planet, where nature reigns supreme. This choice brings with it responsibilities towards the environment and the indigenous people that we meet."

Innovation and cooperation are also common themes in cruise line sustainability statements. Frank J. Del Rio, President and Chief Executive Officer, Norwegian Cruise Line Holdings, says: "Our mission is to continually improve our sustainability culture through fresh innovation, progressive education and open collaboration." Peter Deer, Managing Director, Fred. Olsen Cruise Lines, notes: "We are firm believers in the power of travel to open minds, build connections and inspire shared humanity. Those three ideas are the pillars of everything we do, including planning our sustainability efforts."

For Daniel Skjeldam, CEO, Hurtigruten, there are three key elements: "We continue to push boundaries when it comes to finding solutions to reduce our emissions and adapting to the rapidly changing world around us."

Hapag-Lloyd Cruises concentrates its efforts on three complementary areas of action



**Reducing consumption
and emissions**



**Respecting people
and nature**



**Considering the
environment together**

Source: [Travel the World. Preserve Nature. 2020](#)

Most of the ‘big ship’ operators can afford to have entire departments dedicated to environmental compliance. Celebrity Cruises says: “We know we have a special obligation to protect our environment. The sustainability of our planet is dependent on clean seas and pure air. It is central to our guests’ vacation experience and is at the core of our commitment to continually improve our environmental stewardship practices.”

Holland America Line notes: “We are adapting to the current economy and will continue to manage our resources carefully while enhancing our product in ways which delight our guests and sustain our business.” Meanwhile, MSC Cruises says: “We continuously push the boundaries of what is technically possible at sea and are actively engaged in the development of next-generation environmental technology.”

Norwegian Cruise Line favours a checklist approach to show how it aims to mitigate environmental impact, its top picks being: “Reducing Environmental Impact, Sailing Safely, Empowering People, Strengthening our Communities and Operating with Integrity and Accountability.”

TUI Cruises states: “As a leading tourism group, we want to continue to use our influence to initiate sustainable change. Of course, this also includes the protection of the environment and the climate. We continue to invest in innovations and technologies that reduce the environmental footprint of travel. Our goal remains to be a pioneer in social and environmental sustainability.”

Exceeding expectations is important for Princess Cruises, which says: “We are committed to environmental practices that set a high standard for excellence and responsibility and help preserve the marine environment. In all cases, we meet environmental requirements and, in many cases, we go beyond what is required by law while we are continuously working to identify ways we can raise the level of our environmental performance.”

P&O Cruises promises: “We are taking action to protect the environment and invest in our communities and people to deliver positive impact – not just for today, but for the long term” while Cunard says: “We are invested in looking after our planet and addressing climate change is one of our top priorities.”

COMMITMENT

Smaller operators, many of whose fleets consist mainly of older ships, face particular challenges in retrofitting and maintaining their fleets to modern standards. Phoenix Reisen says: “The share of cruises in the global CO2 burden is “only” less than 0.02 per cent. However, all shipping companies and of course we are still making great efforts to ensure that this load value drops even further. Because you and we want and need a healthy environment so that cruises continue to be carefree pleasure, as you are used to.”

Hansa Touristik states: “A cruise always means a holiday in nature. That is why... as a growing cruise operator, the topic of sustainability and the environment is an important point that our company faces with responsibility.”

“We will leave behind a footprint we are proud of, contribute to sustainable development and create positive change through our operations”

Daniel Skjeldam, CEO, Hurtigruten

Scottish Hebridean small ship operator The Majestic Line says its philosophy is “to adopt a policy of sustainable tourism for our cruises.”

The fast-growing expedition sector is taking ever-growing numbers of visitors to fragile and remote ecosystems. These companies need to work hard to ensure their impact on these regions is as low as possible. Oceanwide Expeditions remarks: “Foremost among our sustainability goals is actively reducing the impact and emission of our vessels, investing in new technology and continuously improving our existing resources.”

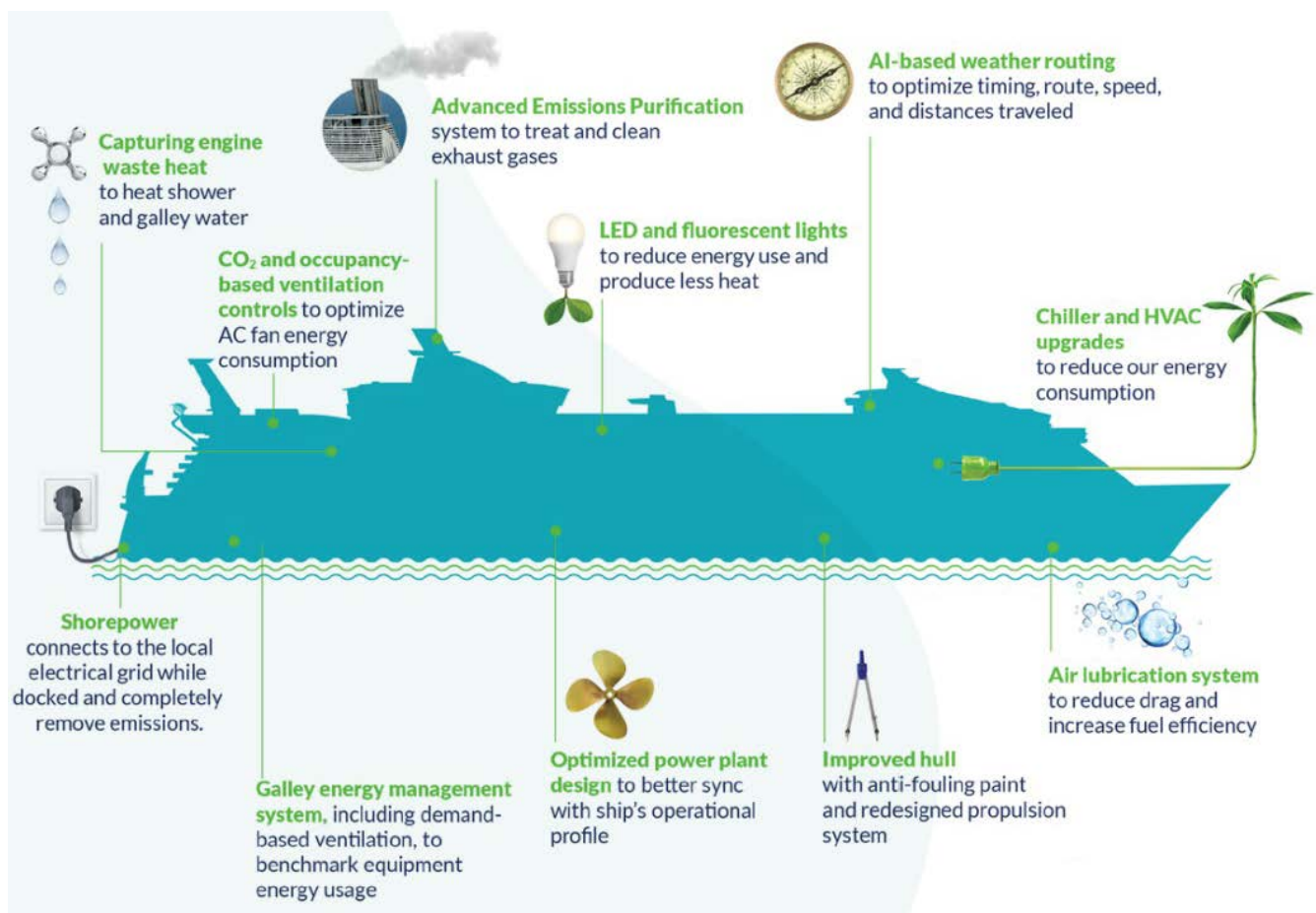
Quark Expeditions says it is “profoundly committed to environmentally responsible tourism. Reducing our footprint and building industry resilience are vital to safeguarding the planet. It’s a no-brainer: all of us must do everything possible to reduce our footprint.” Paul Gaugin Cruises, now part of Ponant, says: “We share the French Polynesians’ deep respect for our vast blue oceans, and our commitment to eco-friendly operations guides our activities both on and off the ship.”

Swan Hellenic says: “Our vessels have been designed and built in accordance with the latest sustainable practices, extending to the design; fuel, engine and onboard products including no single-use plastic and paperless communications. Sustainable materials are also used in fixtures, fittings and for the ship’s technical equipment.”

For Mystic Cruises, “the oceans and atmosphere are a fragile environment that everyone must be committed to preserving, and Mystic Cruises is devoted to operations that minimise our impact on the environment.” Heritage Expeditions states: “Travelling with Heritage Expeditions is to travel responsibly. As biologists and ornithologists, we are intimately aware of the many issues that confront animals and their habitats, the world’s oceans and isolated ethnic groups.”

For small-group expedition cruise company G Adventures, “The foundation of our success is built on one very simple principle: Do the right thing all the time, every time. It’s a pledge to recognise the problems facing the world today and act quickly to meet them. Above all, it’s a commitment to continually challenge ourselves to see the big picture and bring about meaningful and positive change whenever we can.” Meanwhile, UnCruise Adventures says: “One of the key components of our company’s mission statement is to actively promote environmental protection through education, actions, and initiatives that promote responsible travel.”

Illustration of Royal Caribbean Group’s designs for a more efficient future



Source: [2021 Seasustainability](#)

COMMITMENT

Royal Caribbean Group's strategic ESG Plan



Source: [Seasustainability](#), 2021

The luxury cruise lines serve an exacting and well-informed customer base, which demands sustainability as standard. Regent Seven Seas Cruises says: “We remain committed to being a responsible corporate citizen by fostering a culture of awareness and respect for our world’s resources.”

Seabourn comments: “As a leader in the ultra-luxury cruise market, our most important values are our uncompromising commitment to sustainability and the safety of our guests and crew. We maintain the highest standards through ongoing training and adherence to rigorous environmental and safety requirements. We are committed to doing our part to implement best practices and new technologies to reduce our environmental footprint.”

Silversea points to its newbuilds as proof of its commitment to sustainability. “Building on the ongoing sustainability efforts of the Group, Silversea will take delivery of two Evolution-class ships in 2023 and 2024, respectively, pushing boundaries in sustainable cruise travel, with pioneering technology that will reduce the ships’ carbon footprints.”

“For more than thirty years, we have taken our guests to the most secret places on the planet, where nature reigns supreme. This choice brings with it responsibilities towards the environment and the indigenous people that we meet”

Hervé Gastine, CEO, Ponant

Single-ship ultra-luxury operator The World says: “The commitment to environmental responsibility towards the sea, air, and land has always been a vital part of The World. Since the ship was designed and built, sustainability has been a priority in every decision.”

Explora Journeys says it “holds the seas and oceans that sustain our planet in the very highest regard.”

Wind-powered cruise ships and yachts have an advantage when it comes to low-carbon cruising. Sea Cloud Cruises says: “For more than 40 years, Sea Cloud Cruises has followed the concept of gentle tourism. Instead of fighting it with engine power, we use the wind – and prove that unique experiences and a good environmental balance are not mutually exclusive.”

Windstar Cruises says it is “proud to be an affiliate of Xanterra Travel Collection, one of the world’s most environmentally responsible travel and hospitality companies...’With a Softer Footprint’ focuses on how we reduce our environmental impact through our sustainable business practices.”

COMMITMENT

Tradewind Voyages remarks: “We take our environmental responsibilities very seriously and are committed to reducing our environmental impact.”

Norwegian Yacht Voyages states: “We have an extreme focus and approach to all aspects of sustainability, from building to operation, from shore to sea. With our design and engineering team, we love to constantly think on new guests’ experiences and new eco-friendly solutions, never seen before.” Yacht cruise specialist Variety Cruises says: “Our mission is to provide a sustainable sea-going platform for engaging our guests in meaningful communication and exchange of values with the local communities we visit.” Elixir Boutique Cruises says it is proud that “at the same time as offering our guests an intimate and beautiful experience at sea, we also offer them a choice that is gentler on the environment. As a company, we make every effort to keep our environmental impact to the bare minimum.”

By their nature, river cruise itineraries allow guests to get up close and personal with a huge number of destinations. Ama Waterways says: “We are dedicated to making a positive impact on the world through our commitments to celebrating diversity, giving back to local communities and reducing our impact on the environment.” Uniworld lists its priorities as “reduce, reuse, sustain. Reducing the environmental impact of our business isn’t just a ‘nice-to-have’ for us, it’s at the core of all that we do.”

“I look forward to achieving greater resilience through sustainability. Now, more than ever, we must seek to be a leading force for good in the world”

Pierfrancesco Vago, Executive Chairman, MSC Cruises

Niche and boutique cruise lines are also nailing their (green) colours to the mast. Aranui Cruises, which offers mixed cargo cruises in exotic destinations, says these cruises “are built on three strong pillars: comfort, security and the environment.” Bhaya Group says that, as a cruise operator in Vietnam’s most iconic natural attraction, it “understands the vital importance of environmental responsibility. The principles of sustainability are reflected in every process we undertake.”

Certification

Many cruise lines use certification processes to help drive sustainability improvements, with a wide range of standards and systems available. While certification schemes can cover a wide range of aspects of a cruise company’s operations, there are also schemes for individual ships.

Among the options that operators can choose from, those under the ISO umbrella ISO 14001 (environmental management) and ISO 9001 (quality management) are currently important in this field.

“Our mission is to continually improve our sustainability culture through fresh innovation, progressive education and open collaboration”

Frank J. Del Rio, President and Chief Executive Officer, Oceania Cruises

Princess Cruises says that since 2006, it has “achieved and maintained certification to the ISO 14001 Environmental Management System standard. This voluntary programme defines clear environmental goals and establishes strict lines of responsibility and accountability for adhering to policies and procedures.”

Seabourn states: “We manage the environmental aspects of our operations through our ISO 14001:2015-certified Environmental Management System (EMS). The EMS provides a framework for the fleet’s interactions with the environment.”

Celestyal Cruises says it is certified for consistent quality in accordance with the ISO 9001 standard and also with ISO 14001.

Disney Cruise Line says: “Our goal is for all facilities to participate in the Higg index or maintain a sustainable manufacturing certification by 2030.”

At the individual ship level, Costa Cruises says of its vessel Costa Firenze: “The ship was constructed also with sustainability in mind: Costa Firenze’s excellent environmental performance was recognised by RINA (international certification body) through the award of Green Star 3, a voluntary notation that includes the main aspects related to the environmental impact of a ship, each of which must meet very rigorous protection and prevention requirements.”

AIDA Cruises reports that AIDAnova was awarded the Blue Angel in 2019 “for its environmentally friendly ship design.” Ponant says that in 2020, 100 per cent of its fleet had “either the Cleanship or the Cleanship Super label, the highest Bureau Veritas classification.”

COMMITMENT

Cruise line referenced sustainability-related practices

Certification	Summary
Blue Angel	Stringewnt standards for environmental products and services
Cleanship	Bureau Veritas sustainable ship notation
Centres for Disease Control and Prevention	Tasked at saving lives and protecting people
Green Plus	RINA notation that evaluates environmental performance of ships
Higg Index	Sustainability measurement and insights platform
ISM Code	International standard for the safe management and operation of ships and for pollution prevention
ISO 9001	A process to help improve product and service quality procedures
ISO 14001	Practical tools to manage environmental responsibilities
US Public Health Service	To protect and advance health and safety
UNEP Clean Seas	Campaign to dramatically reduce marine litter

Sustainability reports

Company	Report title
AIDA Cruises	AIDA Cares, 2019
Carnival Corporation	Sustainable from Ship to Shore, 2020
Costa Cruises	Restarting Together, Sustainability Report 2020
Fred. Olsen Cruise Lines	Environmental, Social & Governance Report 2020
Hapag-Lloyd Cruises	Travel the World. Preserve Nature, 2021
Hurtigruten	2021 ESG Report
MSC Cruises	Navigating through the Pandemic. Sustainability Report 2020
Norwegian Cruise Line Holdings	Sail & Sustain, 2020
Ponant	Manifesto for Sustainable Tourism, 2021
Quark Expeditions	Polar Promise: Sustainability Report 2019
Royal Caribbean Group	2021 Seastainability
Seabourn	Sustainability Summary, 2020
TUI Cruises	2018 Sustainability Report
Virgin Voyages	This Sea Change is Real
Windstar Cruises (Xanterra)	Our Softer Footprint, 2017

Ferry industry commitment to sustainability

Ferry companies face similar sustainability challenges to those in the cruise sector when it comes to managing the ESG impacts of their ships and operations. In particular, operators are seeking ways to reduce their environmental impacts to comply with regulations and prepare for a low-carbon future.

Of the 115 ferry brands reviewed for this report, 78 have made a prominent public commitment to sustainability on their websites and/or contributed to the report. Many of them belong to global industry body Interferry, which is driving discussion regarding sustainability for its members.

Based on polling research and in-person discussions, Interferry's Strategic Plan 2020-2023 identifies four trends and areas of risk that could impact the industry and are considered to be of greatest concern. Top of the list is climate change/environmental regulations, followed by security, training/skill development/diversity, and automation.

“One of Interferry’s key strategies is to develop supporting key messages that focus on leadership in environmental sustainability and the economic and social value of ferry transportation and the wider ferry industry”

Interferry

As part of its stated aim “to be the unified voice of the global ferry industry by promoting the economic and social value of the ferry industry and the provision of safe, reliable, secure, efficient and environmentally sustainable marine transportation of people and goods”, Interferry says one of its key strategies is to “develop supporting key messages that focus on leadership in environmental sustainability and the economic and social value of ferry transportation and the wider ferry industry.” It further affirms its commitment to “drive the development of effective regulations and policies in line with industry and public interest that support safe, secure, sustainable passenger ferry operations.”

COMMITMENT

Given the very wide range of environments and customer bases served by ferry operators worldwide, coupled with differences in budgets available to operators, it is important to understand that sustainability can mean very different things to different companies – and to their guests. The following observations give a flavour of the intentions of a representative sample of operators.

What the operators say

Statements of intent regarding sustainability are easy to find in the corporate literature of operators. Brittany Ferries says: “We are committed to preserving the environment” while Buquebus claims: “The companies of the Buquebus group have definitively entered the era of environmental responsibility and are leading a real green revolution.” Corsica Linea informs readers: “Since the beginning of its history, Corsica Linea has resolutely traced its path on the path of sustainable development.” CTMA defines environmental protection as “concrete actions that make a difference.”

“Passenger comfort, reliable service and environmental sensitivity are hallmarks of the Catalina Express vessel programme, says Catalina Express President Greg Bombard. “We work hard to provide that.”

“Passenger comfort, reliable service and environmental sensitivity are hallmarks of the Catalina Express vessel programme. We work hard to provide that”

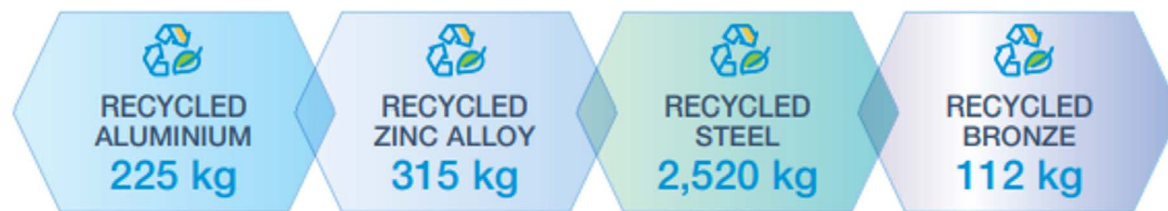
Greg Bombard, President, Catalina Express

Fjord1 looks to the future with the claim that: “We’re going to be the best at environmentally viable transport.” Grimaldi Group cites its past record: “The adoption of a sustainable and socially responsible business model has been a priority for the Grimaldi Group since it was founded, and it has taken on greater importance as the years go by.” Fred. Olsen Express also looks back on its past for inspiration: “Since our inception we have focused our efforts on growing sustainably and have been pioneers in green initiatives in the international maritime sector. Today, we continue to drive opportunities that help connect the oceans and the environment to navigate a better future together.”

Trasmediterranea is another company looking to its history for inspiration: “For more than a century Trasmediterranea has been committed to our clients and the environment.” TT-Line promises that it is “very aware of its high responsibility towards nature and the environment. In line with its pronounced environmental awareness, TT-Line can look back on a long tradition, which is characterized by permanent improvement of the environmental balance of the ship operation.”

Baleària says its business model incorporates the SDGs and adds: “As part of its commitment, the company is implementing projects linked to eleven of the seventeen SDGs. GreenCourse is the motto Baleària uses to define its sustainability philosophy, which encompasses all of the company’s actions linked to environmental protection. Reducing our impact on the environment, that is our GreenCourse.”

Recycling is an important component of environmental stewardship for Hong Kong Ferry (Holdings) Limited



Source: [Environmental, Social and Governance Report 2020](#)

Hong Kong Ferry (Holdings) Limited takes an all-round view: “Throughout our sustainability journey we will pursue excellence in sustainability governance, environmental stewardship, employee wellbeing, community prosperity and social responsibility.”

For Abu Dhabi Maritime: “Sustainability is at the heart of the vision behind the establishment of Abu Dhabi Maritime and it serves as a core driver behind all of its initiatives and activities.”

Interislander says: “Sustainability is central to our purpose of creating stronger connections for a better New Zealand.” Marine Atlantic says it is committed to conducting its operations “in a sustainable manner.” Hornblower says it embraces “the idea of what it means to truly be a sustainable company.”

Mitsui O.S.K. Lines states: “For the next generation on board this planet, the MOL Group will work collaboratively with our partners and stakeholders with creativity to resolve environmental issues.”

MOBY S.p.A describes its brands, MOBY, Tirrenia and Toremar, as “environmentally conscious! The shipping companies of the Onorato Armatori group protect the environment.” Molslinjen, meanwhile, says: “Our commitment rests on internationally recognised principles that are essential to sustainable development.”

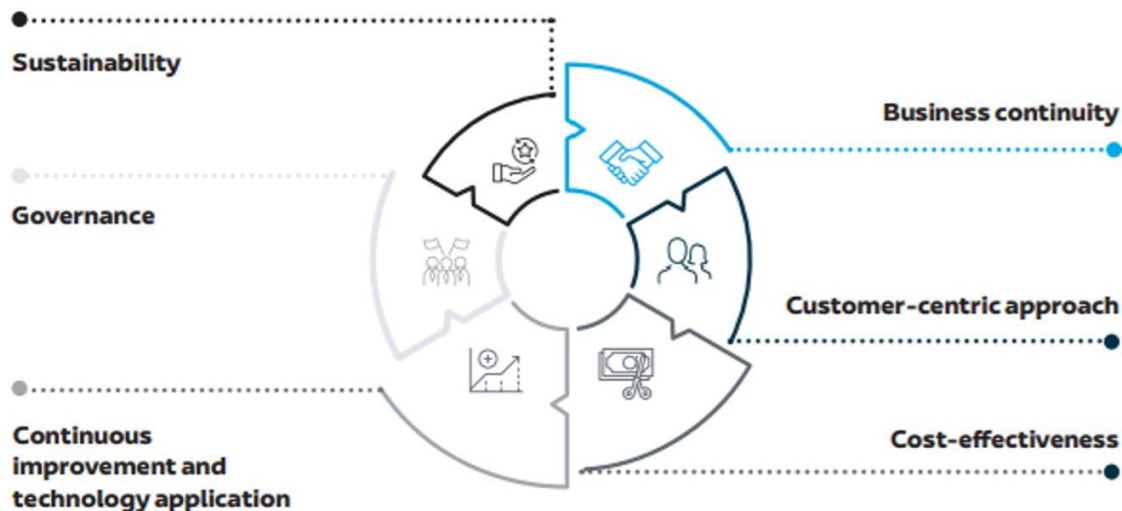
Norled sums up its commitment simply: “The environment and innovation – our core values,” while FastCat says it “cares for the environment.” Another one-liner, this time from Ultramar: “Conscious caring for the environment and our strong commitment to our surroundings.” Rederij Doeksen says that “respect for our environment is concretely expressed in the policy we pursue.”

Stena RoRo states: “We feel that actively working to protect the environment and creating the necessary conditions for life in the future are a matter of course.”

Tallink Group matches its sustainability focus areas to the SDGs. “It’s actually very simple,” says the company. “There’s no tomorrow unless we act today. We need to reduce our impact on the environment and to have a positive effect on the communities in which we operate.”

COMMITMENT

Sustainability is one of six strategic objectives for AD Ports Group's procurement strategy



Source: [AD Ports Group Sustainability Report, 2020](#)

Torghatten AS, meanwhile, is “committed to reducing our climate footprint.” The Isle of Man Steam Packet Company says it is “committed to leading the way in the shipping industry in minimising the impact of our activities on the environment.”

Stena Line says its aim is “to be a leader in sustainable shipping and we are already 10 years ahead of the international shipping targets for reducing emissions. But we are not done yet. Our sustainable journey will take time. But we never cut corners. We never give up. And most importantly we always learn from both our success and our missteps, in order to be able to answer the ultimate question: How can we become better, faster and smarter at solving sustainable challenges in the future?”

Alilauro: says: “We care about maritime links and we focus on the following areas: Planning; Technology; Mechanical Engineering; Environment; Tourism; Communication.”

Attica Group says it is “committed to integrate sustainable development in its operations and to apply environmentally friendlier business practices, in order to reduce, where feasible, its environmental impacts.”

BC Ferries states: “Our environmental, social and economic impacts are central to business decisions... We are one of the most sustainable large scale ferry operators in the world. We employ our resources, services and relationships in recognition of our responsibility to continuously reduce our impact on the natural environment.”

Brittany Ferries adds: “As a signatory of the Sails Charter, we are committed to reducing our impact by investing in an eco-responsible future; reducing our footprint at sea and on land; supporting research and collaborating with NGOs; and raising customer awareness during sailings.”

Kelsian Group asserts: “We genuinely care for the environment and are committed to preserving it through the efficient use of resources, minimising waste and reducing environmental impact, whilst promoting a culture of sustainability.” Says Color Line: “Sea transport has a high priority in achieving national and international climate goals, and Color Line’s sea environmental strategy influences the company’s initiatives.”

Condor Ferries says: “We believe that businesses are responsible for achieving good environmental practice and operating in a sustainable manner. We are therefore committed to reducing our environmental impact and continually improving our environmental performance as an integral and fundamental part of our business strategy and operating methods.”

DFDS explains that its climate action plan “ensures we prioritise our environmental footprint. In an industry with a large carbon footprint, we are committed to finding solutions that will eventually transform how our industry operates.”

FRS Clipper says: “We embrace our responsibilities in the business world to face current and future ecological and social challenges. This is why our actions focus on responsible business practices that are geared towards long-term and sustainable strategies with the goal of reducing our ecological footprint... CSR is embedded into our corporate strategy, our processes and our corporate culture.”

Havila Voyages pays tribute to the natural world in its statement: “Our quiet and untouched nature, clean water and fresh air are worth taking care of. Therefore, Havila Kystruten has invested in green solutions so that those who come after us can experience the same thing.”

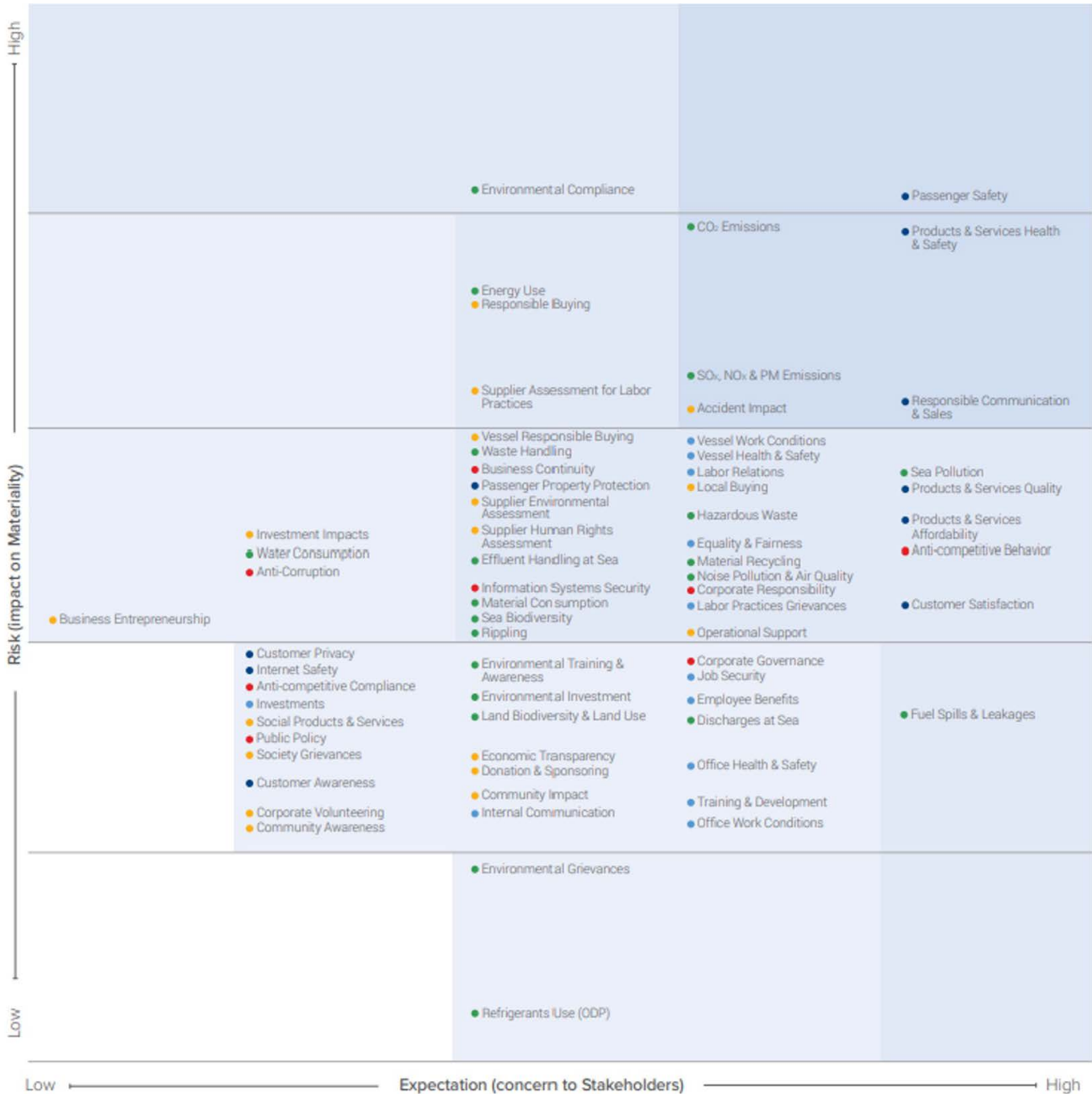
Tallink Group aligns its sustainability focus areas with the UN Sustainable Development Goals



Source: [Tallink Group Yearbook, 2019](#)

COMMITMENT

Attica Group's Materiality Analysis identifies topics by risk and by expectation



Source: Attica Group Corporate Responsibility Report 2020

IDO-Istanbul Fast Ferries claims that “by determining our environmental dimensions and controlling its effects with its life cycle and zero waste approach, we reduce natural resource consumption, prevent environmental pollution and continuously improve our environmental performance.”

For Irish Continental Group, “The successful delivery of the Group’s customer value proposition is underpinned by a commitment to minimising our environmental impact and enhancing the sustainability of all Group activities.”

Naviera Armas explains that it “applies an environmental policy as a dynamic instrument that enables it to constantly improve the conditions in which the services and auxiliary activities are carried out, with the aim of reducing the impact on the environment.”

Integrating sustainability into operations is important to NYC Ferry, which says: “NYC Ferry operated by City Experiences is committed to respecting our customers, our crew and the natural environment. Through our integrated health & safety, quality and environmental management system, we strive to serve you better and leave the planet a better place than when we began.”

“As part of its commitment, the company is implementing projects linked to eleven of the seventeen SDGs”

Baleària

Polish Baltic Shipping says its ships “are environmentally friendly, we comply with all the provisions and regulations of IMO on the special body of water which is the Baltic Sea as well as EU regulations in force in ports.” Another Baltic-based operator, Viking Line, states: “The sea is our lifeblood. It is as important as it is necessary to work for climate-smart travel with the welfare of the Baltic Sea in mind. And we are proud to lead the way when it comes to new solutions to reduce our environmental impact.”

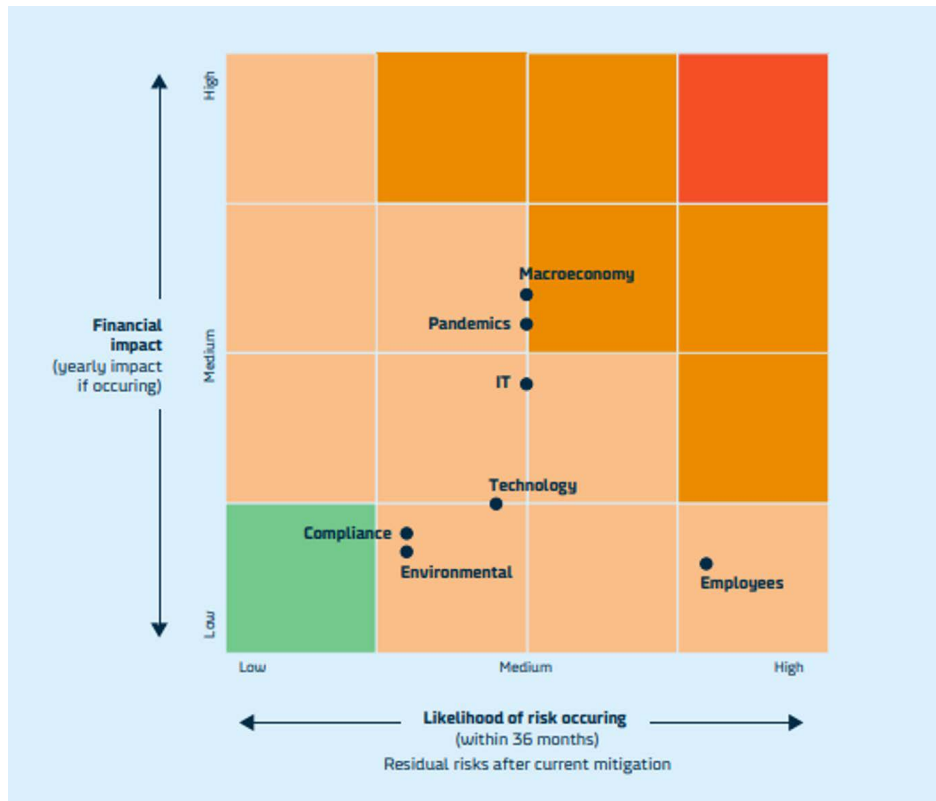
Red Funnel Ferries has a colour-coded approach: “Red goes GREEN is the name given to our new long-term Environmental Strategy. It seeks to showcase the environmental successes of recent years and highlight a wide range of new green initiatives, including measures to change consumer behaviour in line with the company’s commitment to operate in an environmentally sustainable and sympathetic manner.”

Rederi AB Gotland says: “We have an environmentally efficient ferry fleet and we carry out continuous development work for environmental improvements,” while Stena AB states: “A key aspect of Stena’s sustainability work is to minimise negative environmental impacts, to always seek to use the planet’s resources wisely and also to contribute new solutions for the sustainable transformation of society.”

Sun Ferry says the message of its motto, ‘Save our Planet, Protect the Environment’, has become a pressing issue around the globe. “We are committed to implementing a series of green initiatives aimed at reducing environmental impact, saving energy and promoting recycling.”

COMMITMENT

DFDS identifies 'Environmental' (primarily relating to Climate Change) as one of its top seven risks



Source: DFDS Annual Report 2021

The Grimaldi Group and Trasméd say they are “committed to the environment and sustainability and work with the goal of achieving zero emissions in the port thanks to the use of alternative energies (solar energy and lithium batteries) in their state-of-the-art ships.” Wightlink says: “We take our care for the environment seriously with our Green Agenda outlining our wide-ranging initiatives to protect the sea, land and air that surround us.”

Certification

As in the cruise sector, ISO 9001 (Quality Management) and ISO 14001 (Environmental Management) are popular certifications for ferry operators. Among those which have sought certification with ISO 14001 are Attica Group, Caledonian MacBrayne, The Isle of Man Steam Packet Company, Naviera Armas, Rederi AB Gotland, Stena AB (some of its businesses), Stena Line and Tallink Group.

Blue Star Ferries is certified under both ISO 9001 and ISO 14001:2015, as is Trasméditerranée. Mitsui O.S.K. Lines says it has used its own environmental management system, MOL EMS21, since April 2001, alongside ISO 14001 certification.

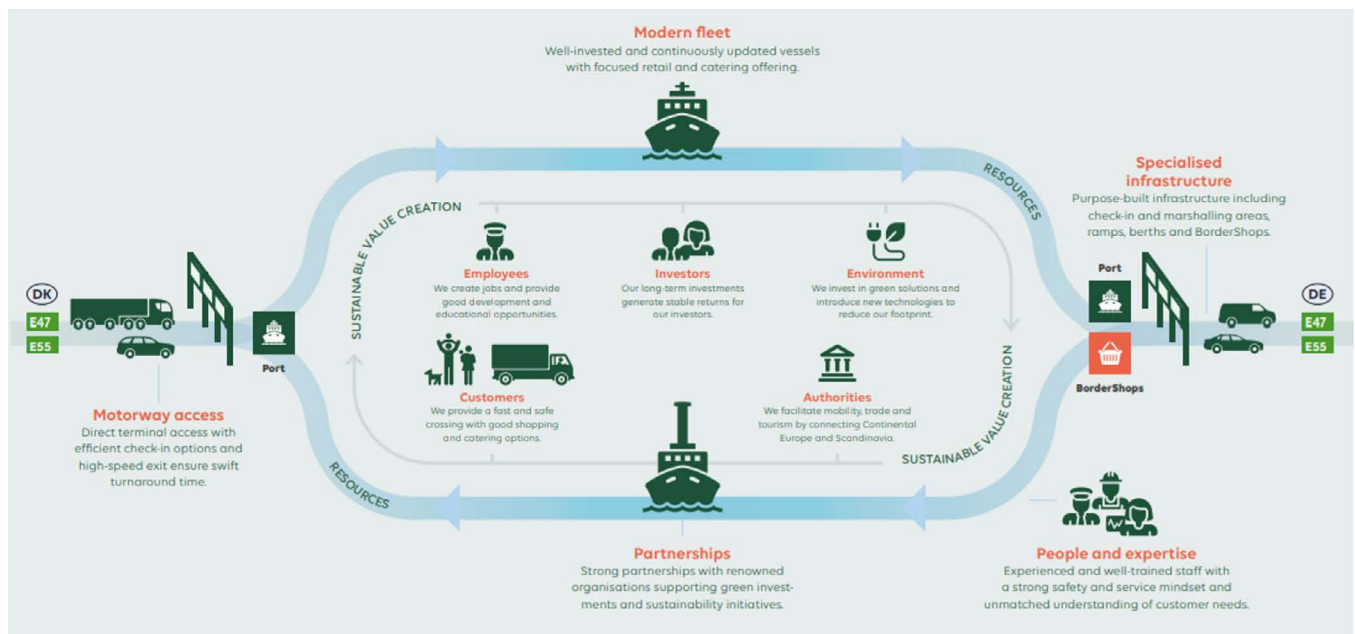
Viking Line says: “The head office, the subsidiary Viking Line Buss Ab and all ships are environmentally certified according to the ISO 14001 standard. Viking Line’s organisation and ships are also certified according to the ISM code.”

Another company that has adopted the ISM code is Eckerö Linjen’s parent company, Eckerö Group: “The entire Eckerö Group including the Eckerö Line is environmentally certified according to the ISO 14001 standard,” says the company. “Of course, we operate in accordance with applicable environmental legislation and the certification is a guarantee that we carry out continuous environmental improvements. Our goal is to minimise our environmental impact and Eckerö Linjen is constantly working to develop new methods for the disposal of emissions and residues from our ship.”

Superfast Ferries is certified under ISO 14001:2015 as well as ISO 22000, the new international standard for HACCP (food and beverage hygiene).

NYC Ferry states that it has an “integrated environment, health & safety, quality management system that is the basis of our operations and management philosophy.” The company says its ‘Respect Our Planet’ motto, known as RMS, is in compliance with the ISO standards for Environmental Management, Occupational Health & Safety, and Quality Management. In addition, Hornblower, which operates NYC Ferry, says: “All interior modifications meet the United States Green Building Council’s LEED criteria for recycled content.”

Visualisation of Scandlines’ Sustainable Traffic Machine



Source: [Sustainability Report 2020](#)

COMMITMENT

The Green Marine certification system is another popular pathway to improved environmental performance. Since 2018, Alaska Marine Highway System says it has been working with Green Marine to reduce its environmental footprint by taking concrete actions. “Green Marine is a voluntary environmental certification programme for the North American marine industry,” says a spokesperson. “It is a rigorous, transparent and inclusive initiative that addresses key environmental issues through 14 performance indicators.” BC Ferries says it is undertaking Green Marine certification for the sixth consecutive year.

Marine Atlantic has been a Green Marine participant since 2014, when it entered its four ships and three terminals located in Argentina, Port aux Basques and North Sydney in the environmental programme.

Balearia reports that it was “one of the 101 companies selected by the Comunidad por el Clima (Community for the Climate) as a commercial example of organisations that are outstanding in their strong environmental commitment”.

Pentland Ferries says it is the first ferry operator in the UK to have achieved a Green Tourism Award. “The awards programme recognises the commitment of tourism businesses to sustainability and is seen as a prestigious hallmark of environmentally sensitive practices and operation,” the company says. “Alfred is more than 60 per cent more efficient in terms of fuel consumption and emission levels than other comparable ferries operating in Scotland. The company plans to roll out a range of other environmentally aware initiatives, to remain the most energy efficient ferry operator in the UK.”

Ferry operator referenced sustainability-related practices

Certification	Summary
Comunidad por el Clima	Reducing emissions to achieve goal 1.5 (keeping average emissions increase below 2 degrees by the end of the century) and carbon neutrality by 2050
Green Marine	Supporting participants as they seek to reduce their environmental footprint
HACCP	Hazard Analysis and Critical Control Point to manage food hygiene and safety
ISM Code	International standard for the safe management and operation of ships and for pollution prevention
ISO 9001	A process to help improve product and service quality procedures
ISO 14001	Practical tools to manage environmental responsibilities
LEED	A recognised symbol of sustainability achievement and leadership

Sustainability reports

Company	Report title
BC Ferries	Performance & Sustainability Report, 2020-2021
Baleària	Corporate Social Responsibility and Sustainability Report, 2021
Tallink Group	Yearbook 2019
AD Ports Group	Sustainability Report, 2020
Attica Group	Corporate Responsibility Report 2020
DFDS	Annual Report 2021
Hong Kong Ferry (Holdings) Company Limited	Environmental, Social and Governance Report 2020
Scandlines	Sustainability Report 2020
Viking Line	Sustainability Report 2020
Mitsui O.S.K. Lines	Environmental Vision 2.1

Cruise and ferry commitment statements

Many cruise lines and ferry operators have made public statements demonstrating their commitment to sustainability, as presented on the following pages.

“As a Danish company leading the Expedition Cruise segment in sustainability, we love to apply Scandinavian designs focusing on functionality, simplicity and craftsmanship, using as much as possible natural materials (with natural colours – no dyes), aiming to reduce waste and minimising energy consumption.”

Hans Lagerweij, former President, Albatros International

“As innovators of the US cruise industry, American Cruise Lines has an obligation to protect the environments we explore, through socially responsible and eco-friendly practices. For decades, we have designed and constructed all our 100 to 200-passenger ships with a ‘green’ forward approach, building the most environmentally friendly fleet of modern riverboats and small cruise ships in the US. From the waterways we cruise to the port cities we visit, we pride ourselves on our continual conservation efforts through local partnerships, emissions reduction, sustainable product sourcing, onboard recycling programmes, and design strategies which reduce water and energy consumption. The rivers, bays, lakes and coastlines we cruise are some of America’s most pristine. We are committed to keeping them that way for generations to come. When you cruise with American Cruise Lines, you always cruise small, local and green.”

Alexa Paoletta, Public Relations Manager, American Cruise Lines

“As a small-scale operator of boutique expeditions to the White Continent, Antarctica21 takes great care in minimising its environmental impact. While our main areas of focus are energy efficiency and strict operational standards, we recognise the significant opportunity offered by sustainable interior design. We are especially attracted by the offers of artisanal producers. When exceptional craftsmanship marries sustainable production methods, guests enjoy a distinctive and exclusive experience, traditional skills are supported, and the planet benefits.”

Diana Galimberti, Executive Vice President, Product and Operations, Antarctica21

“Atlas Ocean Voyages is committed to preserving and sustaining the remote and captivating destinations where we sail. Our newly constructed small, luxury expedition ship, World Navigator, launched in August 2021, incorporates the most modern technology to help minimise the ship environmental impact. World Navigator only bunkers the lowest sulphur marine fuel, and a Rolls Royce hybrid power generation and management system delivers maximum fuel efficiency by consuming as low as one-fifth the fuel compared to conventional engines. The ship also repurposes, recycles and reclaims all waste, and a scrubber system in the funnel minimises emission particulates, a technology unique for a small ship the size of World Navigator (9,930 GRT). Furthermore, World Navigator is also the first cruise ship to utilise hydro jet propulsion, which minimises underwater noise and stress on marine wildlife.”

Alberto Aliberti, President of Atlas Ocean Voyages

“When it comes to the sustainable design of our ships, we minimise our carbon footprint with necessary treatment plants built into the ship design whilst ensuring environment protection for the rivers. Furthermore, we also practice our interior eco-chic design style by using natural materials local to the region. Since the very beginning, Assam Bengal Navigation Co. has been an advocate of conscious luxury travel. We have always carefully considered how our actions impact the wellbeing of our guests, our community and the environment. In celebrating the local cultural style, aesthetic and lifestyle, we are able to support a variety of local artisans, designers, weavers and craftsmen hamlets. It is not just about the design that reflects a sense of homecoming to the regions of Assam and Bengal, it is the fact that local communities benefit whilst keeping our local crew proud of what they represent as brand ambassadors. Our vessels are decked in antiques, handlooms, bamboo panels and cane furniture that have been crafted by hand by a coterie of local artisanal communities that we have been supporting for over 15 years now.”

**Antara Phookan, Director of Business Development and Interior Designer,
Assam Bengal Navigation Co.**

COMMITMENT

“The only way to achieve sustainability in our industry is by creating a cycle that is self-sufficient. We do this through fuel efficiency, reduced engine and energy emissions, sourcing environmentally friendly and ethically produced materials for our vessel design and innovative waste management. Our latest custom-built river vessel, the Aqua Nera, pushes the boundaries of what sustainable tourism means in expedition cruising with the use of efficient energy sources and recyclable innovative materials across the vessel. These include 25m² high-performing solar panels to power internal and external illumination of the Top Deck; the use of RESYSTA – a material consisting of 60 per cent rice husk (agricultural waste product) – for all external flooring, cladding and handrails; and carpets made out of 100 per cent recycled PET plastic bottles and other pre-consumer fibre waste and post-consumer plastic. With the introduction of a second expedition vessel in the Peruvian Amazon, our consolidation in the region is accompanied by an even stronger commitment to the precious Amazon River ecosystem. Elements such as sustainably sourced wood and large solar panels are integrated harmoniously into Aqua Nera’s design, ensuring we use materials that are not only beautiful and functional, but also respectful to the environment, a continuation of our brand philosophy.”

Francesco Galli Zugaro, CEO & Founder, Aqua Expeditions

“The vibrant and beautiful natural surroundings of the world’s rivers are a benefit of river cruising and Avalon Waterways is dedicated to preserving this precious environment. Over the last decade, we have made great strides investing in a state-of-the-art fleet of Suite Ships and top-of-the-line technology to limit energy consumption and emissions; plus waste and recycling programmes to reduce our environmental footprint, save water and foster a sustainability culture among crew and guests worldwide. This past season, our entire fleet was outfitted with BeWell water stations, replacing plastic water bottles with an endless supply of flavoured and vitamin waters – great for Mother Nature and for our guests. And future ship design will play a major role in these efforts, as we look to new and innovative ways to lessen environmental impact, including options for electric power sources and sustainable fuels.”

Steve Born, Chief Marketing Officer, Globus family of brands (Avalon Waterways)

“BC Ferries is always looking for innovative ways to reduce our impact on the environment and use sustainable products. We are in the planning stages to build new major vessels to replace some of our older ships. These vessels are expected to be quieter, more energy efficient, and have a lighter carbon footprint than any major ship that we have ever built. We strive to build ships that will deliver enhanced environmental sustainability and offer flexibility to meet changing travel demands in the future.”

BC Ferries

“Our interior design philosophy is based on three axes: comfort, personalisation and sustainability. We are committed to comfort, so we keep working on the installation of comfortable and reclining seats, which allow the charging of electronic devices via USB in the same accommodation. We always try to adapt our services to the needs of customers. For this reason, some of our terraces are no longer just outdoor spaces, but rather we try to turn them into comfortable and quiet environments, thanks to the combination of bars with chill-out, tables, chairs and sofas, so that people can enjoy the crossing. Likewise, we have worked on the integration of children’s areas and areas for priority pets within the ship’s design. And finally, when it comes to the design we are inspired by sustainability, looking for the most respectful materials with regard to the environment, as well as the safest and most comfortable. As proof of all this, we collaborate with external companies to recycle our plastic products into furniture for our terraces.”

Arturo Escartí, Innovation Director, Balearia

“Our top priority is compliance, protecting the environment, and the health, safety and wellbeing of our guests, crew members, shoreside employees and the people in the communities we visit. We are investing heavily across our fleet in new ship designs and capabilities, new green technology and new procedures and protocols to help protect the global environment. This includes new hull coatings and designs, LED lighting, recycling, new LNG-powered ships, next-generation technology such as fuel cells and large-storage battery systems, and electrical shore power capability. It also includes a focus on reducing the amount of fuel being used and an effort to dramatically reduce plastics and waste on our ships, along with the installation of new environmentally friendly bio-digesters. To date, we have reduced our carbon footprint by more than 25 per cent with plans in place to reduce by 40 per cent by 2030. We aspire to reach zero emissions by 2050. There is not another industry out there that is investing more on next-generation technologies and solutions to help create a better tomorrow. For us, it is a journey that never ends.”

Roger Frizzell, Chief Communications Officer, Carnival Corporation

“We at Lüftner Cruises are fully committed to observing ecological principles and therefore we have implemented many energy- and water-saving practices into the daily routine onboard. Whenever we order a new Amadeus vessel at the respective shipyard, our requirements not only include the highest technical and nautical standards, but it is also a high priority for us to use sustainable interior design and outfitting.”

Lüftner Cruises

COMMITMENT

“As a company we invest in creating products and services that have considered the environmental, social, and economic impacts from the initial phase through to the end of their life. Our ships have a timeless and contemporary style, which helps us avoid yearly refurbishments. Additionally, we strive to use eco-friendly and low-cost maintenance materials, such as stain-repellent fabrics and reconstituted stones but also eco-friendly cleaning products. We work with sustainable suppliers, who are making conscious efforts to reduce their environmental impact, from the recycling of waste materials or glassworks to choosing sustainable wood sources in the production of furniture. We are always aware of the weight (lower fuel consumption) and the use of light materials is a rule. Smart technology is also a big help for us. LED lighting is used where possible, due to its greater energy efficiency. Prefabrication and use of local sources are some of the strategies we follow, together with the recycling of scrap materials. Living green has become a way of life and the new norm.”

Captain George Koumpenas, Chief Operations Officer, Celestyal Cruises

“Century Cruises has been the pioneer of China’s eco-friendly and green health cruise ship construction and interior design since 2013. Century Paragon and Century Legend are the first two ships to feature an electronic propulsion system, integrated energy optimisation system (IEOS), and zero paint decoration on China’s Yangtze. All the ships’ interior decorative materials conform to the international environmental protection standards. Also, other new cruise ships on the Yangtze are following the eco-friendly and sustainable innovations introduced by the inaugural voyage of the new ship Century Glory in 2019. Even the official China Classification Society (CCS) has awarded Century Glory as an advanced eco-friendly river ship for the interior design, engineering system, comfort level (less noise and micro vibration), system of onshore electricity supply at docks along the river, etc. The government has emphasised cruise industry sustainability development in China too. For the four new cruise ships being constructed for Century, we will adopt the most advanced sustainability development solutions to achieve the goals of economic savings and reducing energy consumption. The ships will feature the latest technologies and river cruise ship building innovations.”

Century Cruises

“City Experiences, anchored by Hornblower, is committed to developing, adapting, and operating an industry-leading fleet of sustainable vessels that includes environmentally friendly components and practices at every stage in addition to our environmental management systems under ISO 14001 to ensure we are delivering on our environmental goals. While the broader focus is most often on alternative fuels and more efficient propulsion or mechanical equipment, modern vessel design must also include low-impact, sustainable interior materials and systems to reduce carbon footprint, limit energy loss, extend vessel lifespans and increase air quality while ensuring passengers are provided a safe and efficient journey.”

Timothy O’Brien, Senior Vice President, Ferries & Transportation, City Experiences

“At Disney Cruise Line, we are dedicated to minimising our impact on the environment through efforts focused on utilising new technologies, increasing fuel efficiency, minimising waste and promoting conservation worldwide. We strive to instil positive environmental stewardship in our cast and crew members and seek to inspire others through programmes that engage our guests and the communities in our ports of call. Disney Cruise Line is consistently recognised as an industry leader. All four Disney Cruise Line ships have the U.S. Coast Guard’s QUALSHIP 21 with Zero-E designation, which recognises exemplary vessels that have consistently adhered to environmental compliance, while also demonstrating a commitment to environmental stewardship. Disney Cruise Line also regularly wins awards, such as the Blue Circle Award for voluntary efforts to conserve energy and reduce emissions from Port of Vancouver.”

Disney Cruise Line

“Havila Voyages’ new ships have the latest energy-efficient design and technology onboard, including the world’s largest battery pack on a passenger ship. But sustainable choices must also be followed up in the hotel onboard. Among other things, Havila Voyages has selected local Norwegian suppliers of furniture to ensure that we get durable and high-quality products and materials that will have a long life. This approach helps achieve environmental savings through reducing the frequency of buying replacements. Also, our suppliers are close to the ports that we visit and so it is easy to arrange maintenance and repairs to extend the life of our onboard furniture. By choosing Norwegian suppliers, we feel confident that the necessary production processes and certifications are in place to ensure high environment and sustainability standards are achieved.”

Hege Sævik Rabben, board director and Head of Interior Design and Decoration, Havila Voyages

“At Seabourn, sustainability is not just a commitment, but a mindset that influences our daily decisions in everything we do from operations to interior design. We actively seek partners that have a sustainability strategy built into the way they operate their business and in the products they offer. We donate perfectly usable furniture, such as balcony furniture, when we upgrade to new designs on the ships. Our design team is constantly striving to approach each project with a vision where all of the beautiful products in our spaces are carefully selected with a back story on sustainability. This matters to our Seabourn team, and we feel our Seabourn family that enjoys travelling with us will appreciate the effort we put towards making choices that underscore sustainability.”

My Nguyen, Design Director, Interior Asset Management, Holland America Group

COMMITMENT

“On one hand, it’s the hardware. We are always looking for more sustainable or natural material, including upcycled options. And it does not start or stop there. We are looking at the entire value chain, and imposing the same strict demands when it comes to sustainability on our partners and suppliers as we do on ourselves. But even more important, sustainability is an integral part of how we design and lay out our onboard areas – integrating a more sustainable guest experience into our design. It could be invisible measures that save energy through various ‘behind the scenes’ details. It could be touches such as removing all single-use plastic and adding water refill stations across the ships. And it could be designing entire areas dedicated to sustainability, such as the one-of-a-kind Hurtigruten Expeditions Science Centers – large edutainment areas where guests and the onboard Expedition Team interact and create a deeper understanding of our planet and the areas we explore.”

Thomas Westergaard, VP Hotel Operations, Hurtigruten Expeditions

“We work hard to be as sustainable as possible across the company. Unfortunately, there are few factories in Singapore that produce sustainable interior products and services for maritime use and so we source from neighbouring countries. Whenever possible we seek to install products made from recycled materials and/or ensure that what we have installed on our vessels can be recycled at the end of life. We also specify high quality products and materials to ensure that they have a long life, therefore reducing waste.”

Max Tan, Managing Director, Majestic Fast Ferry

“As an environmentally sensitive expedition company, Metropolitan Touring carefully plans the selection of key aspects before undergoing any renovation, refitting or overall maintenance. This includes, first, the selection of certified shipyards and maritime contractors, as well as their providers, who, when subcontracting other suppliers, will assure that the selection of parts, products and services are compliant with international standards. This level of compliance is carefully analysed by our maritime division before finalising any contracting. Henceforth, building materials, spare parts and all fabrics need to be IMO-compliant, which includes the MARPOL protocol for marine pollution, as well as fire prevention. Materials need to come from sustainable sources (low-emitting suppliers, non-polluting manufacturing processes, or mitigated impacts). These procedures will not only guarantee the safety of our guests onboard, but it will consolidate our commitment to being a sustainable company by fostering environmentally sensitive operations.”

Francisco Dousdebes, Head of Corporate Responsibility and Sustainability,
Metropolitan Touring

“As part of our Sail & Sustain programme, we strive to minimise waste sent to landfill, increase the use of sustainably sourced goods, and invest in emerging environmental technologies. The CDP, a global environmental non-profit that evaluates 9,600 companies worldwide annually, recently recognised us with a ‘B’ climate change score – improving on the previous year and higher than the Marine Transport sector average of ‘C’. We are committed to working with diverse partners across the supply chain to source safe, high quality, ethically responsible and sustainable products for our guests. We have a strong focus on reducing single-use plastics through a multitude of initiatives. Most notably, Norwegian Cruise Line became the first major global cruise company to be plastic water bottle-free in 2020. We have also upgraded lighting on many ships to energy-efficient LED lights which help reduce our energy consumption and heat output.

As part of our long-term climate action strategy, we partnered with the Port of Southampton for its new terminal, which features both shore power and roof-mounted solar power to provide clean, green renewable energy. Additionally, we are proud to be recognised as a leader in sustainable construction with the LEED Gold Certification of our incredible new PortMiami terminal B, the first cruise terminal in the world to receive this certification under the new, more stringent LEED construction standards. We will continue to invest, design and develop towards this commitment including further investment at the PortMiami terminal where we are partnering with Miami-Dade County to add shore power capabilities by fall 2023.”

Gary Anslow, Senior Director of Sales UK&I, Norwegian Cruise Line

“Pentland Ferries is committed to environmental efficiencies and using sustainable materials wherever possible across its entire operation. Our environmental credentials are very important to us and, as the business grows, so too will our commitment to maintaining and cultivating good environmental practice. For us, sustainability is a key consideration in any decision making process. We are proud to operate the most environmentally friendly ferry in Scotland and also to become the first ferry operator in the UK to achieve a Green Tourism Award. Alfred is 60 per cent more efficient in terms of fuel consumption and emission levels than other comparable ferries operating in Scotland. This is central to a series of measures, which includes using low energy lighting, local food suppliers, powering the vessel overnight by wind turbine, using plant-based and fully compostable packaging, providing a water refill point to reduce single-use plastic waste, and other waste reducing and recycling initiatives, which we encourage passengers to embrace onboard.”

Kathryn Scollie, Director, Pentland Ferries

COMMITMENT

“Explore to inspire: explore to better understand, learn, share and protect. Ponant has been committed to responsible tourism, and purposeful voyages of exploration for over 30 years. Aboard a fleet of 13 French-flagged small ships, fitted with the latest environmental technologies, the journey of exploration is always elegant, authentic and inspiring.

Ponant has always been attentive to ecological contingencies. A delicate balance needs to be reached between sustainability and the technical and safety constraints required to sail in remote regions. The use of natural light and quality insulation helps reduce energy consumption. The company uses recyclable materials, wood with a certified origin and natural textiles, not synthetics.”

Wassim Daoud, Head of Sustainability and CSR, Ponant

“We feel responsible for people and the environment and ensure that risks associated with our activities are recognised, acknowledged and, where possible, excluded. We want to prevent damage to the environment as much as possible. Concrete steps have already been taken to this end by introducing two ferries on LNG, which are equipped with heat recovery, solar panels and many other environmentally friendly facilities. In the future we will make every effort to make our services as environmentally friendly as possible.”

Dirk Spoor, Managing Director, Rederij Doeksen

“Commitment to sustainability must begin at the design stage. Scenic’s ships are built to exceed current expected environmental standards. From interior fittings, such as the LED lights running throughout the ship to reduce power wastage, heat and UV emissions, to sourcing more sustainable raw materials and products, every aspect of Scenic’s ships has been carefully considered to reduce our environmental impact. Scenic works with established partners, local suppliers and artists who share our aspiration to be as sustainable as possible. Another key topic for the industry is to address its plastic use. By providing guests with reusable stainless steel water bottles to refill from filtered water stations throughout the ship, Scenic has successfully eliminated single-use plastics for all guests onboard.”

Nichola Absalom, Director, Scenic Luxury Cruises & Tours

“When the planning and construction of the Sea Cloud Spirit began in 2008, the subject of sustainability had nowhere near the importance and significance it has today. Nevertheless, the designers paid attention to the longevity and value of the interior design when selecting the materials used and their processing. From the very beginning, it was their goal to achieve an interior design of the same high quality as on the Sea Cloud. After all, our flagship has been sailing the world’s oceans for 90 years now, which is at least three times the normal lifetime of a ship – for the most part still with the same furnishings as at the beginning. Like longevity, the manufacture of the furniture is also inseparably connected to the issue of sustainability. For example, the furniture and equipment details were individually designed and made especially for the ship by experienced craftsmen. The theme becomes even clearer in the area of the ship’s propulsion and the supply of electrical energy on board. Naturally, the 28 sails with a total area of 4,100 square metres are the main propulsion of the Sea Cloud Spirit. For periods of calm and harbour manoeuvres, the ship has a diesel-electric engine drive. Thanks to the state-of-the-art control system installed shortly before completion, the diesel-electric drive is currently one of the most efficient drive trains in a ship of this size.”

Daniel Schäfer, Managing Director, Sea Cloud Cruises

“St. Lawrence Cruise Lines is committed to improving sustainability and efficiency in all areas of our cruise operations. This includes our ongoing programme to update and maintain the Canadian Empress, which was built in 1981 and originally featured a Victorian aesthetic that included brass and wood furnishings, ornate tin ceilings, and heavy carpeting and drapery. The company has made great progress in transforming the interior of the vessel over the past five years, with a focus on increasing passenger comfort, improving the view of the river, and modernising the style of the Grand Saloon and staterooms. The regulations on our industry in Canada are onerous and the approval process can become an obstacle to the use of certain types of paint, building materials and furnishings that might otherwise improve our profile when it comes to sustainability and efficiency. Despite these challenges, we have been able to make some significant sustainability improvements to our vessel over the last five years. We have replaced all of the observation and stateroom windows with glare-reducing energy-efficient windows, transitioned to LED lighting wherever possible, and greatly reduced our use of plastic on the service side of operations. “

Jason Clark, President, St. Lawrence Cruise Lines

COMMITMENT

“It is SunStone’s opinion that the cruise industry must make a joint effort and take the lead in ensuring that future projects are being developed with sustainability at the very top of the agenda. SunStone is operating in the world’s most fragile areas and ecosystems, based on which we take our responsibility for the environment very seriously. We are currently in dialogue with consultants on the development of a brand new series of vessels (the Boundless Class). This newbuilding project will increase the focus on energy efficiency to a new level, including emissions from the interior outfitting perspective. For us, sustainability and profitability must go hand in hand. Incorporating circular economy and life-cycle evaluation in the interior design strategy will consequently lead to a longer lifetime of essential elements of the accommodation but will also contribute to the profitability of the vessels in general. And it’s a value proposition for our conscientious passengers. Here at SunStone, we strive to contribute to a more sustainable series of vessels by not only focusing on fuels and direct emissions, but by approaching design, build and operation with a holistic mindset.”

Niels-Erik Lund, Founder & Chairman, SunStone Ships

“Swan Hellenic is committed to protecting the beauty of the world we explore and the wellbeing of our guests. Our comprehensive, concrete sustainability measures consequently extend from our ships’ propulsion and Advanced Wastewater Treatment systems to every aspect of interior design, prioritising the choice of sustainability-certified natural, recycled and recyclable materials, low-solvent textiles and surface coverings, and water-based paints. We likewise insist on ultra-low consumption LED lighting and intelligent climate control systems. Moreover, these commitments are constantly aligned with the latest advances, which we monitor carefully to ensure a steadily reducing environmental footprint.”

Andrea Zito, Chief Executive Officer, Swan Hellenic

“We have recently joined Sustainable Travel International as we are currently developing a programme to measure the carbon footprint of all our vessels and itineraries, and from there find more ways to neutralise our emissions. Multiple engine developments have enabled us to reduce our fuel footprint and we always strive to be ahead of the game in implementing the best solutions available. This initiative has led us to reducing fuel consumption and creating more sustainable programmes and itineraries for our guests. Additionally, we are the first cruise line worldwide to join Tourism Declares, which is helping us develop a transparent, practical and functional 12-month plan that will guide the way for lowering carbon emissions, while remaining committed to additional sustainability initiatives including no single-use plastic and ethical food sourcing. Within our interiors, organisations such as Cradle to Cradle help us; their certification programmes for products and materials are driven by sustainability. The types of materials selected are key when it is time to discard and upgrade, ensuring that waste levels are low and recycling is feasible. We are currently working with Add Studio, an award-winning architecture and design company, to redesign Harmony G – improved sustainability is an important outcome for us. Sustainability is key to the type of clientele we serve. It’s about creating a sense that we are part of the nature we wish to discover. We are only at the beginning of where we hope to be (as an organization and as a whole industry), but our passionate team of sustainability-driven individuals continue to strive towards a greener design that will turn our fleet into an eco-fleet through a phased programme.”

Constantine Venetopoulos, Communications Director, Variety Cruises

“Residents of The World, Residences at Sea, are committed to minimising the impact of the ship’s operations on oceans, wildlife and natural environments and reducing its carbon footprint through the adoption of energy-efficient equipment and technologies. The community’s Environmental Impact Mitigation Committee is fully committed to achieving this goal through various initiatives and investments. Residents continuously invest in the ship to keep its public and private spaces in top condition. The ship routinely drydocks, where major refurbishment and design work are completed to ensure that world-class standards of luxury, style and design are exceeded. The World works with Mivan, an internationally renowned leader in specialist joinery and interior fit-out, by choosing ethical and sustainable materials procured from sustainable sources using credible and recognised certification schemes. Innovative practices and design excellence are foremost in the ship’s strategy.”

The World

COMMITMENT

“The route of the new eco-friendly Aurora Botnia passes through the unique Kvarken archipelago, which is the only UNESCO natural world heritage site in Finland. It connects the coastal cities of Vaasa in Finland and Umeå in Sweden. The travel time is only 3.5-4 hours and there are 2-4 departures per day all year round. On board there are restaurants, lounges, a conference area and a shop. For passengers, the environmental friendliness of Aurora Botnia can be experienced in the silence of the ship. It is also reflected in the ecological choices in the passenger areas: adaptable passenger areas and intelligent lighting as well as the HVAC controls. At low season, some areas can be closed to save on heating, ventilation and lighting. In the cabins the water and lighting are used only when needed. Material selections are all very ecological. In the cafeteria the tables are made of reusable materials, and if needed to be changed the same material is melted down to make the new table. The carpets in the cabins are made of used fishnets. In the engine room, different technical solutions affect the ecological footprint: engines that can be run on different fuels (LNG and biogas), batteries and other intelligent solutions.”

Peter Ståhlberg, Managing Director, Wasaline

“At Windstar, we strive to refresh and renew our interior spaces whenever possible. Instead of rushing to the dumpster, we take time to evaluate what can be fixed and incorporated into the new design concept. The US\$250 million Star Plus Initiative we recently completed on our three all-suite yachts presented Windstar with a unique opportunity in interior design. Instead of throwing everything out in the process of completely redoing the ship’s interior spaces, we refurbished, fixed and reused items where we could. Luckily, these three yachts – Star Breeze, Star Pride and Star Legend – were constructed with high quality materials in the interior spaces. Instead of throwing things away and buying new items, we sourced a company to repair and renew items. For example, instead of throwing away a marble dresser in a suite due to a cracked top, we found an experienced company to fix the crack so well that it’s no longer visible. The suites are outfitted with whitewashed oak. To preserve it, we sanded, coloured and varnished it to look fresh again. Often these are quality materials that just need a little TLC coupled with somebody on the design team who sees that and values it.”

John Gunner, Vice President, Expansion Projects, Windstar Cruises

CURRENT REPORTED ACTIVITY



Cruise interior design choices

Increasingly, designers are taking the lead when it comes to making sustainable decisions regarding the ships they work on. In the most successful projects, there is good communication with cruise and ferry owners/operators, interior designers, outfitters and shipyards, with all stakeholders understanding the need for good choices that prioritise a greener approach to design.

Ships and fleets of all sizes can benefit from clear policies regarding design choices. Royal Caribbean Group says: “We design to build the most efficient ships possible. We look 30 years into the future but also at how we can improve our existing fleet of ships.”

At the other end of the size spectrum, small ship operator Aqua Expeditions says it cares about “setting a standard in responsible travel in the destinations in which we operate. We do so from the ground up, beginning with the design, furnishing and function of our vessels.”

Procurement

Well-established and transparent procurement policies and practices are essential to ensure that companies meet the standards they set for themselves.

MSC Cruises says: “Managing environmental, social and ethical issues in our supply chain is critical, and we take a robust approach to this across all areas of procurement. We choose suppliers who share our high ethical standards and concern for the welfare of workers, for the environment and for local communities. We work in partnership with our suppliers to raise environmental standards. All employees involved in any purchasing, sourcing and contracting activity must commit themselves to raising awareness among our suppliers on how to reduce any environmental impacts linked to their production chain, operation and final products. While the benefits of local sourcing are clear where fresh food is concerned, there are also benefits for non-food items, as it reduces the distance that items must travel, lowering carbon emissions.”

“Managing environmental, social and ethical issues in our supply chain is critical, and we take a robust approach to this across all areas of procurement”

MSC Cruises

Norwegian Cruise Line says it invests in new technologies and innovations that will allow the company to improve its environmental performance and practises responsible sourcing. “We are committed to working with diverse partners across the supply chain to source safe, high quality, ethically responsible and sustainable products for our guests. We have formal policies and clearly defined expectations in place for our suppliers regarding environmental management, health and safety, ethics, anti-bribery, human rights and labour practices. In addition to our internal team, we utilise an external ESG Supply Chain consultancy to assist with developing strategies and areas of focus that are relevant to the cruise industry and consumers.”

Sustainable sourcing is also important for Quark Expeditions, which says it is “developing a sustainable sourcing policy that intends to shift our spending towards products that are more environmentally sound and socially and ethically beneficial.”

To create what it calls An Epic Sea Change for All, Virgin Voyages explains: “we will align with like-minded organisations and work closely with our suppliers. From sourcing food to ship furnishings and retail offerings, we are creating a responsible supply chain and a network that is in constant development.” Meanwhile, Virgin Voyages has coined the phrase ‘Hanging out with purpose’ to describe its Sea Terraces, which feature Yellow Leaf hammocks, a social enterprise that fosters women’s empowerment and community transformation in rural Thailand.

Materials

TUI Cruises states that it prioritises “the use of sustainable materials for newbuilds, for example using wood from responsibly managed forests for all installations in the cabins as well as numerous materials such as wool and cork for interior fittings.” In addition, for the new Mein Schiff 1 and Mein Schiff 2, the company “changed all textiles in the guest cabins - ranging from bed linen and towels to the bathrobes - to organic cotton produced in accordance with the Global Organic Textile Standard (GOTS) with respect to cultivation and processing. Some of the bedlinen and textiles on these two ships are also Fairtrade certified.

Hapag-Lloyd Cruises also has the bed linen and all towelling items onboard its new expedition ships certified according to GOTS, observing: “These internationally recognised guidelines guarantee sustainable textile production – from the organically grown, natural raw materials to sustainable and socially responsible manufacturing and transparent labelling.”

Virgin Voyages states: “Tinted windows, LED lighting, and room sensors are just a few of the design choices that help our ship to use less energy and minimise our carbon footprint.”

Swan Hellenic says that sustainable materials are used in “fixtures, fittings and for the ship’s technical equipment.”

CURRENT REPORTED ACTIVITY

Cabins

Items provided in cabins can be a huge source of waste and pollution, in particular from single-use plastic, but investments by cruise lines in reducing this impact are noticed and appreciated by guests.

TUI Cruises says that reducing plastic waste is not new for the company. “Cabins are already equipped with glass water jugs, which guests can fill at corridor water dispensers, eliminating the need for disposable plastic bottles. On all new TUI Cruises ships, cabin showers are equipped with a refillable shampoo and shower gel dispenser, saving 370,000 throw-away packs per year fleet-wide.” The company has also introduced measures such as “placing terry-cloth slippers in bathrobe pockets rather than packed individually in plastic, eliminating 250,000 plastic wrappings per year. In future, laundry bags made of bio-based plastic will replace 270,000 plastic bags.”

Virgin Voyages says that refillable, rather than disposable, soap and shampoo dispensers are available in the cabins, and that “sensors in the cabins automatically close window curtains, turn off lighting, and lower air conditioning settings when unoccupied.” Elixir Boutique Cruises states: “Hotel amenities are eco-friendly in equally eco-friendly packaging”.

Appliances

Royal Caribbean Group has a focus on improving energy efficiency in the appliances installed on its ships and its brand Celebrity Cruises says: “We have high-efficiency appliances throughout the ship in order to minimise their impact on climate change and reduce our energy load. Every type of appliance onboard our ships is being evaluated for efficiency, including TVs, coffeemakers, ice makers, ovens and dishwashers.”

CroisiEurope states: “Most of our ships are equipped with energy-efficient electrical devices.”

Hapag-Lloyd Cruises provides guests with choices regarding how they use the Nespresso machines provided on almost all of the ships. “In addition to the classic Nespresso pods, they can also choose pods made by Feel Good, which are 100 per cent biodegradable and compostable.”

Lighting

Switching to LED lights is an easy win that most companies are taking advantage of. American Cruise Lines says: “American uses low-energy LED lighting throughout the ship as well as EPA Energy Star equipment to reduce overall onboard energy consumption. This means both less energy consumed and less electricity generated.”

Other companies that have switched to LED lighting, at least in some parts of their ships, include Phoenix Reisen, Poseidon Expeditions and Aqua Expeditions, while Avalon Waterways says it has installed LED lighting throughout its ships, fleet-wide. Hapag-Lloyd Cruises says: “We are optimising energy consumption beyond the ships’ engines through smart management and LED lighting, for example.” Royal Caribbean Group is using LED and fluorescent lights to reduce energy use and produce less heat. Tradewind Voyages also mentions the benefit of heat-reduction gained by using LED lighting onboard, along with reducing electricity demand.

Celebrity Cruises is “replacing higher wattage halogen and incandescent light bulbs with longer lasting fluorescent and LED lights throughout our fleet. Fluorescent and LED bulbs require 80 per cent less energy, generate 50 per cent less heat, reduce energy consumption, last much longer and contribute to more efficient air conditioning due to the cooler bulbs.” Solar technology also plays a role on the brand’s Solstice series ships. “The panels and the clean power they produce can help reduce the consumption of energy derived from fossil fuels. 500m² of solar panels produce enough electricity to power a ship’s guest elevators or approximately 7,000 LED lights.”

Norwegian Cruise Line notes of its LED lighting strategy: “In recent years we upgraded 200 units per ship on Norwegian Jewel and Norwegian Star, which has resulted in an approximately 70 per cent reduction in daily energy consumption and approximately 50 per cent reduction in heat output.”

“500m² of solar panels produce enough electricity to power a ship’s guest elevators or approximately 7,000 LED lights”

Celebrity Cruises

Quark Expeditions states: “LED lighting is used throughout Ultramarine, from navigation lights to cabin and bathroom lighting. These lights have potential energy use savings of up to 50 per cent when compared to standard fluorescent lighting. Lighting controls, both local and central, will provide the opportunity to minimise the level of lighting to what is required for any particular service for additional energy savings.”

Windows

Innovative window coatings are allowing cruise lines to save money and reduce heat in the ship interior. Celebrity Cruises explains: “Across the fleet we have applied window films that are specially glazed to prevent solar heat from penetrating, thereby reducing the amount of air conditioning needed to cool the ship, thereby saving energy.”

Quark Expeditions says: “Using the best quality thermal insulation, together with low heat transfer windows, keeps the spaces inside Ultramarine at a more stable temperature.”

CURRENT REPORTED ACTIVITY

Water wins

Norwegian Cruise Line is taking multiple actions to boost water efficiency and has increased onboard water production with evaporators and reverse osmosis (RO) plants that use seawater as the source, which reduces the need for the bunkering of fresh water. “This is particularly important in countries where fresh water is limited and best reserved for local populations,” says the company. “In 2020, we used approximately 2.5 million m³ of fresh water for all onboard operations, down approximately 65 per cent compared to 2019, due to the voyage suspension. 83 per cent of water used onboard in 2020 was self-produced.”

Source: [Norwegian Cruise Line Holdings](#)

Water

Water efficiency is a major concern on all passenger ships. Hapag-Lloyd Cruises intervenes at source to reduce water use: “We fit the taps on our ships with an aerator. This small nozzle is screwed onto the tap and reduces the water used by up to 70 per cent.” Virgin Voyages says “low-flow water fixtures, water-efficient dishwashers and laundry equipment (like tunnel washers and eco-friendly dry cleaning), and vacuum toilets ensure smart water use.”

Discouraging water wastage by guests is another popular strategy. A-Rosa says that the latest generation of its ships “is equipped with water dispensers, and the rest of the fleet is being adapted for them. This will allow us to provide all our guests with refillable water bottles in their cabins instead of disposable plastic bottles.”

HVAC

Heating, Ventilation and A/C (HVAC) systems are becoming ever more efficient onboard cruise vessels. Celebrity Cruises says: “Our ships are equipped with the latest and most efficient air-conditioning equipment commercially available... coupled with improvements in system design and automation.” Cunard states: “We’re improving the quality of our air emissions by installing Advanced Air Quality Systems across our fleet.” Virgin Voyages says: “Implementing optimised HVAC systems, LED lighting, and real time energy measurement ensures smart energy use throughout the ship”.

Other initiatives

Oceanwide Expeditions says it has designed its new vessels, Hondius and Janssonius, “from the ground up to employ only the latest green technology. The company deploys LED lighting, steam heating and biodegradable paints.”

Phoenix Reisen says it has already done a great deal to reduce energy consumption on ships. “The continuous renewal of air conditioning systems and the replacement of conventional lamps with modern, energy-efficient LED lamps with different switching options are just as much a part of this as the successive installation of a central light/power shutdown system in all passenger cabins (sockets, refrigerators and TV programming systems remain unaffected, of course). The replacement of the refrigerators in the cabins with appliances with improved energy efficiency class has also provided great energy-saving potential.”

On luxury vessel *The World*, energy-saving interventions include “the replacement of refrigerator compressors with more efficient machines, upgrading to new dishwashers that use less water, installing LED lighting, implementing ‘smart’ HVAC controls, and capturing and repurposing waste heat from engine cooling water systems.”

TUI Cruises lists among the technologies it invests in for its fleet: “Efficient air conditioning, Innovative lighting controls, comprehensive LED concept.”

Ferry interior design choices

In addition to addressing issues around sustainable supply chains and procurement, ferry operators are leading the way in tackling aspects of their environmental impact such as the effects of refrigerants used onboard their vessels.

Procurement

Ferry companies across the globe are working towards more sustainable procurement. DFDS says: “We joined the responsible supply chain programme IMPA ACT in 2015. This initiative of the International Marine Purchasing Association aims to improve the economic, social, and environmental compliance of its ship purchaser and supplier members.”

Condor Ferries says: “We trust in the close collaboration with shipyards regarding innovative vessel concepts,” adding that as far as possible it will “purchase products and services that do the least damage to the environment and encourage others to do the same.” The company assesses “the environmental impact of any new processes or products we intend to introduce in advance.” Torghatten AS also states its commitment to developing sustainable solutions.

“We joined the responsible supply chain programme IMPA ACT in 2015. This initiative of the International Marine Purchasing Association aims to improve the economic, social, and environmental compliance of its ship purchaser and supplier members”

DFDS

Stena RoRo notes that “environmental concerns are always addressed in sourcing and new technology decisions, and Stena RoRo strives to influence clients/partners towards solutions adapted to the environmental agenda.”

Hong Kong Ferry (Holdings) Limited states: “During the supplier engagement and tender process, our evaluation criteria include product and service quality, safety performance, operational needs and price to ensure business partners share our dedication to environmentally and socially responsible practices.”

NYC Ferry says: “We will seek opportunities to innovate and partner with stakeholders that support our commitment to the environment, as well as vendors with green procurement and packaging.”

Integrating the SDGs for sustainability

Scandlines identifies SDG 12 (Responsible Consumption and Construction) as central to its decision making. “We commit to integrating sustainability into our purchasing decisions, reducing waste and improving our waste recycling as well as through continuous consultation with industry to identify and employ additional initiatives,” says the company. “We consider procurement as much more than cost, and for every tender we run, safety, quality, innovation and sustainability are key selection criteria.”

Source: [Scandlines](#)

Abu Dhabi Maritime asserts that “ethical and sustainable procurement is central to our sustainability strategy.” Mitsui O.S.K. Lines endeavours to “purchase and use environmentally safe goods and materials.”

Materials

Attica Group has implemented systems to ensure the sustainability of the materials it uses in its vessels. “We recognise that raw materials are not inexhaustible, but finite, and prioritise the use of natural resources as efficiently as possible,” says the company. “To achieve this, we implement programmes to monitor the use of materials; reuse materials; recycle materials; and dispose of materials properly.” The company adds: “We promote circular economy projects in making the furnishings for our terraces. We have brought in biodegradable tableware right across the fleet and reached an agreement with Ecoembes to recycle all plastic packaging.”

Hornblower focuses on improving the impacts of three types of materials: “Carpet – contains Everset Fibers made from post-consumer recycled material and is also recyclable. Countertops – indoor and outdoor bars are made from pieces of recycled glass by Vetrazzo, Inc. Interior signage – printed on Plyboo, a Forest Service certified product made from 100 per cent renewable materials.”

Viking Line prioritises “sustainable solutions in serving guests, such as porcelain, glass and melamine. The hot beverage mugs used on board for takeaway have the Nordic Swan ecolabel or are Programme for the Endorsement of Forest Certification (PEFC)-certified.” Wasaline states a commitment to “environmentally friendly materials.”

Brittany Ferries says: “In the cabin, refillable dispensers have replaced plastic individual soaps and cups are made of paper. The soaps and shower gels are now eco labelled: fragrance and dye free.”

Appliances

Several operators focus on the bathrooms of their ships for sustainability wins.

CTMA has achieved “complete elimination of hand paper thanks to the installation of electric dryers on board the CTMA Vacancier.”

Hong Kong Ferry (Holdings) Limited says: “We have introduced various devices to further reduce water consumption, including automatic water faucets and water-saving aerators in the restrooms.”

CURRENT REPORTED ACTIVITY

Scandlines explains that, in the first half of 2020, “we removed paper towel dispensers in the passenger areas on Copenhagen and installed electric hand dryers to reduce paper consumption and waste. The initiative was followed up with the installation of hand dryers on Berlin.”

Equipment on the administrative side of the business also offers opportunities for energy savings. Attica Group states: “80 per cent of monitors and 60 per cent of personal and laptop computers we use have energy-saving specifications.” The company also purchases equipment with Energy Star specifications.

Lighting

The switch to LED lighting is well underway in the sector, with Attica Group having replaced conventional light bulbs on 11 vessels with new LED bulbs. The Group also says it is “installing solar panels (on new catamarans launched in 2022) to meet lighting and electricity needs of onboard hotel services.”

Hornblower, Pentland Ferries and Red Tunnel Ferries all have LED lighting on their ships, with the latter company adding “We also have plans to install solar panels at our terminals in the future.”

Rederij Doeksen says of its decision to change to LED lighting on some of its ships: “This means less energy consumption and no chemical waste, or a reduction in CO2 emissions of 120kg per year.”

Stena Line says: “LED lights lower energy consumption, have a life span of five years and are also easier to replace. Our vessels, terminals and ports are gradually moving over to such alternatives. In 2017 we changed more than 2,500 light bulbs in the corridors onboard the four vessels that sail from Hoek van Holland.”

TT-Line notes: “The new ship is fully equipped with LED lights reducing the power demand for lighting by 80 per cent and ensuring a 10-times longer lifetime of the light sources.”

Windows

Sun Ferry states: “Tinted glass panels are installed in passenger cabins of our fast ferries to reduce solar radiation with the room temperature lowered, resulting in less power consumption from air-conditioning.”

Water

Reducing water and plastic waste is a focus for several operators. Attica Group has installed photocell-operated water faucets in public WCs onboard Blue Star Delos and Blue Star Patmos, while Pentland Ferries is finding that “a water refill point on Alfred reduces single-use plastics”.

Technology

Several operators have implemented technologies that only work when needed. Stena Line says: “Utilising cameras and sensors, the fans on the Stena Scandinavica car deck operate more flexibly, shutting off when not needed. Less noise and less energy consumed!” TT-Line’s cabins are equipped with an energy saving unit. “It interrupts the power circuit for lights and switches the heating to eco-mode if the customer is not in the cabin.” Wasaline has “flexible use of passenger areas with intelligent ventilation and lighting” as well as smart cabins.

Viking Line also uses dynamic ventilation and lighting to save energy. “Some spaces will be equipped with sensors. When these spaces are unused, the lights switch off automatically.” Similarly, the ventilation system is automatically turned off when spaces are not used for a while.

A range of other technologies are deployed by Viking Line to improve the sustainability of processes onboard its ships. “Using a unique vacuum process, heat is converted into electricity on Viking Grace,” says the company, which points out: “We are the first passenger shipping company on the Baltic Sea to utilise digital cabin keys. Since early 2020, passengers on Viking XPRS can use the Viking Line app as the key to their cabin.”

Wightlink has installed hybrid energy engines and a lift that “is capable of generating electricity through kinetic energy, warmth generated by the engine heats water on board and motion sensors are used to control LED lights in lesser-used areas.”

Sun Ferry says: “Tinted glass panels are installed in passenger cabins of our fast ferries to reduce solar radiation with the room temperature lowered, resulting in less power consumption from air-conditioning.”

Catering

Ditching the plastic in kitchens and dining areas is an obvious move that many companies are making. Brittany Ferries says: “In our restaurants, stainless steel cutlery has replaced plastic, coffee stirrers are made of wood and straws are made of paper.”

Rederij Doeksen says: “At our catering points, as many plastic cutlery and cups as possible have been replaced by metal cutlery and porcelain crockery. For our catering range, we choose as many products as possible with a UTZ quality mark.”

Wightlink is also replacing “plastic cutlery, plates and straws with sustainably sourced alternatives”.

CURRENT REPORTED ACTIVITY

Refrigerants

Refrigerants that have been proven to harm the ozone layer and/or cause global warming are being replaced with safer alternatives by some ferry lines.

Stena Line says: “In 2018 all the cooling refrigerants in fridges and freezers on Stena Jutlandica were replaced with new, more energy efficient and climate friendly products. Just like the old ones, the new cooling refrigerants have zero ozone-depletion potential. The big difference lies in the low global warming potential.”

Red Funnel Ferries states: “New chiller units have been installed on the ro-pax fleet which use the refrigerant R449A. This has zero ozone-depleting potential (ODP) and low global warming potential (GWP). The new R449A powered units provide a 63.8 per cent reduction in GWP and 64.4 per cent reduction in CO2 across the fleet.”

“New chiller units have been installed on the ro-pax fleet which use the refrigerant R449A. This has zero ozone-depleting potential and low global warming potential”

Red Funnel Ferries

Tallink Group remarks: “Our fleet is planning the replacement of R404A (e.g., Baltic Queen and Victoria I replaced their R404A with R407F). Others are following during their scheduled drydock (Silja Europa) or topping the systems up with R407F.”

Attica Group says: “We use refrigerants that do not affect the ozone layer...in 100 per cent of refrigerators and freezers onboard our vessels.”

Eco-friendly interiors boost life-cycle benefits



Mike Corrigan, CEO, Interferry

Ferry operators have long been acknowledged as leaders driving the shipping industry's sustainability initiatives, notably through the implementation of hybrid and fully electric propulsion systems to reduce GHG emissions. But these technical advances can be mirrored in many other areas of ship design.

Marine interiors are a perfect example of the varied opportunities that shipowners and designers are embracing like never before to further enhance sustainability – as illustrated by a responsible cabin design presentation at Interferry's 45th annual conference in Santander, Spain, in October 2021. Here, Anders Ørgård, chief commercial officer of OSK Group, Denmark's renowned naval architecture, interiors and maritime consultancy, told delegates about the development of a ground-breaking environmental performance system that offers ISO-validated calculations, optimisation and documentation for the life-cycle emissions of maritime products, designs and processes.

In relation to green cabins, Ørgård said the system had revealed remarkable reductions in carbon dioxide emissions when, for instance, carpets contained more polyester than wool or when ceiling panels were steel rather than aluminium. Referring to a cruise-ferry under construction for Italian operator Moby Lines, Ørgård also disclosed that selecting cushion-backed wooden chairs instead of fully upholstered units would reduce lifetime carbon dioxide emissions by the equivalent of 850 tons of fuel.

It is now clearer than ever that owners can make a significant difference by applying life-cycle thinking to select alternative materials. In doing so, they will be endorsing the circular economy and circular design principles, which tackle climate change by the design-based elimination of pollution. That's not only good for the planet, it's also good for business. Environmental concerns are fast becoming the norm among customers, so they are increasingly likely to support those companies that strive to reduce emissions.

Maintenance and refurbishment

Sustainability means different things over the lifetime of a ship. During construction of a newbuild, operators can take advantage of cutting-edge products and construction methods that help reduce their carbon footprint and enhance their green reputation. But once the ship is in service, all of these innovations are put to the test when it comes to keeping them clean, safe and functional. Further into the ship's working life, there are important decisions to be made regarding how to manage scheduled refurbishments in a way that doesn't cost the planet. This section of the report highlights a selection of solutions cruise and ferry companies have shared with us.

Maintenance

Sustainable cleaning products are a major area of focus for operators seeking to reduce the harm done to the environment by regular maintenance. Disney Cruise Line says: "Crew members use biodegradable cleaning products wherever possible, avoiding potentially harmful phosphates and other chemicals associated with traditional cleaners." TT-Line uses biodegradable chemicals and detergents while Tallink Group states: "Most of the detergents used by our cleaning personnel onboard our ships are biochemicals." Elixir Boutique Cruises says: "We utilise environmentally friendly cleaning products."

Stena Line has introduced a novel way of reducing the use of all cleaning products: "By utilising microfibre cloths when cleaning we manage to keep the use of detergents to a minimum. The idea first came from a staff member on board the Stena Nordica in 2013 and has now become standard on all Scandinavian vessels." Stena AB says it has been working actively for many years to increase the proportion of eco-labelled cleaning products onboard. "In 2020 64 per cent of all the cleaning products on their vessels operating in Scandinavia were eco-labelled."

The basic mantra of "Reduce, reuse, recycle" is still popular with cruise and ferry lines. Ideas shared for this report include Attica Group's "Use clean damaged sheets, towels, pillowcases and other fabrics to clean various surfaces and in the engine room, with over 40,000 reused in 2020" and Irish Ferries' "Bulk purchasing to reduce the number of deliveries and packaging, and segregation of all waste cardboard packaging for recycling." Caledonian MacBrayne favours "Optimising and efficiently using resources whilst maximising reuse and recycling opportunities and minimising waste," while Condor Ferries opts to "minimise our waste and then reuse or recycle as much of it as possible." Mitsui O.S.K. Lines participates in 'Plastic Smart' initiatives hosted by the Ministry of the Environment of Japan.

Some cruise lines are working with specialist partners to manage their maintenance impacts. Norwegian Cruise Line says Ecolab has been a trusted business partner since 2015, providing public health and food safety expertise and a range of cleaning and disinfectant products for shipboard use.

“This year, we kicked off a joint effort to reduce the environmental impact of these products. The Ecolab programme will be phased in over the next 18 months across our entire fleet and have a lasting and powerful impact in many ways. For example, our current floor cleaner requires a second mopping with water to remove any cleanser residue. By using a no-rinse, more highly concentrated formulation of floor cleaner, we will completely eliminate the rinse stage of floor mopping. This eliminates the use of clean water and the disposal of used rinse water. Additionally, the concentrated formulation will reduce the number of plastic jugs used by 50 per cent and avoid sending used jugs for disposal.” The company also donates a relatively high proportion of materials that are no longer needed onboard its ships following scheduled maintenance.

Refurbishment

The greatest ambition for sustainability-focused operators during refurbishment projects is also perhaps the greatest challenge: that of reducing the volume of waste going to landfill.

“Our refurbishment programme is critical to maintaining our competitive advantage by keeping our fleet in pristine condition and continuing to enhance the guest vacation experience,” says Robin Lindsay, Executive Vice President, Vessel Operations, Norwegian Cruise Line. “We minimise waste by recycling and donating to support communities and also use these opportunities to take advantage of emerging technologies that result in more energy-efficient and technologically advanced vessels.”

“Our refurbishment programme is critical to maintaining our competitive advantage by keeping our fleet in pristine condition and continuing to enhance the guest vacation experience”

Robin Lindsay, Executive Vice President, Vessel Operations, Norwegian Cruise Line

Celebrating older elements that have become design classics when renovating the interiors of vessels is a growing style trend in both cruise and ferry interior upgrades. For Blue World, this entails the use of “luxurious refurbished materials that evoke the soul of cruising – like rich, yacht-like polished teak decking and other features far too costly to build now.” In a similar vein, Phoenix Reisen says that refurbishment of its ships every year or every two years “serves not only to beautify, but also to a large extent to improve technology and implement state-of-the-art facilities. The classic, original teak deck coverings are sustainably preserved on all ships and maintained in an environmentally friendly manner.”

CURRENT REPORTED ACTIVITY

Polar Pioneer Management says its expedition ship is “upcycled with a focus on sustainability. Instead of a resource-heavy newbuild, we’ve chosen to sustainably upcycle this beloved polar vessel that comes with a rich history. We’re keeping as much of her original materials as possible, repurposing and refinishing where we can in order to minimise waste and maintain her unique character. Moreover, all decisions about new materials brought into the refit are through the lens of environmental sustainability. From cleaning materials that are biodegradable, to ropes made with recycled plastics, to low-impact staff clothing and an aim to reduce single-use plastics on board to zero, no stone is being left unturned.”

It all comes down to making sustainability the basis of all choices in the refurbishment journey for Ambassador Cruise Line, which says: “Within the guest areas, Ambience is being refurbished and upgraded, with sustainability central to decision making.”

Circularity

For passenger shipping companies, there are clear benefits to improving their performance regarding the environmental impacts of maintenance and refits, from cost savings to compliance with regulatory requirements, as well as appealing to guests who want to tread more lightly as they travel. A circular approach to waste management and extending the lifespan of materials is of particular interest to a growing number of cruise and ferry lines.

Carnival Corporation says: “As the world shifts towards a circular economy model where materials flow around a ‘closed loop’ system, rather than being used once and then discarded, we too are shifting how we work with our supply chain partners to reduce waste.” The company has set an aspiration to send 100 per cent of waste to waste-to-energy facilities by 2050.

Meanwhile, Carnival’s brands are making headway in various ways towards the goal of circularity. Costa Cruises says it implements “circular economy projects aimed at recovery of material used on board” and focuses on the “extension of the life cycle of objects and positive impact on communities.” Holland America Line says: “It is our shared responsibility to limit our environmental footprint. The more we learn, the more we must be willing to move in the direction of zero-impact. We are committed to reducing, reusing, recycling, as well as to properly disposing of the waste we generate.”

For Disney Cruise Line, identifying all sources of the company’s Scope 3 emissions – which can range from viewing a movie to the life-cycle impacts of physical products – is key to managing impacts. The company describes this as “a tremendous challenge, but one that we are currently working to complete in order to identify the greatest impacts and the best opportunities to reduce them.”

Norwegian Cruise Line states: “We are embracing the principles of a circular economy and working to adopt and apply these principles in our waste mitigation strategy. Our progressive waste mitigation programme lessens the environmental impact of our operations, reduces pollution, promotes diversion of material from landfills, conserves natural resources and saves energy. We reduce waste through reusing and recycling, with clear benchmarks serving as the measurement of progress.”

Anek Lines claims to be the first shipping company in Greece and Europe to support an integrated programme that rewards recycling. The company says it “undertook the exclusive sponsorship of the Integrated Centre for Rewarding Recycling in the Port of Piraeus, giving many of its passengers the chance to actively contribute towards the protection of the environment.”

Baleària reused plastic packaging to build the furniture for the terraces of two of its ships (Bahama Mama and Abel Matutes). “Ecoembes and Reciclamás were responsible for collecting the plastic packaging generated on board several ships and at maritime stations, and the companies CmPlastik and Las Aventuras del Señor Maco converted an equivalent amount of recycled plastic into furniture,” says the company, adding: “It is also worth noting that this material is stronger and more resilient than that commonly used in outdoor furniture on ships, so it is expected to last longer and require less maintenance.”

“As the world shifts towards a circular economy model where materials flow around a ‘closed loop’ system, rather than being used once and then discarded, we too are shifting how we work with our supply chain partners to reduce waste”

Carnival Corporation

Scandlines is committed to achieving SDG 12: Responsible consumption and construction. “We commit to integrating sustainability into our purchasing decisions, reducing waste and improving our waste recycling as well as through continuous consultation with industry to identify and employ additional initiatives,” explains the company.

Sun Ferry is supporting the novel concept of a Reverse Vending Machine Pilot Scheme, launched by the Environmental Protection Department in 2021 with the aim of installing the machines at Hung Hom Pier and Kowloon City Pier that facilitate passengers to return used plastic beverage containers. Also targeting passengers, in 2019 Stena Line tested interactive, solar-powered waste bins on Stena Danica. “The so-called Bigbellys encourage guests to keep the deck and ocean litter-free using sound interaction,” says the company.

Stena RoRo says: “Waste handling and recycling are integral aspects in the decision process and operation, in all facets of the life cycle.” Tallink Group says it has a policy to “develop circular economy principles within our company and send as many items as possible to reuse that we no longer have use for ourselves.”

CURRENT REPORTED ACTIVITY

By working with suppliers, operators can increase the level of circularity they achieve. Viking Line explains: “Since 2014, nearly 93,000kg of wall-to-wall carpeting from the company’s vessels have been returned to the carpet supplier Tarkett. The French manufacturer has launched a pioneering project to recycle its corporate customers’ used carpeting, which is collected at the end of its economic life and processed into material for new carpets. As a result of this recycling and new production methods, progress is being made to complete the life cycle of this product in operations.”

Ship recycling

Disposing of ships that are being retired from fleets is a hugely waste-intensive undertaking. Regulation (EU) 1257/2013 (Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships) provides a framework for companies to follow when undertaking recycling of their vessels, building on the (not yet ratified) original Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships as proposed by IMO.

In August 2020, Carnival Corporation announced agreements with maritime reclamation and recycling specialists Ege Celik and Simsekler “to responsibly dismantle and recycle two retired ships scheduled to leave our fleet. Ships will be stripped of machinery, electronic equipment, glass, wood, and other materials that can be directly upcycled for reuse in new ships, used in ship repair or repurposed for other applications. Steel and metal scraps will be salvaged and recycled for direct use or be sent to the mill for producing other products and goods.”

Royal Caribbean Group says: “Our [shipbreaking] policy requires that the yard conducting the process follows the European Union regulations and the IMO Hong Kong Convention for the safe and environmentally sound recycling of ships.”

Among those ferry companies that explicitly state their ship recycling policies on their websites, Mitsui O.S.K. Lines says it is committed to “utilising recycling yards certified by ClassNK as compliant with the Ship Recycling Convention” while Tallink Group says it complies with the requirements of the Regulation (EU) 1257/2013 (Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships) on Ship Recycling.”

Stena AB has a particular focus on the environmental performance of the locations chosen for recycling its ships: “For Stena’s shipping activities, the environmental conditions at yards where vessels are recycled are important. To handle these issues in maritime activities, Stena has a Group Ship Recycling Policy.”

INTERNATIONAL WISDOM



Cross-industry design priorities

Every design choice represents an opportunity to build a future that is more protective of natural resources. To date, the sustainability discussions around passenger ships have focused mainly on fuel and emissions associated with their itineraries. However, a significant portion of the carbon footprint of newbuilds is in the form of embodied carbon from emissions associated with manufacturing and construction.

The key GHGs emitted by human activities that cause warming of the atmosphere are carbon dioxide CO₂, methane (CH₄) and nitrous oxide (N₂O). Although not a gas, black carbon also causes atmospheric warming. Of these, CO₂ is by far the most abundant. Roughly 40 billion metric tons of CO₂ are generated each year by activities including transportation, electrical generation, cement manufacturing, deforestation and agriculture.¹

“Roughly 40 billion metric tons of CO₂ are generated each year by activities including transportation, electrical generation, cement manufacturing, deforestation and agriculture”

NOAA

“Society’s expectation and regulation require that the maritime industry be fully sensitive to the environment through the reduction of harmful emissions, contamination of the seas and more efficient use of sustainable resources,” says the Royal Institute of Naval Architecture. “The thoughtful design and construction of marine vessels and structures can have significant influence in achieving these.”²

As ships reduce their fuel-related environmental impacts, the proportion of non-operational impacts will grow, potentially attracting greater regulatory attention. A circular approach to the design of products and services reduces environmental impact and facilitates future reuse, recovery and recycling.

¹ Source: NOAA, [NOAA Research News](#)

² Source: Royal Institute of Naval Architecture, [Maritime Environment Group](#)

A checklist for sustainable design

According to the American Institute of Architects (AIA), “good design depends on informed material selection, balancing priorities to achieve durable, safe, and healthy projects with an equitable, sustainable supply chain to minimise possible negative impacts to the planet.” The AIA sets out a series of questions that prompt better decisions in this process:

- What factors or priorities will be considered in making material selection decisions?
- How are materials and products selected and designed to reduce embodied carbon and environmental impacts while enhancing building performance?
- How can material selection reduce hazards and support equitable labour practices in the supply chain?
- How does the project promote zero waste throughout its life cycle?
- How does the project celebrate local materials and craft?
- How long will the project last, and how does that affect your material?

Source: The American Institute of Architects, [Design for Resources](#)

Green design ideas

While operational emissions can be addressed through improvements to energy efficiency or switching to better fuels and renewables over time, embodied carbon emissions from construction enter the atmosphere as soon as a structure is built. For this reason, it makes sense to prioritise green construction and material choices during the planning and design stage. This can mean reducing refurbishment interventions by reusing furniture and fittings, along with extending the life of existing materials and products and choosing lower-carbon materials for essential works.¹

Environmentally friendly ‘eco-design’ approaches seek to reduce harmful environmental impacts across the life cycle of products, taking into consideration everything from extraction of raw materials to production, distribution, use, recycling and disposal. The focus is on minimising environmental impact and maximising business impact along the life cycle by designing a circular system around them.

When it comes to improving the maintenance, refurbishment and cost-effective disassembly of ship interiors, maritime designers can benefit from developments in the aviation world, where moves to reduce the impact of material extraction are underway. Strategies such as enabling reuse, facilitating disassembly, ensuring materials are identifiable (especially composites) and prioritising in-life upgrades are predicted to have a profound positive effect on the life cycle impact of cabins. In particular, incremental weight reduction of cabin components, while challenging, can help reduce resource consumption and GHGs.²

¹ Source: Carbon Leadership Forum, [The Carbon Challenge](#)

² Source: Aerospace Technology Institute, [FlyZero Report](#)

Procurement practices come in for enhanced scrutiny when planning for sustainable interiors. Factors to consider include use of salvaged or recycled materials; choosing materials with carbon sequestering properties; specifying that manufacture incorporates the use of renewable energy; sourcing locally; and using low-emission transportation to move materials.¹

Maritime interiors are also taking influences from ideas about green building best practices in the hotel construction sector, spanning a range of best practices, from avoiding environmentally harmful materials to using energy-efficient technology in construction.

The 2019 IFC report ‘Green Buildings: A Finance and Policy Blueprint for Emerging Markets’ defines a green building as satisfying all three of the following criteria: certified as green under one of the internationally recognised certification standards or an approved national standard; at least 20 per cent more resource efficient than a baseline building without resource-efficient design; and able to quantitatively report impact metrics, such as energy, water and materials savings, and GHG emissions reductions.²

The Global Sustainable Tourism Council for hotels sets three green design criteria: use of local materials, practices and crafts where practicable and appropriate; sustainable design, materials and construction practices, with appropriate certification where possible; and environmentally sound sorting and disposal of waste from construction.³

Building certification schemes

Certification schemes such as BREEAM and the US Green Building Council’s LEED system encourage sustainable choices to be made in the early stages of design. Although they were conceived for land-based construction needs, ship owners are increasingly exploring if it is possible to certify through them.

LEED

Promoted as “the world’s leading green building project and performance management system,” LEED (and in particular, the latest set of strategies established by LEED 4.1) seeks to deliver a comprehensive framework for green building design, construction, operations and performance, focusing on material selection, human comfort, air quality and human health features of a building as well as social equity.

LEED 4.1 certification prioritises the use of sustainable materials by manufacturers, lowering a building’s environmental impact and helping reduce “energy, water, waste during manufacturing, carbon footprint during distribution and transportation and overall carbon emissions through the entire production life cycle”.⁴

¹ Source: Carbon Smart Materials Palette, [Whole Building](#)

² Source: International Finance Corporation, [Green Buildings](#)

³ Source: Global Sustainable Tourism Council, [GSTC](#)

⁴ Source: US Green Building Council, [LEED 4.1](#)

This impact-reduction approach to an interior's life-cycle shifts the emphasis towards design for flexibility and adaptability by fostering integrative planning. The pressure to ensure durability and recycling of materials encourages installation of movable and demountable walls and rooms/cabins, plug-and-play lighting, and reusable materials for flooring and other aspect of refurbishment projects.

The American Institute of Architects' Framework for Design Excellence

AIA'S FRAMEWORK FOR DESIGN EXCELLENCE



Design for integration. Good design elevates any project, no matter how small, with a thoughtful process that delivers both beauty and function in balance. It is the element that binds all the principles together with a big idea.



Design for equitable communities. Design solutions affect more than the client and current occupants. Good design positively impacts future occupants and the larger community.



Design for water. Good design conserves and improves the quality of water as a precious resource.



Design for eco-systems. Good design mutually benefits human and nonhuman inhabitants.



Design for economy. Good design adds value for owners, occupants, community, and planet, regardless of project size and budget.



Design for energy. Good design reduces energy use and eliminates dependence on fossil fuels while improving building performance, function, comfort, and enjoyment.



Design for well-being. Good design supports health and well-being for all people, considering physical, mental, and emotional effects on building occupants and the surrounding community.



Design for resources. Good design depends on informed material selection, balancing priorities to achieve durable, safe, and healthy projects with an equitable, sustainable supply chain to minimize possible negative impacts to the planet.



Design for change. Adaptability, resilience, and reuse are essential to good design, which seeks to enhance usability, functionality, and value over time.



Design for discovery. Every project presents a unique opportunity to apply lessons learned from previous projects and gather information to refine the design process.

Source: [The American Institute of Architects](#)

INTERNATIONAL WISDOM

BREEAM

The BREEAM certification system measures sustainable value in a series of categories that address aspects such as: low impact design and carbon emissions reduction; design durability and resilience; adaption to climate change; and ecological value and biodiversity protection.

BREEAM is particularly concerned with the following aspects of design: energy, health and wellbeing, innovation, land use, materials, management, pollution, transport, waste and water. With the exception of transport and use (although these aspects do form part of wider supply chains), all of these elements are directly applicable in a maritime design context, making BREEAM a promising tool for measuring the sustainability impacts of interior designs on passenger ships.¹

These two frameworks, alongside the others referenced in this report, are covered again under frameworks standards and certification, starting on [page 100](#).

¹ Source: BREEAM, [How BREEAM Certification Works](#)

Circularity, waste and pollution

A circular economy accounts for all of the impacts of materials and activities and seeks to avoid waste through careful choices at the planning stages. The responsible use of materials and deployment of eco-design principles eventually enable businesses following a circular approach to attain zero-waste status.

“In the ideal circular economy, there’s no such thing as waste. The ultimate goal is for economic growth to be independent of environmental impact. It encourages the use of renewable energy and materials and can be accelerated by digital innovation”

EFQM

By applying circular economy principles (cutting waste and pollution; circulating products and materials, and focusing on protecting and regenerating nature), organisations can build resilience while gaining a clearer idea of the true value of the resources they use and how to deploy them most efficiently. This allows for better risk mitigation as growth is decoupled from environmental impact – a core requirement of true circularity.

The EFQM’s Circular Economy Models document states: “In the ideal circular economy, there’s no such thing as waste. The ultimate goal is for economic growth to be independent of environmental impact. It encourages the use of renewable energy and materials and can be accelerated by digital innovation.”¹

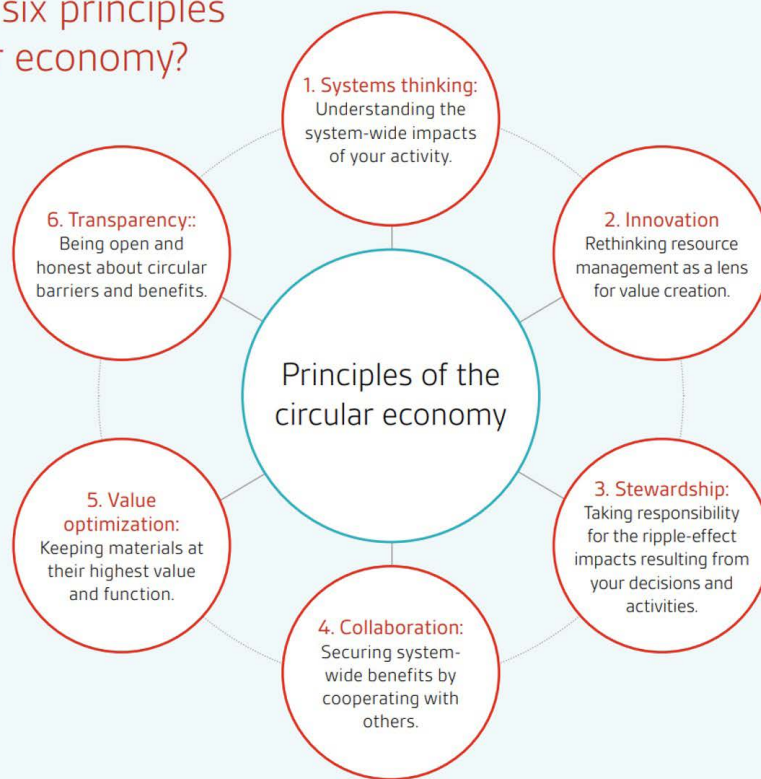
As the environmental, social and regulatory risks attached to linear business models become clearer, circular models are increasingly seen as adding value and reducing investment risks. According to the World Resources Institute, “The unrealised wider economic benefits of transitioning to a circular economy is currently valued at US\$4.5 trillion over the next decade, exceeding the estimated benefits from business as usual within the current linear economy.”²

¹ Source: EFQM, [Circular Economy Models](#)

² Source: World Resources Institute, [Platform for Accelerating the Circular Economy](#)

The principles of the circular economy

What are the six principles of the circular economy?



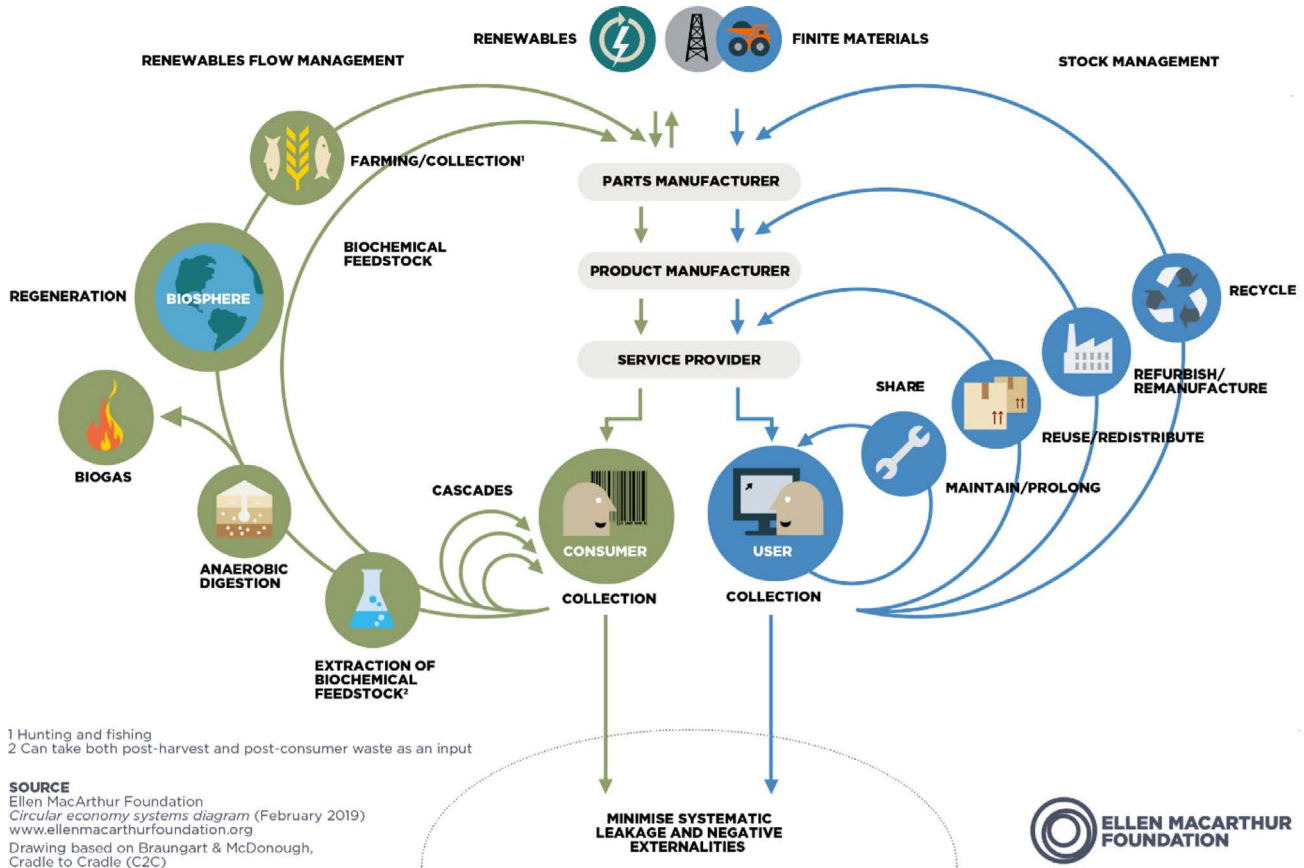
Source: British Standards Institute, [Executive Briefing](#)

According to the Ellen MacArthur Foundation, because a circular economy decouples economic activity from the consumption of finite resources, “it is a resilient system that is good for business, people and the environment.”¹

The move to circularity involves overturning the traditional linear economic model, also known as the ‘take, make, dispose’ model, which has driven industrial development for decades and which presupposes easy access to cheap materials and energy. The linear model also does not take account of the significant amount of resource waste and pollution that is inevitably generated. Circularity therefore requires that economic activity moves away from the consumption of finite resources, while eliminating waste and pollution.

¹ Source: Ellen MacArthur Foundation, [What is a circular economy?](#)

Circular economy butterfly diagram



Source: [Ellen MacArthur Foundation](http://www.ellenmacarthurfoundation.org)

Reducing these impacts, however, requires cooperation amongst a wide range of stakeholders, along with the political will to radically change how things are done. “Since a circular approach contrasts sharply with most of today’s linear industrial operations, this transformation will require significant changes in government policies, corporate behaviour and consumption patterns.”¹

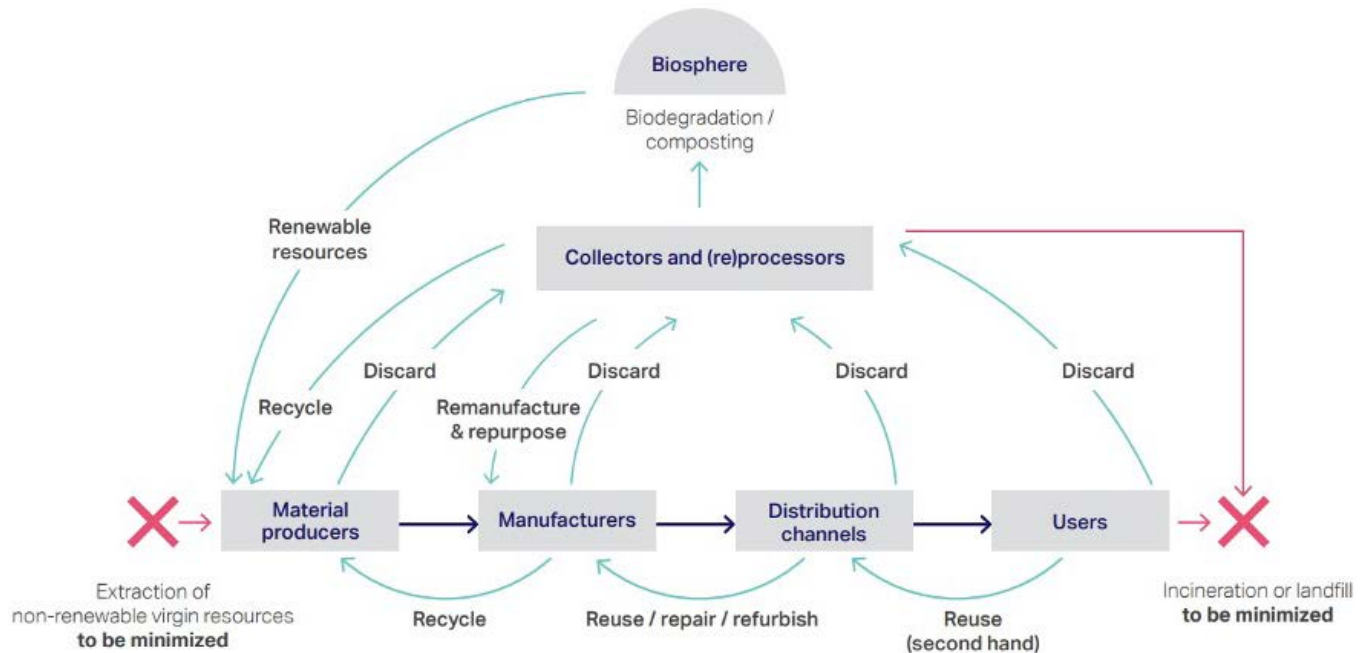
Some of the major changes that are needed include the development of policies for green public procurement, product standards for durable design and measures against planned obsolescence, along with meaningful support for businesses engaged in making items reusable, and transparent information on product reparability.²

In the circular economy, the recovery of materials is strictly monitored to ensure that technical and biological recovery cycles are managed safely and that reused materials are appropriately disposed of at the end of their useful lives. In addition, bio-based resources must be sustainably sourced.

¹ Source: World Benchmarking Alliance, [Measuring What Matters Most](#)

² Source: Green Alliance, [The Commission's Final Report](#)

WBCSD Technical and biological recovery cycles



Source: World Business Council for Sustainable Development, [Circular Transition Indicators](#)

In order to account for all inputs, a circular economy approach needs to incorporate the full range of activities needed to close the loop: make, maintain, repair, reuse, recycle, waste, replace.

Construction is responsible for well over half of the extraction of virgin resources and contributes to some 60 per cent of total waste streams.¹ Applying circular economy principles to structural design can help organisations make strides towards redressing this imbalance. This requires maximising the value of materials while minimising the amount of embodied energy that designs generate.

For designers, this means starting with the end point in mind and optimising designs for the life of products while prioritising the reuse of materials.

According to an EEA report, 'Waste prevention in Europe – policies, status and trends of reuse in 2017', 18 of 33 reviewed waste prevention programmes had explicit objectives for the reuse of products but only 10 per cent included regulatory measures and 8 per cent cited economic instruments.²

¹ Source: The Institution of Structural Engineers, [Practical Application of Circular Economy Principles](#)

² Source: European Environment Agency, [Waste Prevention in Europe](#)

Regulatory frameworks have a vital role to play in enabling good practice. The European Commission notes that: “While up to 80 per cent of products’ environmental impacts are determined at the design phase, the linear pattern of ‘take-make-use-dispose’ does not provide producers with sufficient incentives to make their products more circular.” Global standards are needed to tackle the problem of products that are not designed for easy repair or reuse – or even for more than single use.

Circular design

Design is crucial to the achievement of a circular economy, as it is at the design stage that decisions are made that can eliminate waste and pollution. Also, by designing for longevity, it is possible to keep products and materials in use for longer. These two factors then enable the third pillar of circular business, which is the regeneration of natural systems.

Carbon emissions from operations have long been the main focus of concern and regulation in shipping. However, the circular economy casts a spotlight on the significant carbon emissions from the construction of ships. These are embodied emissions that stem from the production, procurement and use of materials and components. Of particular interest for designers are the part of these embodied emissions related to maintenance, repair, refurbishment and replacement of items.

The evolution of shipping to be more environmentally friendly from an operational perspective (including use of low-emission fuels and renewables) means that the big future wins from a sustainability perspective will be in other areas such as the materials used onboard. This is where a circular approach can pay dividends, enabling organisations to achieve their SDG targets and future-proof their activities.

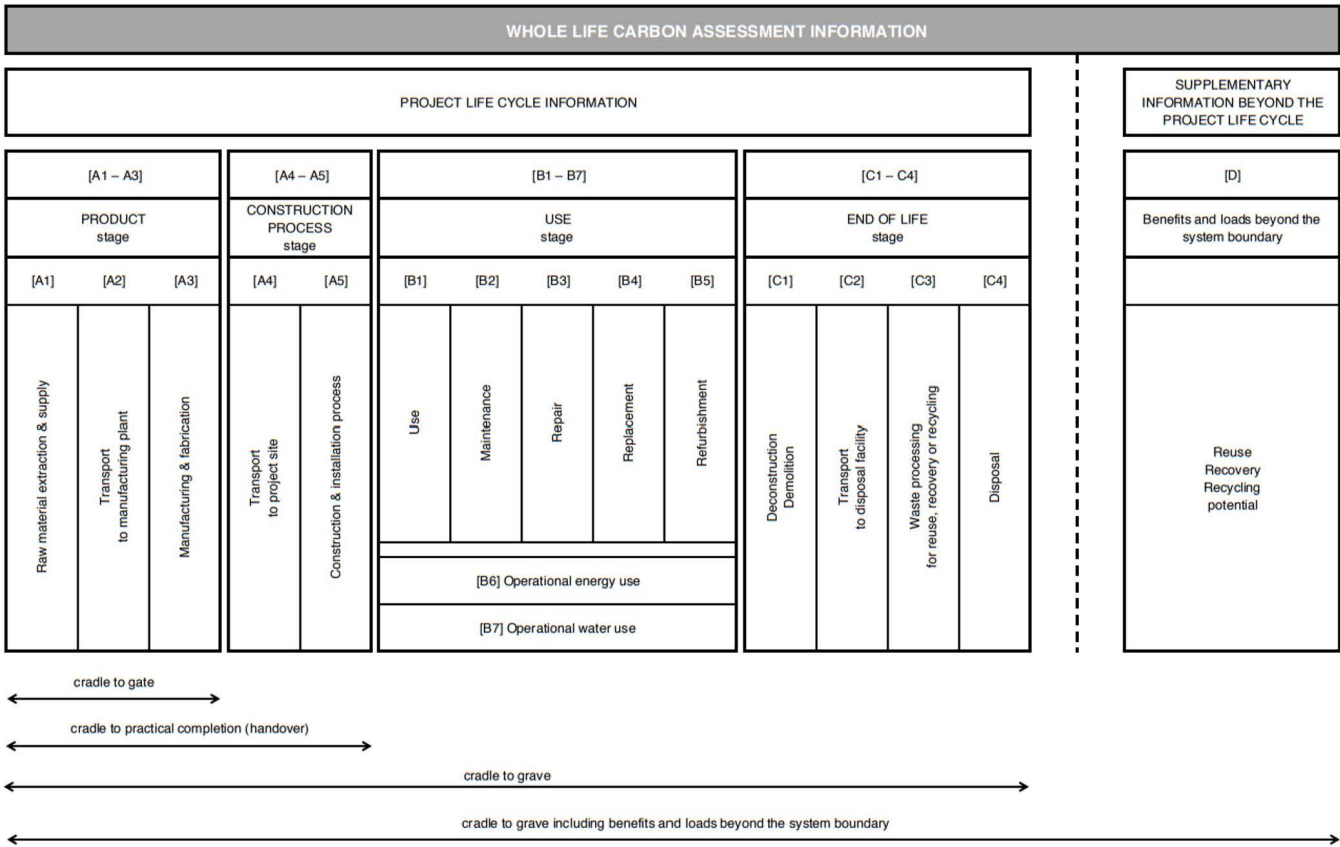
The implications of this shift for design, production and use of products are profound. For designers in particular, this means focusing on ways to eliminate waste and pollution over the life cycle of products, since the design determines in large part the environmental impact of the product or installation over its entire life cycle.

Circular economy business models

- Replacing traditional material inputs derived from virgin resources with bio-based, renewable, or recovered materials
- Recycling waste into secondary raw materials, which reduces the extraction and processing of virgin natural resources
- Extending the use period of existing products, which reduces waste generation
- Facilitating the sharing of under-utilised products, leading to less demand for new products and their embedded raw materials
- Marketing services rather than products, improving incentives for green product design and more efficient product use.

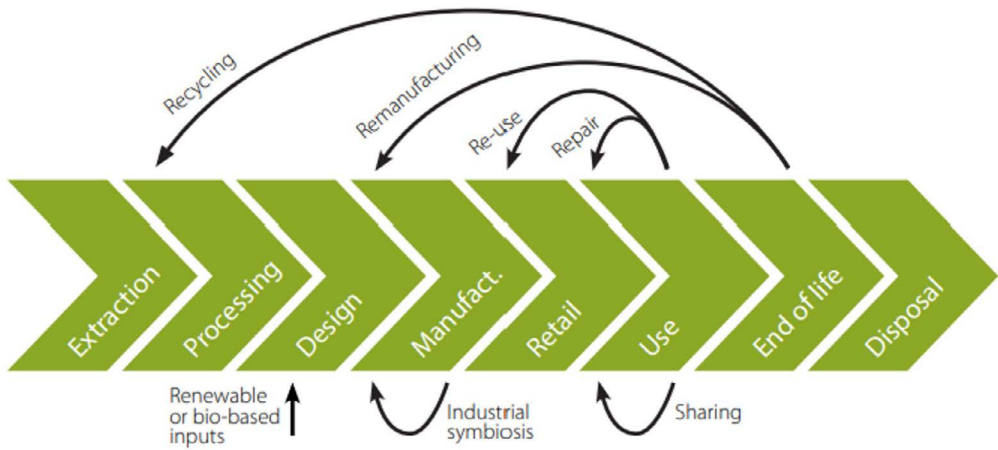
Source: OECD, [Business Models for the Circular Economy](#)

Whole-life carbon assessment for the built environment



Source: Royal Institute of Chartered Surveyors, [Whole Life Carbon Assessment](#)

Business models operate in different parts of the value chain



Source: OECD, [Business Models for the Circular Economy](#)

The need to think differently about the types of materials they commission, based not only on visual ideas and comfort but on material sustainability, requires a commitment to ensuring the longevity of materials. As operators face increasingly stringent regulations regarding recyclability, those designers that are ready for the new challenges this imposes will be in high demand.

Life-cycle analysis

Life-cycle analysis enables companies to assess the impacts associated with construction and refurbishment activities. In particular, it studies the impacts of the extraction and production of seven metals (iron, aluminium, copper, zinc, lead, nickel and manganese) and two construction materials (concrete and sand and gravel), which can exacerbate a range of problems including acidification, climate change, cumulative energy demand, eutrophication, human toxicity, ozone layer depletion and photochemical oxidation. The OECD warns that despite interventions, these global environmental impacts are projected to more than double and in some cases even quadruple by 2060. Best practice requires mapping of the full life cycle of each product, flagging aspects such as chemical safety, resource use and circularity, GHG emissions, and impacts on ecosystems.¹

“About 75 per cent of all aluminium produced since commercial manufacturing began in the 1880s is still in productive use as secondary raw material”

Institute of Scrap Recycling Industries

The life cycle approach has implications for how waste disposal and recycling are perceived and valued. For minerals, recycling is likely to displace primary resource extraction as technology improves and the true costs of production begin to be applied across the life cycle.

Already, 70 per cent of all US produced steel and stainless steel is made from scrap² and this percentage will grow as recycling becomes more attractive. Similarly, the Institute of Scrap Recycling Industries notes: “About 75 per cent of all aluminium produced since commercial manufacturing began in the 1880s is still in productive use as secondary raw material.”³ This trend is set to spread across all construction materials that have the potential for sustainable reuse.

¹ Source: OECD, [Global Material Resources Outlook](#)

² Source: Institute of Scrap Recycling Industries, [Recycling is Essential](#)

³ Source: Institute of Scrap Recycling Industries, [Recycling Industry Yearbook](#)

INTERNATIONAL WISDOM

Most valuable scrap materials

- Non-ferrous metals – do not degrade or lose their chemical properties in the recycling process, which allows them to be recycled an infinite number of times
- Iron and steel – (producing steel from ferrous scrap requires 60 per cent less energy and reduces CO2 emissions
- Recovered paper and fibre – manufacturing paper and paperboard with recycled materials uses up to 68 per cent less energy than using virgin materials
- Plastics – recycling one ton of plastic bottles reduces GHGs by 3,380 lbs
- Rubber – the use of recycled rubber in moulded products reduces GHG emissions by 25-80 per cent compared to using virgin plastic resins
- Glass – the container and fibreglass industries purchase 3.35 million tons of recycled glass annually
- Textiles – the textile recycling industry's total economic impact in the United States is nearly US\$1.2b

Source: Institute of Scrap Recycling Industries, [Recycling Industry Yearbook](#)

Waste and pollution

One of the great gifts of the circular economy is its reframing of waste as a resource that has value. Less than 20 per cent of waste is recycled each year and by 2050, worldwide municipal solid waste generation is expected to have increased by roughly 70 per cent to 3.4 billion metric tons.¹ If this growth industry can be harnessed appropriately, it will reduce not only the amount going to landfill but also the negative impacts of resource use.

This requires a drastic realignment of priorities. Indeed, the United Nations Framework Convention on Climate Change urges: “Materials companies can and must become waste-treatment and waste-use companies that see waste as a resource such that waste becomes like virgin materials in value.”²

Regional initiatives are already underway, such as the European Commission’s revised waste legislative framework, which seeks to implement more ambitious recycling rates along with simplification and harmonisation of definitions and calculation methods for recycled material. The framework also focuses on reinforced rules and new obligations on separate collection, along with minimum requirements for Extended Producer Responsibility and stronger waste prevention and waste management measures.³

¹ Source: Statista, [Global Waste Generation](#)

² Source: United Nations Framework Convention on Climate Change, [Meeting Report](#)

³ Source: European Commission, [Report from the Commission](#)

Waste management hierarchy



Source: US Environmental Protection Agency, [Sustainable Materials Management](#)

Certification bodies provide guidance to businesses regarding changing waste management obligations. LEED 4.1 certification requires that organisations provide safe storage and recycling of facility maintenance waste and have individual project plans for renovation waste. They must also separate facility maintenance and renovation waste from ongoing waste and address safe storage and recycling and diversion of waste associated with maintenance activities.¹

“Materials companies can and must become waste-treatment and waste-use companies that see waste as a resource such that waste becomes like virgin materials in value”

United Nations Framework Convention on Climate Change

Green Marine’s Level 2 waste management performance indicators for ships requires that all vessels are equipped with recycling bins and staff receive training on user procedures and the waste management hierarchy (reduce, reuse, recycle, recovery, disposal). There is a requirement to favour suppliers that use less packaging and to encourage the use of reusable, biodegradable and/or recyclable supplies. In addition, shipboard incineration is not permitted at port.²

¹ Source: US Green Building Council, [LEED v4.1](#)

² Source: Green Marine, [Environmental Program](#)

It is important to check claims of compostability of materials and products. While everything that is compostable is biodegradable, not everything that is biodegradable is compostable.¹ Biodegradable items will decompose but this may take a long time and create environmental problems in the process. Compostable items must degrade in a specific timeframe and environment according to standards set by organisations such as the American Society for Testing and Materials (ASTM). For this reason, labelling products as ‘biodegradable’ can be regarded as misleading to consumers and is illegal in some US states.

For a plastic to be considered compostable it must:

- Biodegrade into carbon dioxide, water and biomass, with 90 per cent of the organic materials converted into CO₂ within six months
- Disintegrate so that after three months’ composting and subsequent sifting through a 2mm sieve, no more than 10 per cent residue remains
- Meet eco-toxicity standards, such that biodegradation does not produce any toxic material and the compost can support plant growth.²

¹ Source: Biodegradable Product Institute, [Certified Compostable](#)

² Source: British Plastics Federation, [Polymer: Bio-based/Degradables](#)

Life cycle of ships: reliable guidance

“Demolition and recycling of a cruise vessel is quite different from a cargo vessel because of the sheer size and volume of accommodation. Before the steel of a vessel can be cut, the interior needs to be taken out, and for cruise vessels this has proven to be quite a challenge. We have seen that the interiors of the vessels we have dealt with were not designed to be taken apart easily, or at least the recycling yard had no idea how to disassemble the interior in such a way that most of the material could be saved and reused. As a result, walls and ceilings of cabins and other parts of the accommodation are mostly torn or broken out and potentially good materials go to waste. Really sustainable maritime interiors would need to follow the cradle-to-cradle concept. We believe that a lot more material from cruise vessels could be reused or recycled, and ultimately material loops could be closed, if end-of-life recycling would be taken into account in the design and building phase. Sea2Cradle’s advice to companies responsible for interior design projects would thus be to design and build the interior of vessels with the end of life in mind, focusing on modular design and ease of disassembly, and only using materials that can be reused or recycled.”

Bert van Grieken, Commercial Director, Sea2Cradle B.V.

“We’re happy to share some of our focus points for the large yachting sector when it comes to interiors:

- Apply life-cycle assessment (LCA) when selecting materials and interior elements in the design process so the entire life cycle is overseen and optimised for. Considering impact and waste throughout the build and maintenance stages, but also especially end of life, is often overlooked in the design stage, creating a problem when an interior is being taken out.
- Actively propose sustainable solutions and choices to clients, based on the LCA approach.
- Use recycled materials: impacts administered to a secondary user are significantly lower than the first user of virgin materials. Use natural materials and source as local as possible.
- Select materials that require little climatisation so that the HVAC system’s capacity and thus onboard energy consumption can be kept to a minimum.
- Reduce interior weight as much as possible by selecting lightweight materials or working with panels instead of massive products.
- We are currently working to provide a tailored LCA course with an accredited provider.”

Robert van Tol, Water Revolution Foundation

Supply chain, procurement and specification

Transparent and responsible supply chains that offer visibility of environmental, social and economic risks are an integral part of a sustainable economy. In particular, sourcing of materials needs to take account of impacts across the supply chain.

With corporate GHG emissions in a company's supply chain on average 11.4 times higher than operational emissions (includes land-based companies),¹ businesses need to address these often hidden impacts if they are to have any chance of performing sustainably.

Sustainable procurement and purchasing policies enable organisations to clarify their priorities and align their activities with their principles to achieve ESG targets. Companies engaged in the travel business can also create awareness among their guests, which is good for business. For cruise and ferry operators, refits and refurbishment processes can become opportunities to collaborate on achieving their climate ambitions by working with design companies that help them source and dispose of materials and fittings sustainably.

While this starts with creating visibility of raw materials and commodities in the supply chain, according to the Textile Exchange, eventually it should include “the broader geographical context and landscape, including aspects affecting biodiversity such as impacts to habitat condition and connectivity, proximity to areas of high conservation value, conservation of important watersheds, and other crucial elements, many of which are highly site-specific.”²

In addition to ensuring that they do not select suppliers that fall short of the required standards, businesses can also work with their suppliers to help them become more sustainable through actions such as setting up communications channels to increase transparency, providing training programmes, establishing shared platforms where data about the supply chain can be shared, and benchmarking with other organisations to glean best practice ideas.³

Specification and procurement

Sustainable procurement is about more than choosing products that claim to be environmentally friendly, sustainable or even zero-carbon. Certification schemes, labelling systems and standards can help narrow down decisions but can throw up conflicting requirements. LEED 4.1 recommends sourcing from manufacturers that participate in extended producer responsibility programmes. Verifiable policies on materials reuse and potential for recycling are also important factors.

¹ Source: CDP Worldwide, [Engaging the Chain](#)

² Source: Textile Exchange, [Biodiversity Insights Report](#)

³ Source: ClimatePartner, [What Makes a Supply Chain Sustainable?](#)

Supply chain optimisation criteria

The LEED 4.1 certification system advises sourcing from manufacturers that engage in validated and robust safety, health, hazard, and risk programs which document at least 99 per cent (by weight) of the ingredients they use and have independent third party verification of their supply chain. Verified processes must be in place to:

- Communicate and transparently prioritise chemical ingredients along the supply chain according to available hazard, exposure and use information to identify those that require more detailed evaluation
- Identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients
- Implement measures to manage the health, safety and environmental hazard and risk of chemical ingredients
- Optimise health, safety and environmental impacts when designing and improving chemical ingredients
- Communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain.

Source: US Green Building Council, [LEED v4.1 Operation & Maintenance](#)

From choice of materials to the finished product, interior designers for cruise ships and ferries face many decision points in the procurement process that will affect the sustainability of their work. These include considering which raw materials to use, how the materials will be transported, how to dispose of waste during construction, and the environmental impact of the materials in situ.

Material transparency is essential if designers are to choose products that do not have hidden impacts such as high embodied carbon or toxic ingredients. Environmental product declarations (EPDs) can help in this regard by showing the environmental impacts of producing and disposing of a product. Likewise, health product declarations (HPDs) disclose ingredients and their toxicity profiles.¹

Strategies to narrow down the range of choices include opting for bio-based materials such as wood, cork, linoleum, wool and bamboo, which have lower upfront embodied carbon and can store carbon over the building life, and avoiding insulation products with high plastic content. Salvaged and refurbished materials can also help lower the overall carbon footprint of ship interiors. These can often be sourced from the ship itself or from other assets owned by the client, leading to cost savings as well as more sustainable outcomes.

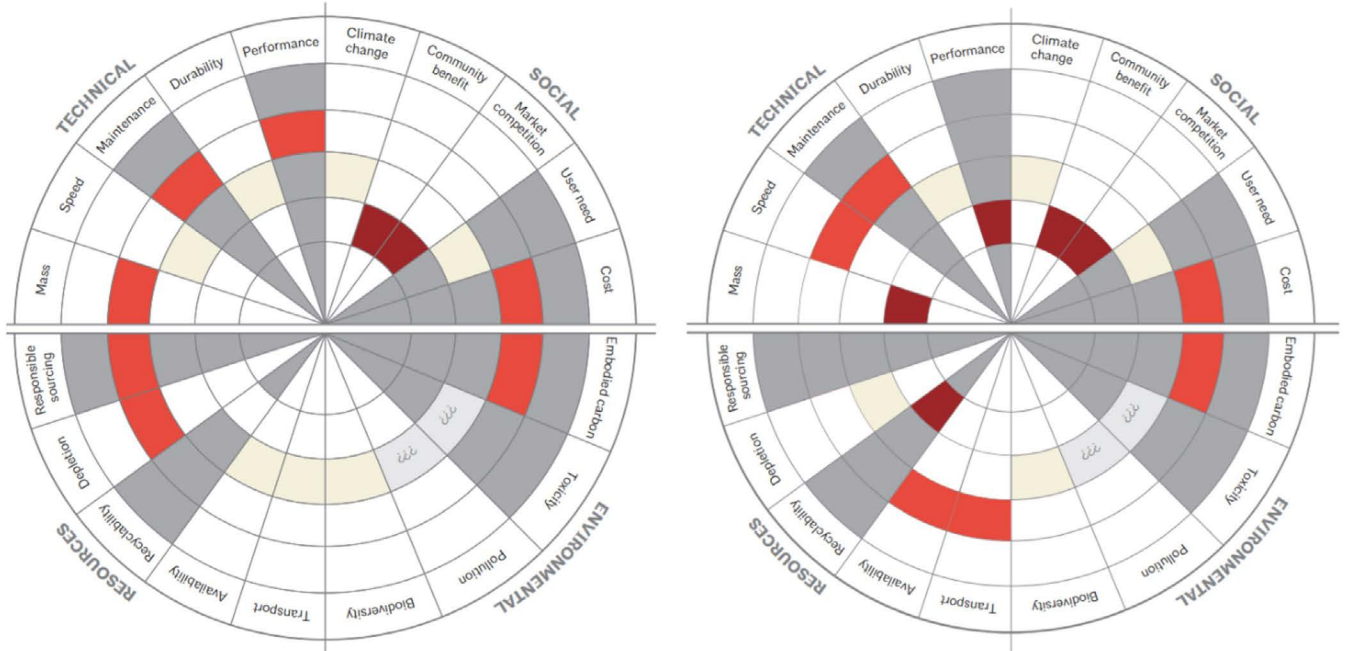
“Designing and specifying materials with end-of-life in mind increases the likelihood of reuse, and it reduces (or eliminates) end-of-life emissions from demolition, transportation, and waste processing,” is the advice of the Carbon Leadership Forum.²

¹ Source: BuildingGreen, [Material Transparency](#)

² Source: Carbon Leadership Forum, [AIA-CLF Embodied Carbon Toolkit](#)

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Arup radial diagrams to compare product material attributes, originally published in AIA report



Source: The American Institute of Architects, [Materials Protocol Handbook](#)

Construction materials: trusted standards

“The Global Organic Textile Standard (GOTS) is a sustainability standard for organic textiles, based on the use of certified organic fibres. Approved certification bodies verify compliance to the standard, which covers clear environmental and social criteria. Only products that are properly certified and labelled are permitted to use the GOTS logo and other words, as specified in the Conditions for Use of GOTS Signs. All steps in the supply chain are subject to the certification requirements, only the final retailer (B2C) is exempted from the requirement to be certified.”

Christopher Stopes, Global Organic Textile Standard

“MindfulMATERIALS is developing a Common Materials Framework that will make it easy for designers and specifiers to find materials that align with the five pillars of sustainability as defined by the AIA Materials Pledge: Human Health, Climate Health, Ecosystem Health, Social Health and Equity, and Circularity.”

Laurel Christensen, MindClick

“It is important to know how the materials used to produce products are sourced – are they sustainable? How can you tell? If you don’t know where and how they are sourced, you could unwittingly be supporting unsustainable practices. Credible certification, such as Forest Stewardship Council (FSC), is a tool that businesses and individuals can use to ensure that the products they choose are responsibly sourced in line with appropriate standards. When sourcing forest products, be they timber, paper, rubber, cork or something else from the forest, FSC certification can provide assurance that they are sourced in a way that supports responsible forestry, helping to ensure forests for all forever.”

Olivia Bargman, Forest Stewardship Council

“Forest Trends is a research non-profit writing for policy makers. Sourcing wooden or wood based interiors, examples of how to approach sourcing sustainably certified timber products like flooring and cabinets can be found at [The Ultimate Guide to Sustainable Interior Design](#).”

Marigold Norman, Forest Trends

Frameworks, standards and certification

By adopting widely trusted standards, frameworks and certification systems, organisations can prove their credentials to clients, end users and suppliers. These systems provide a structured way for businesses to identify their environmental goals and to set priorities for change. They also allow potential business partners to have confidence in the sustainability claims of the organisation.

Participants in this report told us that decisions regarding which systems to work with would be helped by agreement across the industry regarding trusted organisations so that supplier investment in this process is valuable to them as well as to ship owners. This would also help suppliers that are considering certification to shortlist which to work with.

Another area of concern highlighted by participants in the report is that, although design firms creating interiors for cruise and ferry operators are aware of the wide range of certification systems, there is no guidance available on which ones are most suitable for them to work with. In addition, systems such as LEED and BREEAM are designed for land-based buildings, not ships, which means that they are only partly applicable to ships. And, although the major classification societies are active in providing support for sustainable ship design in general, there is no system specifically aimed at maritime interiors.

All of these issues are exacerbated for firms working in several different country markets (or even in different EU Member States), as they encounter different systems across borders and tackle the time-consuming and expensive process of ensuring they meet the requirements of each of them. Solutions suggested by respondents include working towards a joint initiative to create a best practice framework for maritime design ratified by the classification societies and/or IMO. However, this ideal scenario is still a long way from the current confusing situation that firms have to manage.

Green building certifications

To date, there is no green building standard for passenger ships but many operators have taken the core of a land-based programme to create their own internal standard. Six standards were frequently referenced by contributors to this report:

US Green Building Council's Leadership in Energy and Environmental Design (LEED)

"LEED-certified buildings save money, improve efficiency, lower carbon emissions and create healthier places for people," says the US Green Building Council. To achieve certification, a project earns points by adhering to prerequisites and credits that address carbon, energy, water, waste, transportation, materials, health and indoor environmental quality. Following a verification and review process, projects are awarded points that correspond to a level of LEED certification.

German Sustainable Building Council (DGNB)

This certification system provides a planning and optimisation tool that is available in different variants for buildings, interiors and districts – both for new buildings and for existing projects. The aim is to increase real sustainability in construction projects and promote a common understanding of the relevant requirements for sustainable construction among all those involved in construction. DGNB says: “By reducing cost-intensive risks, the system contributes to a high degree of future security for construction projects. The independent certification process serves the purpose of transparent quality control.”

Green Building Initiative's Green Globes

The Green Globes building rating system claims to be science-based and supports a wide range of new construction and existing building project types. “Designed to allow building owners and managers to select which sustainability features best fit their building and occupants, Green Globes certifies projects that meet at least 35 per cent of the 1,000 points that are deemed applicable to the project,” says the Green Building Initiative. The system's software allows project teams to import and monitor performance for individual buildings through entire portfolios.

Bre Group's BREEAM

Reported to be “the world's leading science-based suite of validation and certification systems for the sustainable built environment,” BREEAM provides architects and construction companies with the necessary tools to achieve their ESG, health and net zero ambitions. Owned by BRE Group, a non-profit with over 100 years of experience in building science, millions of buildings around the world trust BREEAM to reach lofty environmental visions. The framework considers a building's whole life performance, driving wise decision-making throughout a building asset's lifetime, embracing circularity and resilience through resource efficiencies.

International Living Future Initiative's Living Building Challenge

Promoted as “the world's most rigorous proven performance standard for buildings,” the Living Building Challenge is a regenerative design framework used to create spaces that, “like a flower, give more than they take.” The criteria are that buildings should be regenerative (connecting occupants to light, air, food, nature and community) and self-sufficient, remaining within the resource limits of their site. They should also create a positive impact on the human and natural systems that interact with them.

Standards systems: taking the initiative

“The industry is going through significant change; many still believe that quality and sustainable solutions can’t go hand in hand. However, we are at a time when innovation, new knowledge and experience combine to make it possible to simultaneously pursue commercial benefit, environmental sustainability and social equity. The industry is at perhaps the most exciting time ever. But it does require businesses to look at their supply chains, their products and their business models.”

Martin Townsend, The British Standards Institution

“A new international ISO standard for maritime energy efficiency, which can contribute to a more sustainable shipping industry, is under development, on the basis of a Danish proposal and with Danish leadership, as Danish Standards is spearheading the project.”¹

Lisa Olufson Klæsøe, Fonden Dansk Standard

¹ Source: [Danish Standards](#)

International WELL Building Institute's WELL Building Standard

Taking a holistic approach to health in the built environment and addressing behaviour, operations and design, the WELL Building Standard is a performance-based system for measuring, certifying and monitoring features of the built environment that impact human health and wellbeing, through air, water, nourishment, light, fitness, comfort and mind. Its principles are grounded in a body of medical research that explores the connection between buildings and the health and wellness impacts on occupants.

The six standards outlined above have nuanced interpretations of what makes a building sustainable but all offer a thorough and rigorous test for owners, architects, designers and construction companies. Although certification for a newbuild vessel has not historically been granted, on at least one occasion a cruise line has self-audited its work against LEED criteria and felt that it had achieved a high enough standard to comfortably exceed the requirements for a Silver certification.

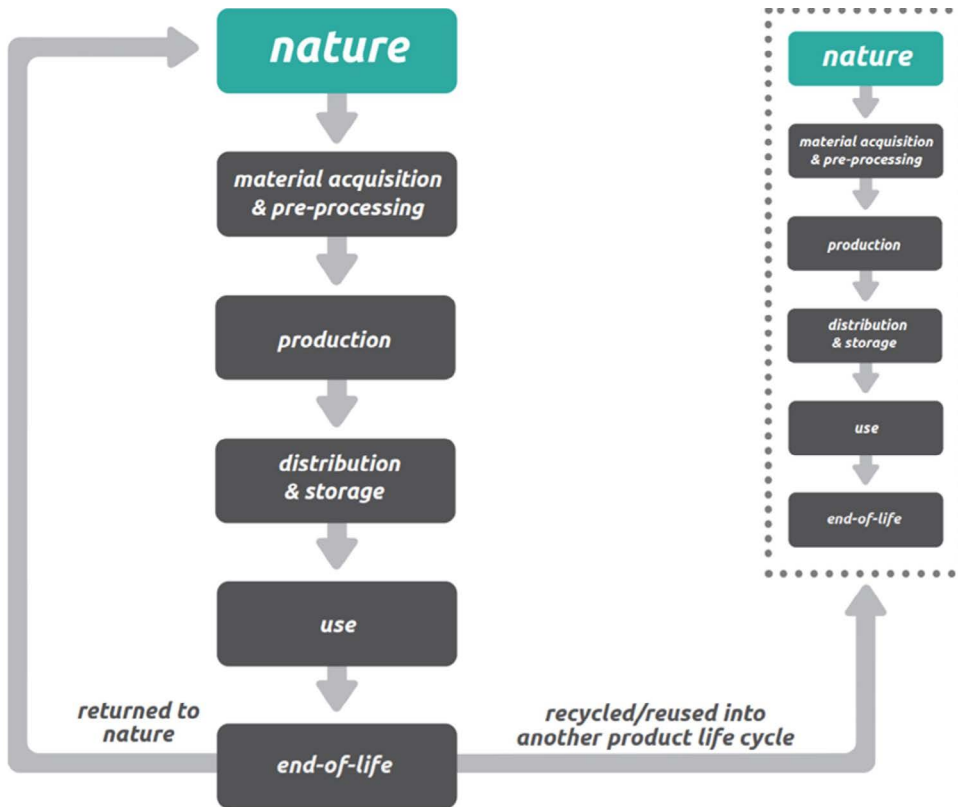
In addition, as we were going to press with this report, a BREEAM sales consultant told us: “We are in discussion regarding a BREEAM in-use cruise ship that is permanently moored ship in Sweden. Cruise and ferry assets are tricky to identify if it is considered an infrastructure building or an industrial asset.” This may become a precedent that has the potential to transform certification for the passenger shipping sector. If BREEAM certification proves to be applicable to in-use ships, there is every reason to believe that it could lead to the organisation working out how to manage newbuild certification. If that happens, others will likely follow.

Alternative frameworks and standards

Between them, the six green building standards outlined above encompass a variety of other recognised sustainability approaches that can contribute to a building's certification assessment. Although these approaches have various intersecting aims and methods, they are often pursued as standalone efforts to seek greater sustainability:

- Environmental Product Declaration
- Health Product Declaration
- Life-Cycle Assessment
- Organisation Environment Footprint
- Product Environment Footprint
- Sustainability Reporting
- Sustainable Materials Management
- Zero Waste

GHG Protocol five product life-cycle stages



Source: GHG Protocol, [Product Life Cycle Accounting & Reporting Standard](#)

Life-Cycle Assessment

A life-cycle thinking approach supports organisations as they move from a linear ‘take, make, dispose’ economic model to a sustainable, circular alternative. Life-cycle assessment (LCA) tools increase awareness of the impacts of purchasing decisions on the environment over the course of the entire life cycle of a product, material, process, or other measurable activity while encouraging a proactive strategy regarding management of environmental aspects and impacts. By modelling the environmental implications of industrial activities and systems, it provides actionable data to shape sustainable behaviours.

The GHG Protocol Product Life Cycle Accounting and Reporting system allows organisations to quantify and publicly report an inventory of GHG emissions and removals associated with a specific product. The goal is to provide a general framework for companies to make informed choices to reduce GHG emissions from the products (goods or services) they design, manufacture, sell, purchase, or use.¹

¹ Source: GHG Protocol, [Product Life Cycle Accounting & Reporting Standard](#)

Environmental Product Declaration

Based on LCAs, Environmental Product Declarations (EPDs) are designed to meet the global market demand for science-based, transparent, quality assured information about product environmental performance by disclosing a product's environmental impacts. They use ISO 14025 to enable standard voluntary ISO Type III environmental declarations. These third-party verified, comprehensive documents communicate the results of a product's LCA, along with additional relevant environmental performance information at one of two levels, business-to-business or business-to-consumer. "An EPD provides an opportunity for manufacturers to have increased transparency regarding the environmental impacts of their products using established international standards," says the International Code Council.¹

“An EPD provides an opportunity for manufacturers to have increased transparency regarding the environmental impacts of their products using established international standards”

International Code Council

Health Product Declaration

While EPDs typically focus on broad environmental impacts, Health Product Declarations concentrate more on specific effects of toxic substances and other dangers to human health. The Health Product Declaration Open Standard “gives the opportunity to leapfrog past the increasing complexity and confusion of trademarks, eco-labelling, health claims, and certification systems to address the asymmetry that exists in the marketplace between building product producers and consumers,” says the organisation.²

Organisation Environmental Footprint and Product Environmental Footprint

The European Commission's Product Environmental Footprint (PEF) and Organisation Environmental Footprint (OEF) methods provide a common way of measuring environmental performance. The PEF and OEF are the EU recommended LCA-based methods to quantify the environmental impacts of products (goods or services) and organisations. The purpose of the information generated by the PEF and OEF is to reduce the environmental impacts of goods, services and organisations, taking into account supply chain activities (from extraction of raw materials, through production and use to final waste management).³

¹ Source: BuildingGreen, [Material Transparency](#)

² Source: Health Product Declaration Collaborative, [HPDC Guide](#)

³ Source: European Commission, [Environmental Footprint Methods](#)

Sustainable Materials Management

According to the United States Environment Protection Agency (UNEP), “Sustainable materials management (SMM) is a systematic approach to using and reusing materials more productively over their entire life cycles. It represents a change in how our society thinks about the use of natural resources and environmental protection.” The SMM approach seeks to use materials in the most productive way with an emphasis on using less and reduce toxic chemicals and environmental impacts throughout the material life cycle.¹

Sustainability Reporting

As institutional investors increasingly consider ESG information in their portfolio strategies, non-financial information is assuming a more important role for businesses. Previously a voluntary ‘nice to have,’ sustainability reporting is now expected of established businesses and, in some contexts, is becoming a required business practice. The GRI notes that: “Transparency underlies Target 12.6 of the SDGs, to encourage companies to adopt sustainable practices and integrate sustainability information into their reporting. Through better reporting, organisations can understand, communicate, and better manage their contributions to the SDGs.”²

Zero Waste

The Zero Waste Certification (ZWC) process focuses on upstream processes and policies by implementing zero-waste practices in the participant industries. In order to achieve zero waste, manufacturing companies and product designers need to focus on products that can be easily broken down for recycling, can be reused industrially in the production of another product, or can be naturally broken down by the surrounding environment (biodegradable).

Other sustainable design strategies and approaches that were raised in our research include:

- Dematerialisation
- Design for Disassembly
- Design for Environment
- Disruptive Design
- Galley energy management
- Lean Manufacturing
- Modularity
- Natural Resource Management
- Product Service Systems Models
- Product Stewardship
- Remanufacturing
- Science-Based Targets
- Sustainable Production and Consumption
- Sustainable Resource Management
- Sustainable Supply-Chain Management.

¹ Source: [United States Environment Protection Agency](#)

² Source: Global Reporting Initiative, [Integrating SDGs into Sustainability Reporting](#)

NEWH: focusing on social sustainability

“The Network of Executive Women in Hospitality (NEWH) has impacted the interior design industry in an ever-growing manner consistent with its mission as a non-profit. The interaction of its talented members has created a framework for design improvements from aesthetics and economics to sustainable practices, bringing different sectors of the hospitality industry together. For the past nine years, NEWH has helped shape hospitality interiors through its sustainable education outlet called NEWH Green Voice. These in-person and virtual sessions have assisted the industry in conceiving better environmental practices on land and water. A new venture entitled Healthy Hospitality Resource Directory was constructed to assist designers in their efforts to assess hospitality products and services for a range of factors including pandemic-related issues as well as sustainability. NEWH continues its support for students interested in careers in hospitality and has provided US\$7.8 million in scholarship funding to deserving students. The fundamentals of NEWH include strong commitments to the empowerment of women in the workplace and to diversity.”

David Mahood, NEWH

Establishing the criteria for ecolabelling

- An Initial Research Report gathers product information, technical characteristics and checks global development trends
- An initial life cycle analysis is made, and existing global criteria are compared
- Sub-product categories are scoped for inclusion
- Elements of existing criteria are separated into 'core' and 'non-core' portions
- Detailed specifications/requirements are listed for each core element
- Testing and verification methods are set for each specification
- Common core criteria are agreed and an action plan proposed
- Members are encouraged to adopt the criteria.

Source: Global Ecolabelling Network, [Common core criteria](#)

Product and material certification

Environmental profiles can be used to measure the impacts of a construction material, product or building system throughout its life. This includes its extraction, processing, use and maintenance and its eventual disposal.¹

As certified products become more commonly available worldwide, the positive impacts for the environment and human health cannot be underestimated.

Ecolabelling is a method of verifying the environmental credentials of products. The largest global directory of ecolabels, the Ecolabel Index, currently tracks 455 ecolabels in 199 countries and 25 industry sectors.²

Life-cycle ecolabels can provide proof that a product or service has met the highest environmental requirements across all the stages of its life. This includes extraction of raw materials, as well as the manufacturing and recycling stages.

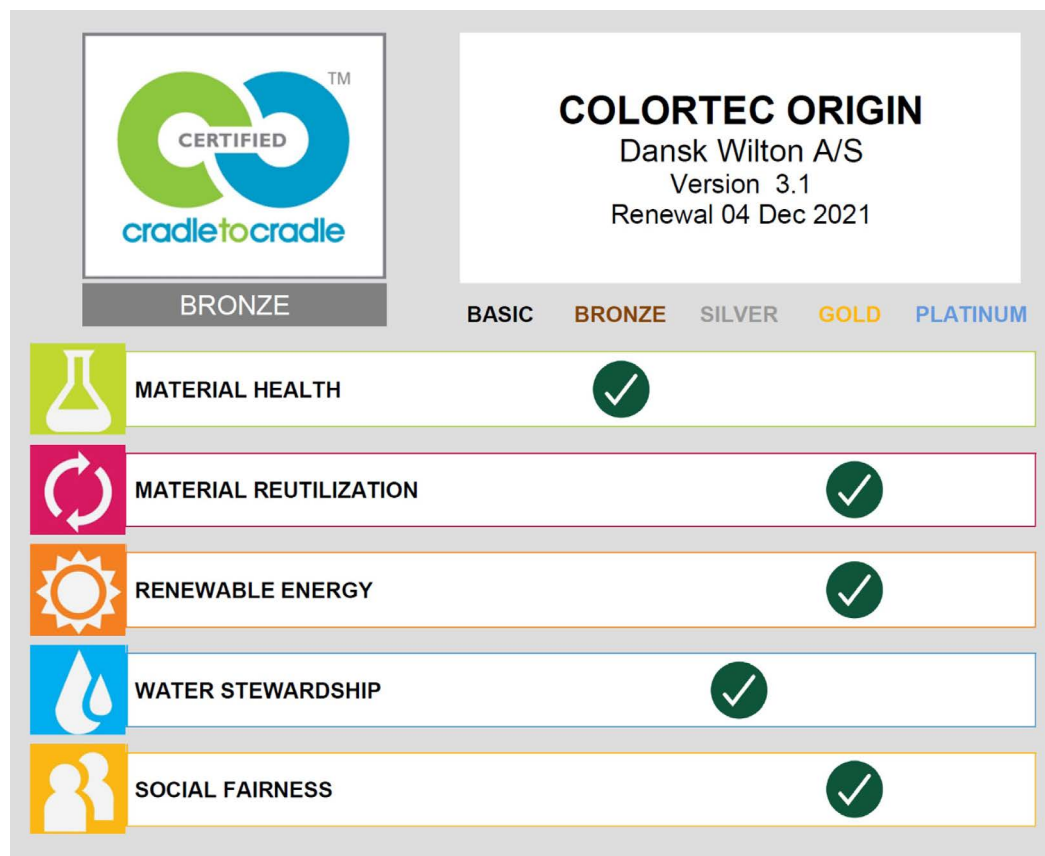
“The largest global directory of ecolabels, the Ecolabel Index, currently tracks 455 ecolabels in 199 countries and 25 industry sectors”

Ecolabel Index

¹ Source: GreenBookLive, [Environmental Profiles](#)

² Source: Ecolabel Index, [Who's deciding what's green](#)

Cradle to Cradle scorecard



Source: Dansk Wilton/Cradle to Cradle

The Cradle to Cradle standard provides designers, manufacturers, and suppliers with a framework for continually improving what products are made of and how they are made. The categories covered by the standard are Material Health (chemicals and materials prioritise protection of human health and environment); Product Circularity (products designed for their next use and recycling pathways); Clean Air & Climate Protection (manufacturing has a positive impact on air quality, renewable energy supply and the balance of GHGs); Water & Soil Stewardship (water and soil treated as precious shared resources); and Social Fairness (companies committed to human rights and fair and equitable business practices).

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Trusted certification systems

From the many systems of certification that can be used to guide sustainability in maritime design, the following were highlighted as being desirable by two or more contributors to this report. It should be noted that there are many more high quality standards and certificates available and until the industry completes a thorough audit of the available options, suppliers (and other stakeholder groups) will continue to pursue their own course.

Product certification schemes trusted by report contributors

Allergy friendly	Allergy Standards Limited ECARF
Bio-based	BioPreferred
Biomass	Green Gold
Chemical content	UL Product Lens
Chemicals	Clear Chem Greenguard
Cleaning products	CleanRight Green Seal GreenScreen Safer Choice
Compostable waste	Biodegradable Products Institute
Cotton	Better Cotton
Electrical	Energy Star EPEAT
Floor coverings	Floor Score Green Label Plus
Furniture	ANSI/BIFMA e3 Furniture Sustainability Standard Furniture Industry Research Association
Health and safety	CHAS
Indoor air quality/VOC emissions	UL Indoor Air Quality SCS Indoor Advantage The Building Information Foundation RTS sr
Mining (metal and stone)	Alliance for Responsible Mining Fair Mined Metals

Other	British Standards Institution Ecologo EU Ecolabel Good Environmental Choice Australia International Organization for Standardization Nordic Swan NSF TÜV Rheinland UL Ecologo
Plastic free	Plastic Free Certification
Product content	Declare.
Product life-cycle	Cradle to Cradle Living Product Challenge
Recycled content	Global Recycled Standard GreenCircle
Rubber	Programme for the Endorsement of Forest Certification
Textiles	Fairtrade International Global Organic Textile Standard Oeko-Tex
Water use	Unified Water Label Water Sense
Wood	Forest Stewardship Council Sustainable Forestry Initiative
Wool	Responsible Wool Standard

Greenwashing

While there are many rigorous and valuable standards, labels and certifications that are available to designers and manufacturers, there are also many that are too easy to acquire and are therefore misleading. The presence of a standard is not necessarily a reliable indicator of an organisation's commitment to sustainability. It is important that businesses become familiar with the trusted systems within their sphere of work so that they can judge the claims being made by partner companies about their sustainability performance.

Greenwashing is a persistent problem in business, with companies making claims to sustainable behaviour that do not stand up under closer examination. This undermines public trust in corporate statements and risks derailing urgent climate action.

The EU Green Claims Law has been established to provide a binding template in order to ensure that information regarding green goals and achievements is verifiable and to encourage organisations to substantiate their claims. In the UK, the Competition and Markets Authority (CMA) issued guidance on making environmental claims in September 2021, setting six principles that environmental claims must follow. These require claims to be truthful, accurate, clear and unambiguous; not to omit or hide important information; only to make fair and meaningful comparisons; to consider the full life cycle of the product or service; and to be substantiated.

Signs of greenwashing

According to Greenpeace, organisations engaged in greenwashing often give the game away with the following signs:

- Token gestures such as promoting one 'green' feature, while ignoring other more important environmental issues. For example, switching to recyclable paper straws, while still using meat suppliers responsible for burning down forests
- Not being specific or using very broad or poor definitions on purpose to cause misunderstanding. For example, using a recycling symbol on packaging without indicating which part is or can be recycled
- No evidence to back up a claim, making it difficult to check
- Using green buzzwords or images, like 'non-toxic', 'all natural', 'eco conscious' and 'chemical-free'
- Carbon offsetting by paying others to reduce carbon emissions or take carbon out of the atmosphere. It still means lots of carbon goes into the atmosphere
- Redundant claims. This is when the claim is not needed. For example, a company advertising a product as vegan or plant-based, when it would be anyway.

Source: Greenpeace, [Greenwash](#)

The chapters in this 'Addressing industry issues' section of the report consider a variety of potential approaches to, and solutions for, sustainability, which have been distilled from suggestions submitted by the industry participants who contributed to this report. Comments were provided on the basis of anonymity to encourage frank and open discussion.

Working towards more sustainable interiors

A sustainable interior is one that marries efficient and effective use of space with a selection of construction materials that offer the lowest negative impact on the planet, people and economy. Designed and built with the environment in mind, it uses carefully chosen materials with thought given to manufacturing and installation processes.

In order to be truly sustainable, design needs to balance social, environmental and economic goals. All three must be equally considered and integrated to achieve a truly sustainable interior solution. To limit the impact of an interior on the environment, materials and construction processes should be carefully chosen to limit environmental harm and waste throughout the entire life cycle, as well as aiming for durability, energy efficiency, safety and flexibility.

"Sustainability in interior design expands beyond materiality and aesthetics. It's also about enabling efficient operating procedures, as well as sustaining physical and mental wellbeing, and creating environments that promote health and clarity"

The challenge for designers of modern interiors is to find a balance between the client's needs and the expectations of their customers without putting the needs of future generations at risk. This means basing the comfort and liveability of interior spaces on the most sustainable products and technology available, using low-impact products and materials. There should be minimised ecological footprint from production, use and recycling at end of lifetime.

Closing the loop

Passenger ship interiors receive regular updates to maintain a fresh and contemporary feel for guests. Historically, this has meant that many fixtures and fittings are scrapped while they still have plenty of use left in them.

To be sustainable, interiors need to be designed with deconstruction (post-life reuse and recycling) in mind. Each phase of the design's life cycle should make the best use of social, economic and environmental resources to meet the design specifications, without compromising the future availability of such resources. This requires prioritising recycled, recyclable and natural products and considering the full life cycle of a product, while reducing or eliminating the use of toxic and harmful materials.

“If a designer is involved at the very beginning, they can ensure that the right choices are made in terms of using materials that have low impact on the environment and that can be recycled once the interior is ready for refurbishment or replacement”

Other aspects include attention to reducing water use and unnecessary transportation of materials. A sustainable interior is one created in a way most considerate of humanity and the environment. Ultimately, a circular approach acknowledges that sustainable interiors arise out of a set of decisions which reduce the negative impact on environment, ecology and health.

The gold standard is an interior where the full cycle of the product and project life has been planned for, from material sourcing to production and installation, as well as what happens when materials and products are no longer needed. Setting targets for when the ship is in operation, to limit emissions of GHGs, production of waste and consumption of energy, further enhances sustainability.

Circular economy and life-cycle approaches can help designers to ensure that all aspects of interiors are chosen to reduce harmful impacts, such as products that are easy to dismantle, sort and categorise for possible reuse and easier replacement when refurbishment is necessary. Measurable and documented sustainability parameters covering the complete life cycle can provide evidence of the impacts of specific efforts, materials or solutions.

The benefits of life cycle analysis early in this process include an overall lower environmental impact caused by interiors. With the focus on materials and construction processes that are not depleting Earth's resources, designers can deliver spaces that ensure the health of occupants while working towards zero-carbon status by reducing the amount of embodied carbon produced in construction.

Built to last

By considering the end of life of the materials and products used within designs and making them and whole interiors easier to repair, deconstruct, reuse and recycle, it is possible to enable reuse after they have served their original purpose. If the process of an item's manufacturing is not as sustainable as it could be, then it is even more important to think about how to make it more sustainable in its end-of-life stage.

“It is when you first take the raw materials that there is a CO2 impact, not when you use or reuse existing furniture”

Solutions include high quality furniture built using less or no adhesives ('screws not glue') and assembled to facilitate easy renovation, and opting for modularity so that, for example, a seat or leg of a chair can easily be replaced or repaired rather than requiring the whole chair to be discarded when updating to follow trends, update colours and materials, or reflect new brand requirements/rebranding.

ADDRESSING INDUSTRY ISSUES

Good design is a crucial part of building for the long term. Timeless designs that deploy universal aesthetics and durable, resilient materials and take a holistic approach to the entire design, manufacture and passenger experience, result in interiors that look good for longer than high-fashion trends and require lower levels of future maintenance. In this context, choice of raw materials is of key importance.

Materials' durability and smartness can be as important as eco-credentials in achieving an interior that delivers longevity and versatility. Similarly, an interior that last 10 years may be less sustainable in the long run than one that is replaced in three years if the materials used in the former are less environmentally friendly.

Knowing the requirements of the ship owner and brand can enable a clearer understanding of how the interior will be used, both now and in the future. Creating a space which enhances guests' physical and mental wellbeing and stands the test of time is an effective sustainable design principle. However, it can be a challenge to secure the longevity of cruise and ferry ship interiors, ensuring that they continue to resonate with the brand identity and appeal to guests.

By specifying sparing use of materials, designers can achieve a form of sustainable minimalism, creating spaces where the quality of materials is more important than their quantity. This means fewer materials, fewer renovations and reduced waste as a result. Functional, natural, safe and environmentally conscious design, elements and products enable a framework on which to build future-proof interiors.

Green material choices

The choice of raw materials and products has significant impacts during construction and refits. A conscious, responsible approach to sourcing materials takes into account where they come from, where and how they are produced, what their likely lifespan will be (including the possibility of recycling and repurposing) and whether they are certified as sustainable.

"Investing in sustainable materials should be a priority. With this, more testing can take place in operational environments while reducing costs and turning these into mainstream options"

Overall sustainability is boosted by selecting materials, furniture and fittings whose production processes cause the lowest possible CO₂ and other emissions. This includes the energy to acquire the material as well as for transport and other impacts that take place long before an interior is built.

Use of recycled and upcycled materials allows for designing with the intent of repurposing and reusing, taking into account the full life cycle of the materials and ensuring that those selected are easy and economical to recycle. It also makes it easier to repurpose items already onboard to give them a fresh look and feel without starting from scratch.

Natural materials and by-products (waste recycled content or plant-based materials) can often still be processed at the end of their useful life with minimal use of chemicals and water. The array of natural options includes timber, terrazzo, mycelium, lightweight composite stone, rammed earth and hemp, although in the maritime context compromises are often needed regarding natural materials because of fire restrictions.

The power of technology

Modern design processes benefit from green technologies and best practices in energy efficiency, resource conservation, ecologically sensitive products and other sustainable practices.

Interiors can be designed in ways that reduce their operational carbon footprint by leveraging green energy-efficient technologies. This can improve sustainability when the ship is in operation by addressing energy efficiency of HVAC, lighting and other areas through strategies such as planning for more natural light rather than electric lighting where possible, as this means less power required and lower emissions going into the environment. Automation (sensor technology) for lighting and air conditioning are other aspects that can make a space more environmentally friendly.

Technologies and products that optimise air quality, heating, ventilation and acoustic enhancement are increasingly popular for both newbuilds and refits, as are strategies to reduce water consumption with fixtures such as ultra-low flush toilets, low-flow shower heads and grey-water reuse.

Integration of modern technology can greatly enhance efficiency and implementation of clean technologies in production processes. When choosing suppliers, materials and technologies, research is vital to identify the most appropriate innovations, manufacturing methods, technological advances and new products. To get the best out of the available options, designers benefit from cooperation with operator teams, architects, suppliers and shipyards from an early stage to determine the best choices for the design.

To deliver sustainable results, technical design must make renewal of damaged components possible, while also allowing for changes to colours or patterns during refurbishments. In addition, design projects are increasingly able to benefit from technologies that protect and conserve water, enhance indoor environmental quality, and optimise operational and maintenance practices.

Sustainable design and delivery processes

Interior designers have a huge impact on the sustainability of an environment, as they decide what materials and products will be used in a space and how the end user will interact with them. Ideally, sustainable design principles should be integrated in the design of an interior from the very beginning and followed throughout.

ADDRESSING INDUSTRY ISSUES

Although designers can improve the sustainability of interiors by researching and understanding the impacts of the materials and processes they plan to use, the big wins come from working together with other stakeholders (owner, operator, yard, outfitters, classification society, etc.) to leverage best practices. Collectively, all those who are involved in a design project can benefit from having a better understanding of the processes and materials being used. In addition, a cooperative approach allows for greater clarity regarding which aspects of sustainability are key for the project, enabling these to be tracked throughout.

“Sustainable interiors can be designed for flexibility, longevity and maximum efficiency by anticipating the end users’ present and future needs”

For the best chance of achieving sustainability, it is necessary to plan for it from the start rather than adding it on as an afterthought. But although green choices should be embedded in the decision making process for functional requirements, design, material selection, operation, maintenance and decommissioning, it is often necessary to adapt to what the environment allows and find creative solutions within these limitations.

Finding a suitable balance in this regard requires clear channels of communication between the brand and the design team, with the buy-in of the shipyard. If the owner commits to building sustainable interiors, the designer can create a sustainable design. The next stage involves the outfitter and yard taking the necessary actions to install the specified sustainable features. Good communication in this final phase is particularly important, to ensure that the yard does not inadvertently change sustainably flagged products for cheaper or more easily available alternatives.

Opting for quality over quantity, and simplicity over ornamentation, helps to create a durable and timeless space that will not need the whole design to be changed every couple of years but has the flexibility to adapt to future needs.

The design process also needs to take account of how the designed spaces and elements will be used when the ship is in service. However sustainable the design and construction of a space may be, it can only remain so if it is operated and maintained in a sustainable manner. The development and implementation of a programme for operational best green practices is an important aspect of any design.

It is the responsibility of the ship owner to ensure that sustainability is regarded as a critical aspect of the overall project. The shipyard also needs to be onboard with this. However, for commercial spaces such as cruise ship interiors, it is essential that any changes introduced include the interests and needs of the guests who will travel on the ships. If these two aspects do not work in harmony, sustainability will not thrive. Even where there are laudable sustainability objectives for a space, these will only be met if the space meets the actual needs of the end users to whom it is being marketed.

Successful designs integrate an environmentally friendly approach and consider natural resources as part of the design, at the same time as acknowledging their social, and economic impacts from the initial phase through to the end of life. The basic objectives are to reduce consumption of non-renewable resources, minimise waste, and create healthy, productive environments.

Trusted suppliers

Good relationships with suppliers make it easier for designers to achieve innovative, durable and sustainable results. The first steps towards establishing trust are to understand and qualify prospective suppliers and their products. Where do they obtain their raw materials? How do they process them? What steps are evident in the supply chain to minimise the environmental footprint?

When sourcing materials and products, design teams also need to know what questions to ask to rule out the possibility that marketing messages are based on greenwashing. A good place to start is establishing whether products come from verifiable and/or certified sources. Where the client has a 'maker' list' of verified sustainable suppliers, this can persuade suppliers to improve the sustainability of their products or services to be included on the list.

Additional items on a sustainability checklist might include a history of creating spaces that comply with environmental regulation and environmental protection, and ability to produce credible and recognised sustainability credentials. Other factors to look out for are the availability of a range of green options from the supplier, such as products based on natural resources or recycled material and using green energy in production and construction.

"The guests' demand for a sustainable product is increasing enormously and putting pressure on us and the owner"

Verification of supplier sustainability credentials, including through annual audits, is also helpful and enables confidence that recommended options will be compliant with all relevant legislation, regulation and best practices. The social aspect of sustainability should not be overlooked either. Examples include fair treatment of workers and avoidance of exploitative producers in the supply chain.

Strategies such as selecting and prioritising local suppliers and manufacturers, or sourcing from communities that are easily accessible for transport of goods and are located as close as possible to where the construction is taking place, can help to reduce many harmful environmental impacts and cut costs for the client. Building strong local supply chains can also yield benefits far beyond reducing GHG emissions, allowing businesses to reduce logistical complexities and save on their transport budgets.

Sustainability stakeholder responsibilities

Close collaboration between owners, designers, shipyards and contractors has the potential to significantly increase the sustainability of interior design projects, especially where the owners truly believe in sustainable values, the designers welcome the opportunity to implement sustainable interior features in the concept, and the yards and contractors are ready to ensure that everything is made and built with sustainable production processes.

Broad experience in environmentally responsible materials and finishes is in demand as passenger shipping companies seek greener designs. From research and analysis to evaluation, specification, delivery and installation of the finished interior, this allows for lateral thinking and facilitates a ‘no blame’ approach to asking what could be done better or how products can be sourced more sustainably in future. It can also enable cooperation on lists of the products and materials that are best in class for sustainability.

“It must become second nature to think about the environmental impact of what we are doing at any stage in the process”

Successful delivery of a sustainable interior involves the cooperation of all teams and suppliers, both at headquarters and on site. It is particularly important for the architects, designers and engineers to work together on embedding sustainable principles in refits and refurbishments, to prevent situations where a quick and cheap solution (for example, gluing) is chosen over the more sustainable option of making things modular and fixing with screws so that they can easily be taken apart. If the yard and contractors can work effectively with the owner’s architects, it is possible to achieve the necessary step changes in how interiors are built, even if these changes may increase the cost initially.

Ideally, ship builders, design teams and architects will work in tandem to ensure that sustainability aims are achieved, for example through fundamental design features that may lower potential impacts of the stages of a new ship design. An assigned person from each of these teams needs to be given the responsibility to deliver on the sustainability objectives of a ship owner.

Ship owners and operators

Owners and operators need to be able to make it clear to designers, shipyards and contractors that they want a sustainable ship. However, given how diverse the definitions and priorities regarding sustainability are, it can be a challenge to convey clearly what is expected – and for the stakeholders involved to fulfil what is expected of them in this regard.

If the owners are able to clearly identify the social and economic benefits that they expect to get out of pursuing a strategy of sustainability, it becomes easier to develop strategies together with the designer, with clearly specified criteria for sustainable interior design solutions.

The scope of activities to be included in commissioning sustainable interiors is broad, from the definition of purchase specifications and associated certifications to maintenance and recycling ambitions. All organisations that will work on a project need to be checked to ensure that they fulfil the requirements for sustainability set out by the owner.

A major advantage for those specifying sustainable design today is that the construction team and other stakeholders are likely to be more aware of the operational implications of their work than was the case in the past. Thinking about long life, quality and ease of refurbishment and embracing sustainable design is now a matter of routine rather than the exception in most major shipbuilding or refurbishment situations. However, this needs to be accompanied by a change in mindset from one that favours cheap, short-life products to an understanding of where more expensive but high quality long-life products will enhance the long-term sustainability of an interior.

Ultimately it is the ship owner/operator that has to foot the bill for sustainable materials and a more long-lasting method of construction. This requires a longer-term approach to investment that factors in the sometimes non-financial benefits of designing for energy efficiency and using products or materials that have the least impact on the environment.

While some visionary shipowners are leading the way by spending big on eye-catching green ships, others will be more motivated by new legislation driving change in the industry. Already, this can be seen in the growing focus on reducing harmful CO2 emissions from ships, which has seen brands spending significantly on reducing the environmental impact of their fleets in operation. It is perhaps not such a big step to turn this intense focus onto the interiors of their new and renovated ships.

“Ship owners and operators are market drivers and should be the main sustainability advocates. They should require assessments and communication of social-environmental impacts from their suppliers and partners”

If owners request sustainable interiors, the industry has to provide them and manufacturers will deliver. They are also in the best position to drive demand among guests for sustainably outfitted ships, especially given the trend for consumers to seek out companies that are making the health of the planet their priority. Over time, the expectation is that this will drive revenue enough to increase the capital to buy more sustainable products and systems – a virtuous circle indeed.

Some of the actions that owners can take towards more sustainable interiors include requesting more sustainable materials and equipment onboard; asking for a carbon calculation to determine the carbon impact of materials; implementing accountability and traceability of all interior elements; committing to regular environmental impact assessments; and adopting a life-cycle design approach, engaging designers (both internally and externally) with the skills to deliver it.

ADDRESSING INDUSTRY ISSUES

Reaching out to industry experts and recognised organisations to consider sustainable design features is also important, allowing owners and operators to investigate potential products and materials, and work closely with architects and suppliers to identify opportunities. Owners and operators can help advance the green performance of maritime interiors by prioritising partners that meet key sustainability requirements. By leveraging the scale of their buying power, they can also influence vendors to focus on sustainable products.

Shipyards

Shipyards are tasked with purchasing based on what has been specified by and contracted with the owners but their role is by no means a passive one when it comes to sustainability, especially if they invest in research and technological development of greener solutions.

Yards are also ideally placed to develop the R&D process on sustainability regarding methods of construction, waste management and replacement of non-sustainable products. They can bring their practical experience to bear with regard to materials and although this can sometimes manifest in a conservative approach to new materials, this does not mean that they are not motivated to build sustainably.

“Shipyards, as the main power in the creation of ships, can promote the idea of sustainability to their client. The building of ships is a cooperation between the two and together, they are able to force change”

There is enormous potential for shipyards to become leaders in sustainable material selection, construction techniques and equipment processes. On the one hand, the owners hold the reins; on the other hand, once contracts are signed, the yards have great influence on final decisions as regards procuring products. Shipyards can leverage this advantage for the sustainability of their operations by ensuring that manufacturing, installation and disposal services are carried out making the best use of resources. When avoidance of waste, pollution and other negative impacts is not possible, mitigation and compensation should be implemented.

In the automobile and aviation sectors, some companies have established precedents for sharing excess materials. Shipyards have the potential to do something similar, for example by building recycling facilities and by working with local authorities to reuse donated products coming off ships. They can also enable unused materials from one project to be deployed in others or set up appropriate facilities to sort waste by type.

For items that cannot be reused, having facilities to separate and compact these can reduce the space needed in transporting them to their final destination (and thus cut the carbon costs of this transport). This can also help the yards get closer to their own zero-waste targets.

Environmental programmes such as ISO14001 and Green Marine certificates can help shipyards to reassure their customers that they themselves operate sustainably. Embedding sustainability in their purchasing terms and conditions is another signal of commitment. Other areas where shipyards can take the lead include transitioning to renewably sourced materials and composites designed to optimise performance and reduce impact on the living environment; moving away from reliance on non-renewables and fossil fuels; monitoring and targeting energy use; and embracing new technologies such as robotics, AI and digital software.

All of these possibilities must be seen in the context in which shipyards work, which is competitive and focused on the bottom line. Most yards control their vendor lists very tightly, making it difficult to know whether priority is given to sustainability. But it can only be good for business for yards to expand their lists to incorporate sustainable materials in the options presented to owners.

Classification societies

Classification societies command trust in the industry as they set standards for performance and certification. Their status makes them obvious candidates for the role of arbiters regarding what is sustainable.

Some respondents to this report suggested that these organisations might be good choices to take ownership of a sustainability standard and a reporting system or licence that could be applied to the maritime interiors sector. The main classification societies already include the class notation ‘green,’ focusing mainly on machinery, but it could be extended to interior materials, (for instance, with requirements on durability and recycling). Alternatively, this might entail the creation of a new notation specifically for interiors.

There are also suggestions that, if classification societies were to take on the task of developing such a standard, it could make sustainable practices more affordable and accessible to organisations that currently find testing of materials to IMO standards too costly and complex. This indicates that a standardised, perhaps centrally defined, approach that defines and measures sustainability in design and installation of interiors across the ship would be welcomed. Such a system could cover raw materials and sources manufacturing, shipping, adhesives, fixtures and fittings, and more.

“Classification societies are trusted advisors to cruise and ferry companies – they are well placed to provide interior and interior related certification services”

It is logical to assume that, as sustainability becomes more important to the industry in general, classification societies should adopt more environmental practices within their inspection criteria. As the gate keepers in terms of quality and safety, these organisations can be the source of reliable certification of products. Within their current scope of activities there is plenty of potential for them to work towards clarity in certification of sustainable materials to allow their use; remove barriers for development of sustainable products and their implementation; and implement sustainability criteria and notations for interiors (or the complete ship including interiors).

ADDRESSING INDUSTRY ISSUES

An important characteristic of classification societies is their capacity to lead on innovation, rather than simply monitoring for compliance with existing rules and norms. To support shipbuilders and designers in achieving sustainable certification, classification societies can take an active role in pushing rule development processes to drive the adoption of standards for sustainability that must be followed. Providing certifications according to a standardised scoring table of interior materials and monitoring performance would promote sustainability within the limitations associated with the framework of a particular classification society.

The main benefits of this approach would be the availability of clear criteria regarding how to achieve sustainable interiors, as well as standardised improvement plans that participants can follow. Regular reviewing and updating of the technical standards, for example to reflect the SDGs, would help ship designers and outfitters in their achievement of the goals. This approach would also provide help and resources to those in the maritime industry seeking to transition towards more sustainable operations.

Another way that classification societies can drive sustainable interiors is by working with product manufacturers to get more recycled and green products to pass IMO flammability requirements. They could start requiring that a certain percentage of products/materials that go into ship construction be 'green'. Once a standard or rating system is developed, classification societies could monitor sustainability compliance by all parties to the process. There is also scope for determining standards regarding materials used in interiors, their assembly method and long-term sustainability of designs, accompanied by certification for compliance with these standards.

Interior designers and architects

Designers and architects benefit greatly when shipowners clearly state their sustainability policies. While some interior design companies bring their own policies, which they implement regardless of the project, it is always helpful to have an understanding of the level of sustainability activity that is expected and endorsed by the client.

If designers and architects include sustainability-related factors in their design principles, this improves the likelihood that these principles will be integrated in the final product. However, this is by no means guaranteed and they may still need to persuade their clients that a sustainable design will not only save the environment but also yield profits in the long term. And even if the owner is onboard with greener options, it is also important to convince the shipyard of the importance of a sustainable approach.

It is the responsibility of designers and architects to stay informed about new materials and methods of production, so they can introduce these to the client and explain the benefits. In particular, they must find a way to flag and explain the sustainability elements or benefits of a product so that if it is changed by the yard, these elements can be retained in the alternative product.

In addition, by sourcing suppliers who offer sustainable products, collaborating with sustainable stakeholders, and educating themselves about sustainability, designers and architects can ask the right questions and thereby avoid being a victim of greenwashing.

Interior design firms can be influential in steering the choice of interior fixtures and fittings in a more planet-friendly direction. They can do this by designing in the ability to reuse, repurpose and recycle items; assisting the owners as early in the process as possible to set requirements for sustainability in the specifications and contracts; and focusing on long-lasting designs comprising materials which are sustainable.

Because interior designers and architects are often the first to screen the market offer, they should also be the first to avoid specifying elements which have negative impacts on any of the three ESG sustainability dimensions (economic, social, governance). Part of their responsibility is also to make sure that interiors comply with or exceed rules and regulations, including any environmental requirements stipulated by the owner.

Setting the bar high for sustainability in this context includes stipulating no VOCs or toxic chemicals and gasses to be used in production, installation or use; minimal power consumption in production, installation or use; no unethical materials or processes; and choosing suppliers with transparent labour policies.

“As architects and designers, we can contribute directly to more environmentally friendly ships by delivering timeless designs, not following short term fashion trends. Interior designs of lasting beauty and of durable construction with well-developed functionality will have a longer lifespan”

Design aspects that boost sustainability during operation of the ship include maximising opportunities to provide natural lighting or to capture all wastewater for treatment prior to discharge to the environment. Creating a bespoke cleaning and maintenance plan for all of the products in each interior also ensures that the design maximises the lifespan of interiors. For parts that are modular, it is essential to provide clear instructions for ordering replacement parts.

Designers and architects can make a difference by seeking out producers that have a green message and products. When in the remodelling phase, they can foster new and clever ways to reuse existing elements instead of pulling everything out and starting over (repairing instead of removing, for example).

In addition, they can work with manufacturers and suppliers to conceive products that will succeed in the market and then accelerate the rate of success by specifying them. This in turn will enable suppliers to see a real incentive to invest time and funds in innovating to deliver new and sustainable products.

ADDRESSING INDUSTRY ISSUES

Interior outfitters

Thanks to their knowledge of materials and what meets IMO requirements, maritime interior outfitters are well placed to work with all stakeholders to promote the implementation of sustainability-related certification as standard for all materials.

Outfitters should consider impacts along their supply chain to ensure that the products they are supplying are as environmentally friendly as possible. Points of focus that can make a major difference to the environmental profile of an interior include implementing and monitoring production processes that limit the emission of GHGs, production of waste and consumption of energy, reducing reliance on adhesives, building for easy dismantling and creating a maintenance manual for each built interior are other good practices.

“While clients need to tell their outfitters what they want, the outfitters have the responsibility to constantly stay updated and educated about better choices”

As outfitters work in close cooperation with designers and architects, pushing for the idea of sustainable materials can have an impact on the materials used. To ensure that outfitters’ ideas about how to improve sustainability get heard, deconstruction plans within an interior report should be written in collaboration with everyone involved in a newbuild to ensure the space is effectively managed throughout its life cycle, from selection of materials to proper preparation and efficient installation, including repair, reuse and recycling.

Interior outfitters have a responsibility to contribute to their clients’ sustainability agendas while meeting their own. There are many ways they can do this, from establishing close and transparent cooperation with the client and yard throughout the outfitting process to monitoring the actions of suppliers to verifying claims that materials are certified.

They can also prevent good, sustainable products from being replaced with others that do not meet the required standards. And if they can help owners produce a recycling and donation strategy when they are taking out materials at refits, this can pay dividends long into the future.

Requirements for minimum levels of sustainability can be embedded in the purchase terms and conditions for material sourcing and subcontracted work and manufacturing. Outfitters can also demonstrate a commitment by ensuring they are positioned to answer on sustainability requirements in tenders. Likewise, they can be ready to propose sustainable alternative materials where appropriate. Implementing traceability along the supply chain and introducing environmental and social public reporting are other practices that will pay dividends in establishing greener practices.

Interior suppliers

The processes involved in outfitting a ship's interior require compliance with safety and quality standards and industry regulations. For suppliers, it can be a major challenge to provide materials and products that meet the existing required standards, let alone the growing list of new sustainability measures that are becoming critical to future-proof vessels.

Among the suggestions received for this report from industry sources is the suggestion that the industry should collaborate to find an easier and cheaper way for suppliers to get IMO certificates, as this would make it much easier to bring new and more sustainable products to market. It would also allow suppliers to invest in a larger range of sustainable products and reduce their cost, so that they can become more affordable.

Under pressure from end users and the regulatory framework, suppliers are often in the line of fire for factors that are beyond their control. While they may offer a warranty, the actual performance of their products in situ can vary depending on placement, traffic levels and other aspects of use.

New demands for sustainability are testing suppliers still further as they have to scramble to update their inventory. For example, an historic directive from IMO for fabrics to reduce flame spread immediately led to a reduction in available choices for one client from 50,000 fabrics to just three. Resolving issues such as this will require commitment across the supply chain, certainly involving the manufacturers from whom suppliers source their products.

“Suppliers will give a warranty but it's very difficult to know how long a product will last. If it's in the corner of a show lounge it might last 10 years but if it's in the middle of the atrium it might only last six months.”

Good suppliers can win the trust of clients, who rely on them for information and education regarding the best options for their interiors. It is to suppliers' advantage to ensure that they are knowledgeable about the most sustainable options. In this way they can help drive the necessary shifts to choices which help their customers meet their sustainability targets and achieve the SDGs.

Strategies for suppliers to position themselves as trusted providers of greener products and materials include conducting life cycle analyses on products supplied; expanding catalogues of available materials and solutions classed as sustainable; and implementing sustainability in their purchase terms and conditions for material sourcing and subcontracted work and manufacturing.

They can also introduce additional services with their offer, such as regular inspections of the supplied products, along with maintenance and/or recycling of products to extend their life cycle. Investment in R&D is a necessary step for suppliers whose products come from vulnerable ecosystems or whose processing currently uses toxic substances or causes pollution, to find sustainable alternatives.

ADDRESSING INDUSTRY ISSUES

Many of the issues that suppliers are being asked to address have very wide ramifications and causes both up and down the supply chain. For this reason, the chance of success in moving towards sustainability is greater if suppliers can work together, for example in geographic clusters, as well as cooperating with other stakeholders to find solutions.

“Actively ask suppliers for their sustainability plan, dare to ask suppliers to educate you. We need to have the tools to be able to spot the differences between products and make better choices.”

Because they need to balance ensuring their products are manufactured in a sustainable way with maintaining the sustainability of the business itself, many suppliers are wary of fully committing to sustainable offerings whose future profitability is as yet untested.

This can leave them vulnerable to accusations of greenwashing if they develop green ranges without addressing the sustainability deficits of their existing products. Suppliers can address this by adopting trusted certificates for their products (such as Cradle to Cradle) and fully supporting their greener offerings with warranty periods similar to those for current products.

While waiting for sustainable interiors to become ‘industry standard’, suppliers should be constantly researching to source new sustainable products, components and systems. If there is demand from ship owners and operators, as well as those specifying interiors, this will drive innovation at the supplier level and lead to better results across the maritime interiors community.

Barriers to building and renewing sustainable interiors

Although the maritime interiors industry is seeing positive progression regarding demand for sustainable initiatives, there are major barriers that prevent the delivery of more sustainable choices. These include inertia when tackling long-established norms, along with high costs, longer manufacturing times and limited availability of sustainable materials.

In addition, there are many restrictions that apply to the installation of interiors on ships. For example, while land-based interiors can include natural materials purely on the basis of their green credentials, in a maritime environment there are fire-load limits that restrict how much natural material can be used and where it is permissible.

“Our only option is to become more sustainable than we are today; to become as sustainable as we can possibly be. This will require a concerted effort comprising a combination of small steps, giant steps and sometimes even great leaps”

Most significant barriers

Sustainable design does not exist in a vacuum but is part of a wider context. A significant barrier to sustainability is the unwillingness of companies to take on higher short-term costs to avoid long-term negative impacts. In addition, sustainable design knowledge is still not fully integrated in the disciplines of architecture and design, so there may be a lack of understanding of the basic principles. Further issues arise from the fact that few products have undergone life-cycle analysis to enable informed decisions, the lack of information on the environmental impact of various interiors choices, and a shortage of funding and personnel to conduct these studies.

The majority of materials must hold marine certification to be acceptable for use onboard. Innovation in the use of natural fibres and repurposed materials is still developing and there is not yet mass availability at a competitive price of sustainable materials and products for large commercial products. That means the cost to bring new products to market specifically for maritime use is high. Testing and certification are time-consuming and many manufacturers do not see the potential economic advantage in these processes.

ADDRESSING INDUSTRY ISSUES

It can be difficult to measure the overall sustainability of interior spaces as this often needs to be specifically defined within the context. While it is possible to measure aspects such as the energy efficiency or the carbon footprint of a space, depending on the products used within the space, each may conform to a different sustainability certification which measures different things. Also, the manufacturing processes of certain materials may be intrinsically sustainable but may not have (or need) a certificate to say so. Conversely, sustainable manufacturing processes do not always go hand in hand with sustainable maintenance, recycling or replacement processes for the same material or product.

Many ship interiors are built using processes and materials that have not changed for years, resulting in a huge ‘domino effect’ of changes when one element is replaced.

IMO regulations also play a part in stalling sustainable progress as these restrict the recyclability of many products. In addition, new sustainable products often do not come with years of performance data under the conditions of a ship at sea, making them a harder sell to shipyards and designers.

With materials and products developed in more recent years, there is an element of risk in specifying them due to the limited time of testing their quality and durability. This, coupled with limitations in sustainable treatment options to ensure materials comply with health and safety and operational standards, can lead to risk-averse purchasing that rules out many sustainable products.

Potential buyers have to weigh the costs of buying, installing and replacing materials during the life cycle of a ship and better choices may have an unpalatably long payback period. For this reason, it is often seen as safer to stick with the status quo and maintain current practices. And, because green products may not be easily available, designers may need to take a wider view to find new opportunities that are palatable to their clients.

“Sustainability is a very hard factor to measure in outfitting; you only have to watch the offloading skips in a drydock to see this”

Unsurprisingly, less-sustainable solutions are often easier, faster and cheaper to implement. Projects are based on reference ships, so if a design suggests a new material, it usually causes additional cost and may be ruled out for this reason. In addition, some organisations are slow to see the necessity for sustainable practices and focus on the negative – for example, that the use of natural dyes restricts the design to a limited range of muted colours so the aesthetics of a sustainable interior would suffer.

Education, information and innovation will go a long way to making sustainable interiors more desirable for those who hold the purse strings for interiors projects. To have a selection of sustainable materials to choose from, with verification that the materials presented as sustainable actually meet the requirements, will be a big step in the right direction.

The barriers to sustainability could be greatly reduced if a standard method of calculating CO2 emissions for all products and materials were adopted. Proponents of such a method argue that it would make sustainability more transparent and generate a more accurate understanding of how to lower the CO2 footprint in manufacturing, construction and design. This would reduce the number of self-certification schemes that have sprung up in recent years, in some cases allowing major players in industry to perpetuate unverifiable sustainability narratives about their products and services.

“Due to the lack of a sustainability index for materials, no incentive exists to pursue a more sustainable interior. A ship owner can’t promote how environmentally friendly their latest cruise ship or renovation is”

If sustainability criteria are designed in at the start, costs can be balanced by making smart choices as early as the concept stage. This requires an understanding of the expected lifespan of a space before ordering a redesign. In addition, any new green elements will not pay back the investment if they do not work for the client, who is likely to remove them too soon to get any sustainability benefit from their presence on the ship.

Shipowners often choose cheaper products due to limited initial budgets but this does not take into account the costs over a ten-year period, for example. More research could be conducted by specifiers to ensure the longevity of products and reassure owners that they are low-maintenance. In other words, more ‘big picture’ thinking is required at all levels, which will involve the integration of many different departments as well as the shipyard where the work is being carried out. It could include making information available on take-back, replacement and repair schemes that make it easier to retain interiors rather than replace them.

What is certain is that removing the barriers to sustainability will be a long-term project that requires multi- and interdisciplinary cooperation and research to resolve. Other needs include streamlining and simplification of certification processes and inclusion of smaller suppliers by making it feasible for them to attain relevant certification.

To make further progress, it is crucial that owners commit to making the necessary investments in sustainable interiors. Architects, designers, outfitters, builders and suppliers must be willing to expand their knowledge of the products and materials that meet with the relevant regulations to enable greener interiors to become the norm on passenger ships.

Newbuild sustainability roadmap

New ships must be optimised with green technologies and design, otherwise the cruise industry will continue facing sustainability challenges long into the future. Collectively, clients, shipyards and suppliers should work together to set new standards within the processes of a newbuild project. And where designers and owners agree on the importance of sustainability, this will become a key point of discussions and a requirement of any project.

ADDRESSING INDUSTRY ISSUES

The good news is that many operators are already shifting towards sustainable design and construction. However, this needs to be supplemented by training and information sharing about sustainability. And while currently, adopting innovative green technologies is a voluntary move by operators keen to carve out a green market niche, it needs to become simply what is expected of responsible ship owners, with certain activities regulated and enforced. This will then mean that all stakeholders have a commitment to a more sustainable shipbuilding process.

“We need to be aware that if we want to develop something new, we cannot follow old specifications and references. That starts with the very first contract with the yard”

Shifting the focus to environmental stewardship in newbuild projects will lead to the achievement of higher sustainability standards, with green technologies and practices incorporated into newbuilds to address the bigger environmental challenges that the cruise industry faces. This requires the identification and presentation of data and analysis to obtain support and sponsorship, with sustainable design principles included in the design from the pre-contractual phase. Commitment of all the parties involved is necessary for success, as is agreement on industry standards and level of ambition.

This is not to say that the balance should shift to ‘all stick and no carrot’ when it comes to implementing sustainability programmes and initiatives. There needs to be a benefit to taking steps towards being more conscious towards the environment so that all players in the industry realise that there are rewards for being more efficient with the resources available and that money alone should no longer be the only motivating factor.

“Include the criteria of sustainable interiors during the contract negotiation phase, especially for prototype ships. If you don't get it into the prototype phase, then it is ten times harder to make changes”

Starting with the end in mind is essential for companies involved in planning newbuilds. In this regard, there is room for significant improvement in end-of-life plans for products and spaces, in particular, how to safely deconstruct an interior at the end of its life. If the lifespan of a particular product is known, it makes it much easier to plan effectively for its refurbishment, reuse and recycling.

Many changes need to take place across the entire chain as a result of the shift in mindset towards sustainability. For example, the way that ships are constructed currently makes it difficult to thoroughly reuse or recycle old interiors. One way of reversing this trend is for the designer, owner and yard to collaborate on a sustainability report for each interior. Shipowners and shipyards can specify clear sustainability targets in their newbuilding projects and rank their full supply chain in this regard. The report could cover product lifespans, spare parts, cleaning instructions, deconstruction plans, waste planning and much more. Above all, sustainable design should be the framework for all interior projects, not a niche topic that is an afterthought or a box to tick.

Newbuilds offer the perfect opportunity to include sustainable design from the outset and ensure durability and waste minimisation for the future. Although sustainable and recyclable materials may be more expensive to manufacture and supply and have a longer lead time as stock is not always held, as awareness of their value grows among owners, operators, designers, contractors and shipyards, this should lead to reductions in overall costs and better availability over time.

“Designers and owners must recognise the importance of sustainability and partner in making this a key point and even a requirement of the project”

New regulations from legislators and support from governments will help in this process, as will the development of a common standard that yards and operators can adhere to, with a higher degree of transparency. And, because focusing only on ROI will not reveal the full spectrum of benefits of sustainability, shifting the focus to life-cycle costs and granting sustainability the same level of importance as cost and timeline will help justify greener choices.

Towards more sustainable refurbishment projects

Interior refurbishment projects involve multiple points of risk when it comes to avoiding unsustainable processes and outcomes. From the outset of any project, it is important for all teams involved to have an understanding of what is planned for the interior and its life cycle. Questions that need to be answered include: if products are being replaced or specified, where they will go after strip-out? And can they be reused, recycled or repurposed?

By addressing the three key aspects of design, materials and installation, it is possible to ensure that a refurbished interior is designed and built to last. Development of renewable products, opting for renewable materials, retrofitting vessels with new green appliances, and reviewing emissions levels of ships are among the strategies that can be used to reduce environmental impacts.

The impacts of refurbishment over the lifetime of a ship can be drastically reduced by installing modular products or making it easier to repair individual components rather than replace the whole product. By combining prefabrication and preassembly with a focus on reduced waste, it is possible to speeding up refit times and reduce energy use. There are also economic benefits to the resulting streamlined processes.

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There are major challenges associated with embedding the new mindset required to tackle the onward journey of items coming off ships. Tax issues and regulations affecting charitable donations in particular jurisdictions can prevent items being moved to communities that need them after their removal from ships. There are reports of attempts to donate used items such as mattresses having to be abandoned as the donated items were finding their way into online sales platforms. In addition, some governments' requirement that items being removed must be broken or marked prevents further useful deployment of these items.

“We need a common standard that yards and operators can adhere to and a higher degree of transparency, with a better way of measuring and reporting the impacts of materials and conversion processes”

Reducing the amount that goes to landfill is a challenge but also an opportunity for companies that are set up to transform old textiles and other items into new products. This turns waste into a positive item on the balance sheet while reducing the volume that goes to landfill.

Several participants told us that the refurbishment phase of maritime interiors would benefit from a way to measure and report how environmentally efficient a refurbishment is. This would encourage shipowners to increase the percentage of reused materials onboard and prioritise sustainable solutions. It would also help shift the mindset regarding what is wasted during refits and refurbishments, leading to more decisions that enable reuse or recycling.

Implementing sustainability as an integral part of decision making processes for all parties involved in refurbishment projects is a good starting point for greener refits. This goes hand-in-hand with increasing public awareness to make sustainability a customer expectation. Long-term planning, ideally starting up to two years before a planned refurbishment, is essential to ensuring that sustainable practices take place at all points of the process.

While the solutions suggested do not come cheap, investment in improving the sustainability of drydocks to meet the needs of greener shipbuilding and refurbishment will pay significant dividends in future, enabling greater accountability around responsible supply chains and supporting the SDG targets of all stakeholders along the chain. In particular, working with organisations that can divert waste to upstream value chains can help boost participation in circular economies.

Participants in this report are in broad agreement that there are currently not enough resources that can take materials for recycling or receive donations. Even where these do exist, the paperwork process is complex and since ships are flagged from different countries and refit in different areas of the world, there is not a straightforward approach to donating or upcycling products.

Suggestions for how to address these issues tend to focus on introducing restrictions on non-sustainable business processes, materials and products over time. Given that the interests of designers, owners, outfitters, suppliers and others are frequently quite different when it comes to making decisions about what ends up included in interiors, achieving this will not be without its challenges.

The cost of greener ships

To be truly sustainable, any interior design project needs to be affordable to the client whilst at the same time not 'costing the earth.' Companies involved in the financial aspects of interiors report that the premium for sustainable solutions can add around 20 per cent to the overall cost of a project. This is daunting, particularly as there is always a need to account for the options chosen – and clients do not always appreciate the real value being added by green choices.

Challenges include higher purchasing prices for materials that meet green standards and certifications; costlier transport for moving and storing items with reduced or no packaging; and increased labour resources needed to research materials and meet new installation requirements.

These costs may be offset by savings in the long term from using recycled and/or sustainable materials, sourcing locally or regionally, lower energy consumption, reuse of materials and less frequent refurbishments.

Although the short-term upfront costs of material and construction for a green space may be higher, the long-term costs could be lower because sustainability leads to repeated savings. Investment in energy-saving systems like motion-detected lights and water faucets, for example, reduces energy and water consumption, leading to lower operating costs over time.

"If we revisit our concept of 'expensive,' we find that sustainable interiors cost less to deliver as they deliver long-term gains ecologically, economically and in terms of wellbeing"

Among the potential remedies for the high upfront costs for sustainability is the idea that ports might reduce port taxes for ships that meet certain sustainability criteria. This in turn would encourage operators to enhance their ships in sustainable ways to take advantage of this rebate. Perhaps this is only likely for sustainability factors that impact the port.

In general, it seems that there is no way to avoid the initial pain of the cost premium for greener interiors and this is likely to be a barrier to entry for many companies. However, this could be easier to bear if it means that it enables further material and product development until the point is reached where the demand increases and the cost falls for sustainable items. To make this achievable, there needs to be a way for shipowners quantify the benefits from a cost perspective. If they can see true cost savings over time, then it is an easier sell.

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Although the prevailing perception is that specifying sustainable interiors costs more than designing with traditional materials, this reflects the current lack of information and education about sustainable methodologies. Over time, as the whole value chain works towards improving sustainability, life-cycle costs are expected to become lower for sustainable solutions. And, as the age of cheap waste disposal looks set to end with countries that typically absorbed much of the waste load beginning to close their doors to this avenue of disposal, sustainable solutions that do not generate waste can give operators confidence that they will not be left with too much unwanted waste material in future.

It does require vision to look beyond the current situation, in which deadline pressures can often lead to inferior products being substituted because they are more easily accessible within the required timeframe. Many sustainable technologies have a long-term savings effect, as well as an impact on non-tangible costs or revenues. This is driving interest in new ways of costing for sustainability, with any cost analysis taking into account long-term impacts.

The cost premium of sustainable interiors will begin to drop with the development of economies of scale. Once demand has been established, innovation and investment will follow. The more mass-produced sustainable items are, the cheaper they will become. This process, however, requires the commitment of all stakeholders to drive the necessary changes.

Specifying sustainable products

To be regarded as sustainable, products must meet a number of criteria, including considering the environmental and social impacts during production, being sourced from suppliers who meet and preferably exceed environmental and social regulations, being designed and built to last, and being able to be repurposed at the end of their working life.

The definition of sustainability is always up for redefinition to meet new challenges and encourage development of new technologies that enable better ways of solving problems. In the past, discussions about how to achieve sustainable interiors focused largely on the designers' point of view, but owners are more active in the conversation now, frequently with clear green strategies of their own. When it comes to which options make it onto the ship, the cost of the best choices for the planet has long been a factor that keeps many good products from making it to the shortlist – but this is changing as momentum builds for greener interiors.

Best-practice sourcing

Ideally, sourcing materials for interior projects involves end-to-end thinking that takes into account the full life cycle of the design and considers how materials will be recycled or reused eventually. Best practices include looking at each product's supply chain and opting for suppliers that comply with international labour legislation, minimise waste in their production facilities, use renewable resources and take steps to lower their GHG emissions.

Information should be provided regarding the energy used in production, which raw materials can be regenerated, and the recycling possibilities. In addition, the environmental impact criteria should be included in the purchase specification, such as water usage and the level of CO₂ emissions from fabrication and transport.

Other factors to look out for when sourcing for interiors projects include the lifespan of materials and the environmental footprints of extraction, manufacturing, delivery, use and disposal.

Availability of life-cycle analysis (from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling) assists with comparisons. Aspects such as the rarity of raw materials used and the amount of recycled content in products, along with the ease of deconstruction and redeployment of components or materials, are also important.

In a maritime setting, IMO certification and SOLAS requirements for onboard use shape what is permissible regarding weight, fire and safety approval. For products containing chemicals, use of REACH-ready materials (Registration, Evaluation, Authorisation and Restriction of Chemicals) is important. Technological solutions such as galley energy management (GEM) systems, which measure, control and reduce energy consumption in galleys, are also increasingly used to determine the kinds of products that are suitable for a space.

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Sometimes, factors other than the product itself have a role to play in determining what is the best choice. Location of the manufacturer can make mainstream products more sustainable if the production plant is close to the shipyard where the interior is being assembled. Whatever the sustainability merits of products, reliability, durability, quality and price will always be critical factors when sourcing. Given that many suppliers of sustainable goods are relatively small in comparison to the size of passenger ship projects, they may not be able to meet expectations of order quantities in the time frame based on their limited resources.

“We are never given enough time to shop around. It doesn’t matter if we start looking at a project three, six or 12 months in advance, decisions are always made at the 11th hour”

While all of the above criteria for sourcing best practice can help build long-term sustainability in the maritime interiors sector, real-world challenges can make these look like impossible ideals. The need to work to deadlines set by the owner and yard is one of these. Others include the ongoing impacts of the Covid-19 pandemic, as the industry remains in what one respondent to this report calls ‘survival restart mode’. Backlogs in production are exacerbated by staff absences to create a perfect storm in which specifying a greener product can seem like a ‘nice to have’ rather than a necessity.

Emerging from this difficult phase will require a renewed focus on the basics of sustainability, with partnership between purchasers and suppliers seen as a priority. At the very least, it is reasonable to expect a supplier to have a sustainability strategy, even if it is currently under pressure due to market conditions and supply-chain crises. Those suppliers that can demonstrate a willingness and ability to work with design teams to achieve sustainable results will thrive in the longer term.

Making informed choices

Through a combination of in-house research and conversations with suppliers, some buyers for maritime interiors are updating their specification system to automatically create reports on sustainable and certified materials used in products. Criteria include locally sourced, lightweight and durable materials in addition to those that comply with various sustainability certification systems. Sustainable production and recycling procedures and maintenance without use of chemicals are other aspects that are considered. Using their own sustainability analysis matrices, these organisations are doing their best to ensure suppliers and materials meet their sustainability requirements.

One organisation says that the sustainability merits of products it specifies for newbuild and refurbishment projects include lower costs thanks to durability, efficiency and repeated savings; better indoor air and environmental health; reduced carbon emissions and water usage; less deforestation; and less waste sent to landfills.

Where suppliers claim to self-regulate when it comes to sustainability, this can be a red flag due to the difficulty of obtaining evidence that shortcuts are not being taken. Sustainable sourcing requires evidence that suppliers are following basic ESG standards, as evidenced by end-to-end control and inspections.

Conversely, where the sustainability claims of suppliers are backed up by evidence, this can be powerfully motivating to sustainability-minded clients. More than one participant in this report says that a supplier's sustainability strategy was the deciding factor in the decision to specify that supplier's product for all of the staterooms or public areas on the ship.

On occasion, those sourcing materials may find the sustainability guidance they are following is in conflict with IMO regulations. This is certainly an area of concern that could be addressed by the development of industry-wide standards for sustainability of maritime interiors, ideally endorsed by IMO.

In the case of some materials and products, the presence of a well-respected certification (such as FSC for wood products) is all that is needed for a product to go to the top of a list of possible choices. But the sustainable choice is not always the most intuitive one, especially where carpets are concerned. For example, wool carpeting may appear to be the most sustainable option due to being made from natural fibres. However, it may be less sustainable over the long term than new-generation nylon carpet in respect of its inability to be recycled as easily as nylon carpet can be.

Increasingly, where teams specifying materials are considering two otherwise similar materials and one of them is made from recycled materials, they will select the recycled one. This suggests that if all other factors are equal, the more sustainable product will win. In view of this, the more that can be done to skew the bias in favour of the conscious supplier winning the contract, the better.

“For the industry to make real gains, designers and outfitters need to be given the responsibility to deliver the most sustainable interiors possible, and the budget to fund it”

If data can be made available regarding the comparative costs and benefits of sustainable interiors, cruise and ferry companies will be better placed to make informed decisions about how far and how fast they can go towards the ideal of meeting higher sustainability standards.

As the companies involved with sourcing products for maritime interiors become more sustainability-focused, there is a growing awareness that one-off green initiatives are not enough; the commitment to sustainability needs to go beyond soundbites and become embedded in the way the company does business.

ADDRESSING INDUSTRY ISSUES

Working together for change

The impetus for change has to start somewhere and those tasked with sourcing supplies for interior projects are well placed for this role, as they can get the conversation started with suppliers and keep it going, informing them that there will be a market for their goods when they develop sustainable solutions. This tends to have a knock-on effect as the early adopters of sustainability among suppliers start to profit from their efforts, and other suppliers climb on to the trend. And while all stakeholders have a part to play in this process, it is likely to be led by the clients as they are most likely to have strong requirements for the look and finish that works with their brand, as well as the cost aspects of projects.

The direction of travel regarding sustainability of maritime interiors is set in the pre-contractual phase. When owners choose their approach to the materials to be used in their projects with a focus on establishing sustainability as a key deciding factor, this is likely to lead outfitting companies to choose the manufacturers they work with on this basis.

“Establishing a strong network of stakeholders (suppliers, designers, architects, operators, ship buildings and industry experts) and encouraging the sharing of discovery and learning is fundamental in the development of sustainability”

By seeking the involvement and commitment of all the parties involved, a better result will be possible as the culture of sustainability becomes embedded. Through a combination of education, incentives, certification and audits, the level of ambition can be increased across the industry, reaching everyone from owners, operators and designers to contractors and manufacturers, while increasing investment in the development of new and approved sustainability elements. Highlighting sustainable organisations and their work at trade fairs and in the trade media also helps to raise the profile of those taking green interiors seriously.

Sustainability cannot only be pursued as a for-profit option and action needs to be ongoing despite the price premium that often exists for greener, cleaner product and materials. However, by placing it as part of the agenda for all interior projects in all levels of the industry, it will be more likely to gain traction. In the same way that the introduction of IMO standards has fuelled innovation among the supplier community to meet new needs, incorporating higher sustainability standards may have a similar impact on green innovation for maritime interiors. In the process, the current issues around cost and availability of sustainable materials and products should improve. This process can be helped by raising customer awareness and providing a voice for customer interests to make sustainability a market requirement.

The impetus for this needs to come from cruise and ferry operators and owners, who are largely responsible for interiors specification through their design companies. The outfitting contractor's role should be to work together with the client, suggesting more sustainable products and innovative choices.

Ship owners and operators can support suppliers of sustainable materials and products by helping them promote their commitment to sustainability practices. This can take place through shared platforms that showcase best practices and facilitate knowledge exchange through collaborating on R&D. Such an approach may be especially helpful in building connections with suppliers that have not previously chosen to work with clients in the cruise sector, for example. Cooperation between cruise lines will greatly magnify these sustainability efforts.

Local sourcing is a key determinant of sustainability and for this reason it is a good idea for all stakeholders in maritime design projects to do what they can to support local businesses, enabling them to grow and encouraging them to prioritise sustainable products, processes and materials. This in turn will enable suppliers to tell their own sustainability stories while building their customer base among companies seeking greener ships.

If the industry can encourage ongoing conversations about sustainability with the aim of developing a unified voice and broader awareness, momentum will build to the point that greener interior options have a relevant market share – and as a result, suppliers will develop more sustainable products.

Validate and verify

To achieve sustainable outcomes, it is important to be able to validate a supplier's sustainability claims. Independent labels, ratings tools and certifications on sustainability can help in this regard. However, not all eco labels are equal and there does not yet exist an industry-wide resource for maritime interior designers to use that would help them compare 'apples with apples' when choosing between a range of apparently green options.

Where products are marketed in a transparent manner, with information about the production chain and environmental footprint, it is easier to assess the level of sustainability than in situations where impressive green claims are not backed up by facts.

"It would be beneficial to have one standard that all suppliers and manufacturers worked to and was easy to understand for all parties"

In the shipping sector, construction and refits take place against a backdrop of regulation (fire-load calculations; IMO/SOLAS regulations, MED Wheelmark, among others). There is considerable interest among respondents to this report in a system that could provide sustainability guidance for maritime interior designers by, for example, specifying a maximum environmental footprint on each project, with guidance on how to measure impacts. This could become a certification system or a method of auditing – or simply a voluntary self-assessment tool to help improve best practice. And, given the established presence of sustainability ratings in land-based construction, it is likely that one or more of these methodologies could be adapted for marine interiors.

ADDRESSING INDUSTRY ISSUES

For a cruise or ferry operator to succeed in making its interior spaces authentically sustainable, it is necessary to ensure that the company's own brand, design and commercial values are all aligned regarding sustainable practices and processes. Installing sustainable products and materials could otherwise be seen as an inauthentic add-on or even as greenwashing on the part of the operator. Equally, a passenger shipping brand with high integrity could suffer reputational damage if it is seen to endorse the use of products and materials that are themselves not as green as their suppliers claim.

For these reasons, it is important to know as much as possible about the materials and finishes that are being specified for interiors, not only in respect of the provenance of the materials but how they are constructed and transported.

“Our industry should make it clear which certificates it recognises so that suppliers don't waste time and energy pursuing a certification that is deemed to be of little value”

It can be confusing as a specifier to sort through the many green claims made by suppliers and understand which products will be best for the environment in the long run. Trusted certificates can go a long way to resolving this confusion, as can information from suppliers on every stage of the processing of the raw materials they use, both before and during production.

A combination of best practice and industry pressure to shape responsible supply chains is needed to encourage materials traceability and corporate accountability, accompanied by third-party certification wherever possible. Sustainability reporting to current industry standards is also helpful in addressing claims and weeding out greenwashing.

Participants in this report were asked how the maritime interiors industry as a whole could improve its verification processes. One suggestion received in response is the development of a green stamp of approval for products and suppliers, with an industry panel reviewing and discussing evidence from suppliers. Other options are for industry-specific sustainability audits to be made available and for targeted legislation to be introduced to control how suppliers source their materials. All agree that transparency throughout the supply chain should be actively promoted. However, while some wish to see strong enforcement of any new standards, others are in favour of encouraging higher sustainability ambition through voluntary participation that emphasises mutual trust, especially when dealing with smaller companies that do not have the resources to manage formal assessments.

Finding a better home for waste

If life-cycle management is integrated into the first design of a prototype, the goal of sustainability is much easier to achieve. Focusing on the possibility of a future refit rather than a replacement could greatly increase the life of a vessel. This approach can be applied to the fixtures and fittings within a vessel as well as to its infrastructure.

Designing out waste is the ultimate goal of sustainability. For interiors, this means designing the product and associated guest experience such that sustainability wins are simple. In some cases, this means offering less to customers, thereby saving on 'stuff.' It may be possible to create a compelling story for the brand in this context, selling the experience as aspirational.

Using waste resources – or sharing waste resources with others in the supply chain or adjacent supply chains – is another solution. For example, the aircraft supply chain has good links with the automobile supply chain and they share resources. If the cruise and ferry construction and outfitting communities could establish this sort of infrastructure, it could be beneficial in many ways, including providing deeper insights into the practices of other players in the supply chain.

“Just think of how many thousands of square metres of carpet there are onboard, needing to be replaced quite often – with the right manufacture it can be sent back to get a new life rather than ending up in landfill”

Ideally, all waste products from the construction and installation of interiors should be repurposed and reused to minimise the use of non-renewable resources and waste. The simpler and more modular the design and the longer the lifespan of the materials used, the better from a waste management perspective. Waste should be of low environmental impact and recyclable or reusable, with any packaging also made of recycled material or easy to reuse.

The focus needs to be on closed loop systems, low-to-no pollution and reduced energy usage, along with use of organic materials and eco-friendly production.

Sustainability by design

Longevity and eventual decommissioning should be part of a vessel's initial design. A vessel designed for durability has less need of extensive, and expensive, refurbishments. Taking into consideration the full life cycle of a product, including its ease of maintenance, would help designers to specify products that could be repaired more easily and more often before they have to be replaced. For example, there are many different types of flooring available, some with greater longevity, some easier to clean, others easier to repair or partially replace.

ADDRESSING INDUSTRY ISSUES

There is a need for new materials to replace some of those currently authorised, many of which are made of plastic due to weight, fire and maintenance considerations.

“Repair and reuse should be intrinsic parts of a design where possible. Contracts could include clauses specifying sustainability requirements for the vessel”

An analysis of recycling and reuse possibilities for products at the time of ship construction would enable designers and outfitters to make conscious and well-informed decisions on what they use in their designs. They must consider the future replacement of worn-out items, the ease of updating out-of-fashion items by refinishing them or the use of timeless, classic designs.

In the building construction industry, the ‘design for deconstruction’ technique aims to enhance the salvageability of parts and materials during the deconstruction process. This does increase costs as each piece has to be taken apart and decommissioned individually rather than demolishing a whole building. However, these costs can be offset by selling the components thus ensuring their reuse. Unfortunately, this depends upon future prices which cannot be predicted with certainty and therefore may fail to recoup as much of the costs as originally envisaged.

Reduce waste

Problems are not limited to the end of a vessel’s life. There is also wastage at its beginning. Simplification of architectural design and allowing more time for project planning would enable the preparation of more detailed engineering plans and more precise ordering of materials without any unnecessary surplus. Taking account of the dimensions of materials in their original form – such as the length of planks and the width of carpets – can enable the use of as much of the original piece as possible and thereby avoid off-cut waste.

Waste avoidance must be considered throughout design, construction and refitting. For example, another source of avoidable waste is covering materials (often large rolls of unrecyclable plastic) used to protect existing structures while work is carried out. Contract terms could require the use of covering materials that can easily be reused.

Encouraging suppliers to provide information on the life cycle of products can generate more sustainable results over the long term. Rather than a drydock generating tonnes of waste, all the items of a certain kind would then be able to be handled in groups and by type in specified ways, for example by being disassembled and turned into something else.

If products could be designed from the outset with an understanding about what happens to them next, this would greatly reduce the volume of material going to landfill and raw material reuse would become the norm.

Recycle and reuse rather than replace

Replacement should never be the first option considered. Reuse or repurposing is almost always preferable; even partial reuse of equipment and materials would be better than scrapping them. ‘Reuse, recycle, retain’ is a useful motto when it comes to deciding how to manage items over their life cycle on a ship.

Many structures can be broken down into component parts which can then be reused or recycled. Multi-level deconstruction could salvage usable materials, sub-assemblies and components thereby significantly cutting waste. Forward thinking in the design and construction stages could make this disassembly more straightforward. Items that cannot be reused by their current owner can be offered to one of the waste exchange markets which buy and sell reusable and recyclable commodities.

There are many ways to reuse fittings in order to improve sustainability and avoid purchasing expensive, brand-new products. Ceiling panels can be repositioned, while curtains can become upholstery. Wood can be sanded and refinished. Metal can be resurfaced. Wall panels can be laminated or foiled.

“There is no need to completely destroy everything if many of the items can be updated visually and continue in their original role or in an alternative one”

Waste is more expensive to dispose of when it is not sorted and much unsorted, or wrongly sorted, waste ends up in landfill. Rubbish should be properly categorised for recycling before it is taken off the ship and out of the yard. Some waste has high value when handled correctly which might make the additional cost of pre-sorting less significant. Contracts could also specify minimum waste recycling rates.

Partnerships and best practice

Partnerships with suppliers and designers who have creative solutions can assist with the reuse of waste. By supporting innovation, vessel owners can become part of the solution rather than being part of the problem.

Many different types of organisation can assist with the responsible disposal of unwanted items and materials. Shipyards, governments, NGOs, charities and other local stakeholders all have a role to play. Suppliers could be encouraged to take responsibility for the removal and recycling of their own products and packaging.

Vessel owners would need to establish the conditions to be met in each country where there is a newbuild or refurbishment yard in order to facilitate the transfer of materials coming off a ship to a third party so they can be reused. Agreements as to how recycling will be accomplished should be reached before a refurbishment project begins.

ADDRESSING INDUSTRY ISSUES

There are artists and designers who deliberately take discarded objects and change them into something beautiful. New and refurbished ship interiors are increasingly incorporating this kind of interior design feature, which helps build a sustainability story for the vessel and the brand.

Maritime interiors are subjected to heavy wear and tear so it is inevitable that items will have to be replaced during the ship's lifetime. The industry could do more to collaborate and share learning to develop best practices. For example, there are opportunities to better categorise types of debris to establish which items could be repurposed or donated and how. It is also important to look at other industries, for example in the automobile and aircraft sectors, to see how they handle the problems.

Investigating material sustainability

Pressure on the planet's resources is at an all-time high because of established patterns of production, consumption and extraction. Disposal of the goods resulting from these activities adds further strain to ecosystems and threatens biodiversity; in the past 50 years, humans have consumed more resources than in all previous history.¹

The International Resource Panel defines natural resources as metals, minerals, fossil fuels, biomass, water and land.² Negative environmental impacts result from the extraction of these resources as well as from production and assembly of building materials and finally the disposal of these materials. By tracking resources as flows through the economy at each of these stages, it is possible to develop tools and strategies to manage them more effectively, lowering their harmful impacts.

“One half to three quarters of annual resource inputs to industrial economies is returned to the environment as waste within just one year”

US Environment Protection Agency

Until recently, much of the damage associated with construction has been hidden from businesses because impacts on the natural world were excluded from material costs. Today, it is the responsibility of every business engaged in construction to consider the impacts of chosen materials throughout the supply chain. This means choosing materials which minimise harm – and, where possible, reversing previous damage by restoring the health of the environment.

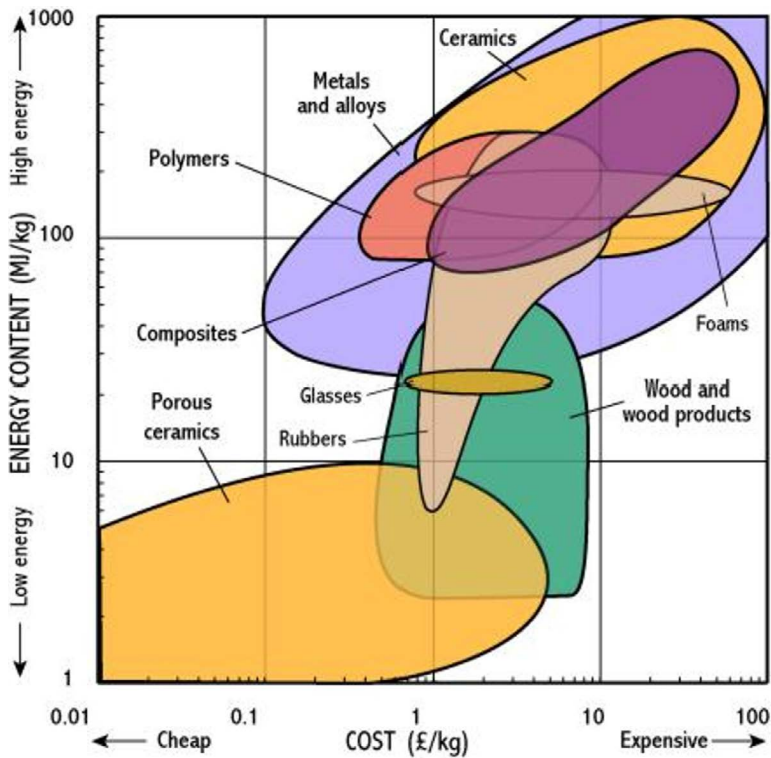
Businesses can make a significant difference simply by putting the brakes on waste. According to the World Resources Institute, one half to three quarters of annual resource inputs to industrial economies is returned to the environment as waste within just one year.³ In addition, replacing materials such as plastics, metals and cement with more sustainable alternatives can work just as well with lower environmental and other impacts.

¹ Source: US Environment Protection Agency, [Sustainable Materials Management](#)

² Source: United Nations Environment Programme, [BDNR](#)

³ Source: US Environment Protection Agency, [Sustainable Materials Management](#)

The sustainability of materials must consider production energy requirements as these represent a significant factor in the environmental cost, often closely correlating to the financial cost



Source: [University of Cambridge](#)

A sustainable approach to materials

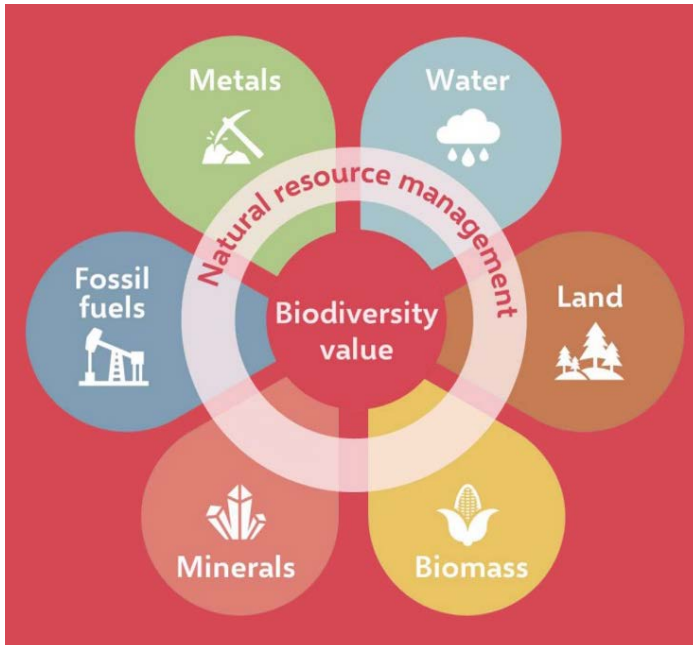
The environmental impacts of materials include GHGs from the extraction and processing of raw materials, pollution caused by using them, and contamination of air, land and water resulting from disposal. All of these impacts hinder organisations and countries from achieving the SDGs. Finding carbon-neutral solutions is essential for a sustainable future – but raw materials are also part of many of these solutions.

By practising sustainable materials management, it is possible to use and recycle materials more productively, sometimes extending their use far beyond what was previously possible. But this requires a change of mindset to one that emphasises taking less from the natural world, while reducing toxins and pollution released throughout the life cycle of materials. BuildingGreen warns: “Understanding what makes a building product green is a long-term prospect. Green characteristics differ from product category to product category, and multi-attribute vetting is critical.”¹

¹ Source: BuildingGreen, [Material Selection](#)

PRODUCTS AND MATERIALS

UNEP – Sustainable resource management nurtures biodiversity value



Source: United Nations Environment Programme, [BDNR](#)

Material sustainability topics

Every year, approximately 100 billion tonnes of raw material are extracted from the earth. Around half of this is used in construction. The industry is responsible for a third of global waste and at least 40 per cent of the world's carbon dioxide emissions. Much of the waste could be reused and repurposed.¹

Chemicals

Volatile organic compounds (VOCs) are among the most harmful chemicals found in building materials, interior furnishing, cleaning products and personal care products. These carbon-based substances can cause chemical emissions as they evaporate. According to the Indoor Air Quality Association, there may be anywhere from 50 to hundreds of individual VOCs in the indoor air at any one time.² Common VOCs include formaldehyde, decane, butoxyethanol, isopentane, limonene, styrene, xylenes, perchloroethylene, methylene, chloride, toluene and vinyl chloride.

VOCs are among the chemicals on the Living Building Challenge (LBC) Red List, which details the materials, chemicals, and elements used in construction and known to pose the most serious risks to human health and the environment. The International Living Future Institute (ILFI) argues that these materials should be phased out of production.³

¹ Source: BBC, [Future Planet](#)

² Source: Indoor Air Quality Association, [Volatile Organic Compounds and Gases](#)

³ Source: The Living Building Challenge, [The Red List](#)

Chemical content of materials should be considered at the planning stages of construction or refurbishment, to ensure that all components meet the requirements for maximum level of any chemical of concern, according to regulations such as the EU RoHS Directive or (in the US) state-specific controls. The list of risk factors is wide and far-reaching, from carcinogens to substances that could cause neurological defects.

Fire retardants

Until recently, most foam products used for upholstered furniture, mattresses and other soft furnishings were required by law to be treated with fire retardants. As evidence has grown of the harms caused by the toxic chemicals these substances contain, some countries have taken action to ban the most dangerous retardants. However, they are still in widespread use in many products.

Glass

Glass is a fully recyclable material and is very resource-efficient as it is mostly composed of the readily available raw materials of sand and glass waste (cullets). It has insulating properties and can be used as glass fibre to reduce weight (and therefore fuel consumption) in ship construction. Because cullets melt at a lower temperature than raw materials, glass recycling is extremely energy-efficient. Processing also does not produce much solid waste.

Sustainable product specification

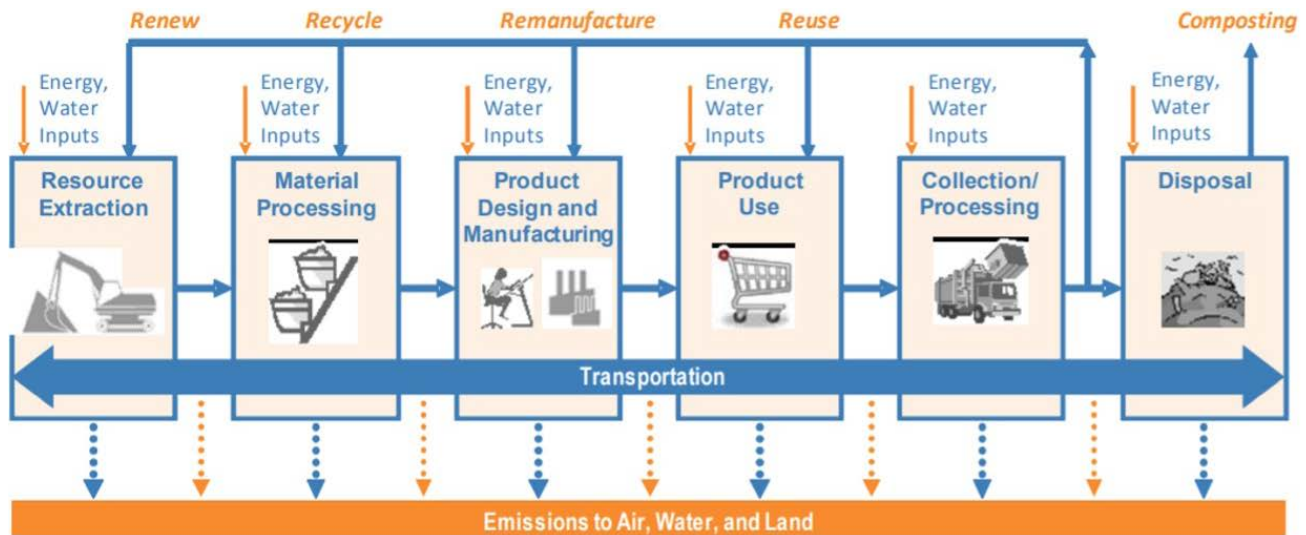
To drive more intentional product specification, the American Institute of Architects (AIA) has developed an Architecture & Design Materials Pledge that commits businesses to five overarching statements:

1. Support human health by preferring products that support and foster life throughout their life cycles and seek to eliminate the use of hazardous substances
2. Support social health & equity by preferring products from manufacturers that secure human rights in their own operations and in their supply chains, positively impacting their workers and the communities where they operate
3. Support ecosystem health by preferring products that support and regenerate the natural air, water, and biological cycles of life through thoughtful supply chain management and restorative company practices
4. Support climate health by preferring products that reduce carbon emissions and ultimately sequester more carbon than emitted
5. Support a circular economy by reusing and improving buildings and by designing for resiliency, adaptability, disassembly, and reuse, aspiring to a zero-waste goal for global construction activities.

Source: American Institute of Architects, [Materials Pledge](#)

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The flow of materials



Source: US Environment Protection Agency, [Sustainable Materials Management](#)

Metals

The mining of metals causes damage to the environment and to those working in the industry. The Alliance for Responsible Mining seeks to improve conditions for mining communities, advising “reduction in use and responsible management of toxic substances, particularly mercury, in accordance with the Minamata Convention; initiatives for better water management; and environmental remediation of sites.”¹

Scrap metals should be the first choice where possible due to their lower environmental impact. Iron and mild steel are the least energy- and resource-intensive metals and iron is also the most recycled metal, adding to its sustainability. Metals such as aluminium, tin, copper, brass and bronze, followed by tungsten and titanium fall somewhere in the middle of the sustainability spectrum. At the other end of the scale, gold, silver and platinum mining causes a high degree of environmental impact, while lead and mercury are harmful to health.

Aluminium

The [Aluminium Association](#) says, “Lightweight and strong, durable and infinitely recyclable, energy-saving aluminium is the sustainable material of choice. As we strive for a more energy-efficient future, aluminium continues to provide innovative solutions and competitive advantages for businesses and consumers.” While virgin aluminium consumes a lot of energy in production, it is less than many metal alternatives and it has the advantage of being easily recycled.

¹ Source: Alliance for Responsible Mining, [Impact of the Alliance](#)

Copper

Copper is increasingly scarce and requires significant quantities of ore to produce. According to the [Copper Development Association](#), “Copper’s superior thermal and electrical conductivity, combined with its 100 per cent recyclability make copper a truly green material perfect for building a sustainable world.”

Nickel

“Nickel is an element. It cannot be created nor destroyed. Its attributes – corrosion resistance, high-temperature stability, strength, ductility, toughness, recyclability, as well as catalytic and electromagnetic properties, help achieve sustainability,” says the [Nickel Institute](#), adding: “Responsible and sustainable production practices are a priority for Nickel Institute member companies.”

Steel

The [World Steel Association](#) says, “Steel is completely recyclable, possesses great durability and, compared to other materials, requires relatively low amounts of energy to produce. Innovative lightweight steels (such as those used in automobiles and buildings) help to save energy and resources. Producing one tonne of steel today requires just 40 per cent of the energy it did in 1960. Dust emissions have been reduced by even more.”

“Steel is completely recyclable, possesses great durability and, compared to other materials, requires relatively low amounts of energy to produce”

[World Steel Association](#)

Stainless steel

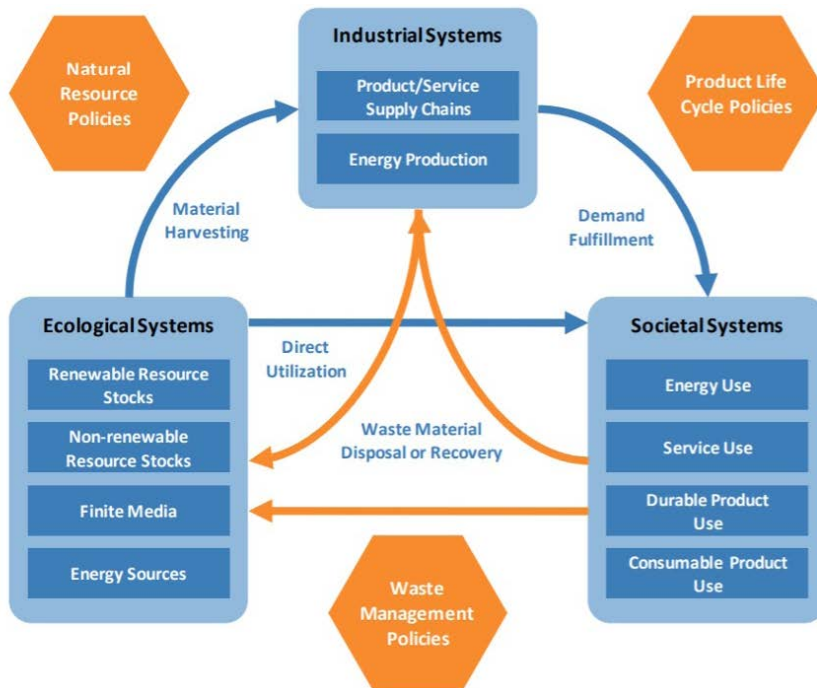
The [International Stainless Steel Forum](#) says, “The emission footprints of the material, especially those related to carbon, water and air, are minimised. Reuse and recyclability are at high levels. The material has low maintenance costs and a long life. As stainless steel has a high intrinsic value, it is collected and recycled without any economic incentives.” However, as an alloy containing chromium, nickel and magnesium, stainless steel does carry sustainability risks.

Tin

According to the [International Tin Association](#), “Tin as a metal is fortunate to have no proven toxic effects in either man or the environment, and in being a metal that is widely recycled in alloys and re-refined metal products.” The association cites artisanal and small-scale mining, mining regions, sustainable production and recycling as the key focus areas for responsible production.

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Sustainable Materials Management



Source: US Environment Protection Agency, [Sustainable Materials Management](#)

Zinc

Over 60 per cent of the more than 14 million tons of zinc produced each year go to protecting steel from rust and corrosion through galvanising. Emissions of zinc from human activity amounts to around a million metric tons per year, although the [International Zinc Association](#) says: “By comparison, annual anthropogenic emissions of zinc are estimated to be only 10 per cent of that from natural sources.”

Natural fibres

It seems logical that natural fibres such as cotton, bamboo, wool and silk should be more sustainable than synthetic ones, although some of these have damaging impacts on the environment. Cotton crops, for example, require a great deal of water and pesticides.

Bamboo

Because it grows fast, does not require fertilisation and regenerates quickly, bamboo is popular and considered to be sustainable. However, methods of harvesting can be damaging to the environment and there is evidence of land clearing to plant it.

Cotton

Organic cotton from non-GM seeds is the most sustainable type. However, cotton is very water-intensive to grow. Some cotton farmers are adopting regenerative approaches to address impacts on soil, carbon capture and biodiversity.

Hemp

Made from a variety of cannabis plant, hemp is fast-growing and resilient. It does not deplete the soil or require pesticides, and the fabric created is durable and can replace cotton. The naturally organic nature of hemp makes it highly sustainable.

Jute

Jute plants are native to India and are also grown in China and Pakistan. Using much less water than cotton, jute can be grown year-round. The fibres, which consist of cellulose and lignin, are used to produce white jute and the stronger, softer brown jute.

Leather

Durable and recyclable, leather is a by-product of the meat industry, which makes animal welfare a priority for sustainability in the supply chain. Tanning methods are also frequently environmentally damaging, although this is being addressed as processing advances become widely adopted.

Linen

Linen is made from flax, a resilient crop which does not require fertiliser. It has the distinction that all parts of the crop can be used, eliminating waste. Untreated linen is also biodegradable. However, it is more expensive than other fabrics.

Silk

The only source of silk is silkworms that live on a diet of mulberry tree leaves. The presence of animals in the silk production process means that it may be unacceptable to some consumers and it is important that producers adopt ethical production methods.

Wool

Wool can be a sustainable fabric depending on how it's produced. Fibershed, for example, creates Climate Beneficial Wool on Carbon Farming landscapes where carbon is captured and put back into the soil. Wool is also easily compostable and has insulating qualities.

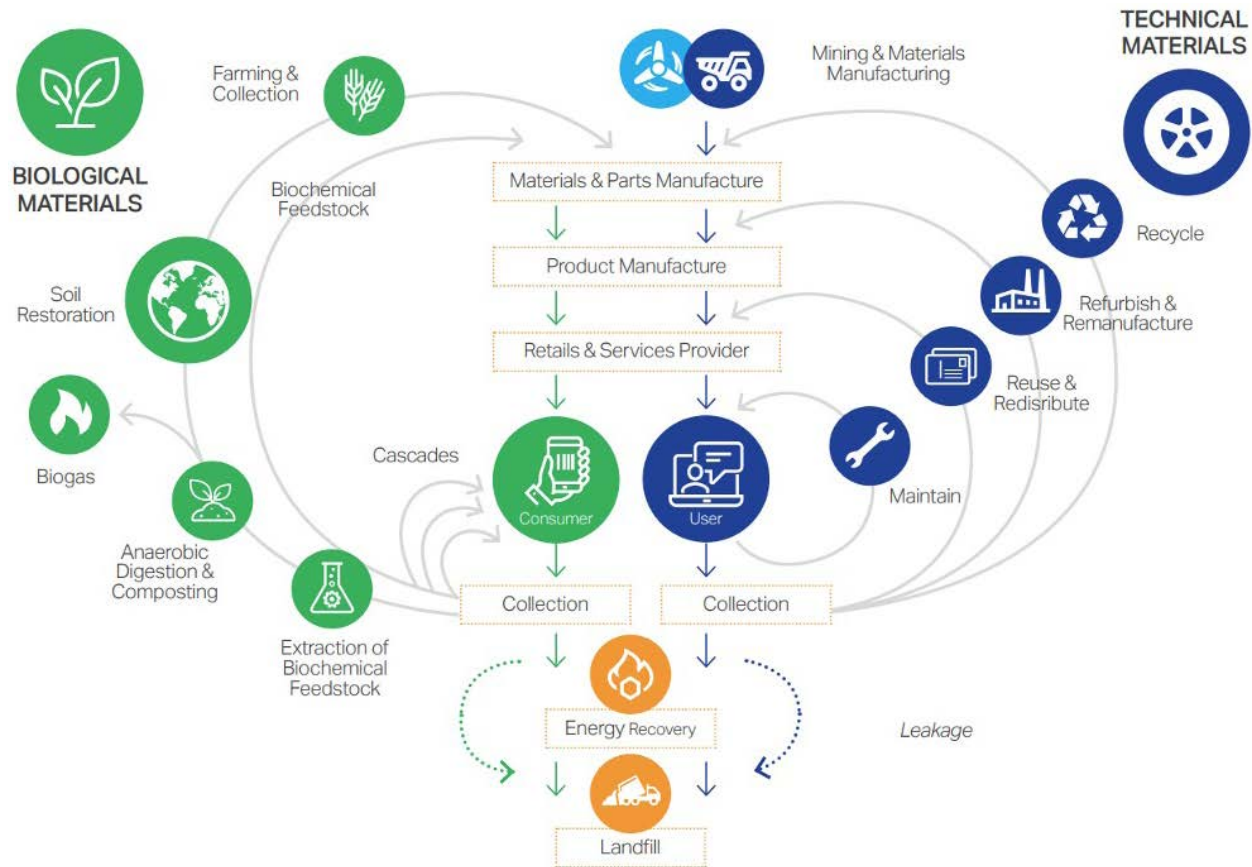
Non-metallic minerals

Non-metallic minerals are used as stone in construction, with the most popular types including alabaster, basalt, granite, limestone, marble, onyx, quartzite, sandstone, slate, travertine, laterite and gneiss.

No embedded carbon is released during quarrying and fabrication of stone and it is suitable to be used untreated and uncoated for indoor and outdoor use with low maintenance requirements. It is also easily recycled for use in other buildings or for construction ballast and other uses. However, it is important to check that quarries are responsibly managed to protect the environment and that the stone chosen is abundantly available to ensure sustainability.

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Technical and biological material recovery cycles



Source: [Ellen MacArthur Foundation](#)

The Stone Federation's Ethical Stone Register allows buyers to verify whether a stone contractor is taking measures to ensure that the stone it buys has been sourced responsibly and ethically.¹

Plastics and other polymers

Plastics are of concern from a sustainability perspective, due to the obvious issues with very long lifetimes and low recycling rates, along with toxic manufacturing processes. Plastic production accounts for 4 per cent of global oil production.

The British Plastics Federation argues that there is a case to be made for plastic's sustainability, however, thanks to its capacity for recycling, light weight, durability, and low water consumption during production of plastic goods.

¹ Source: [Designing Buildings](#)

Thermoplastics

The most commonly used plastics, thermoplastics soften when heated and harden when cooled, which can be repeated multiple times. It is the most commonly used type of plastic and easily recycled. Types include polyethylene (including HDPE, LLDPE/LDPE), polypropylene (PP), polyvinyl chloride (PVC) and polyethylene terephthalate (PET).

Thermosets

Thermosets are polymers in which there is chemical bonding between macromolecular chains, creating a three-dimensional network. Thermoset composites (for example, in the form of carbon fibre often used in the construction of aircraft cabins) have a heavy environmental impact across their life cycle.

Bio-based plastics and natural bio-based polymers

To address issues with non-renewable, fossil-fuel-based plastics, bioplastics are being developed based on hydrocarbons from sources such as biomass. Natural bio-based polymers including polysaccharides, cellulose and rubber are synthesised by living organisms.

Rubber can be sustainable if issues regarding labour exploitation and harmful pesticides are addressed. Efforts made towards sustainable rubber farming can also help reduce pressure on farmers to switch to less environmentally friendly crops.

Cellulose is widely available and can be woven to produce a durable construction material. It is also found in textiles such as linen and cotton. Natural polymers such as collagen, starch and latex are in demand for textiles and other uses.

Synthetic bio-based polymers

Some polymers from renewable resources require a chemical transformation for conversion to a polymer. “Although its origin is renewable the polymer cannot be considered ‘natural’ as it is synthesised within a chemical plant.”¹

Recycled polyester

Recycled fabric made out of plastic water bottles broken down into fibres enables plastic to be rescued from landfill and recycled repeatedly. Production of recycled polyester generates fewer carbon emissions than working with virgin materials.

Wood

Eight out of 10 global consumers expect companies to ensure that their wooden or paper products do not contribute to deforestation or damage wildlife habitats, according to the Forest Stewardship Council, which says: “Responsible sourcing of wood can benefit construction projects in many ways. Wood is more carbon- and energy-efficient in comparison to other building materials.” The main challenge in sourcing sustainable wood products is ensuring that it is the result of proper forest management practices. Choosing FSC-certified wood helps addresses these issues.²

¹ Source: British Plastics Federation, [Polymer: Bio-based/Degradables](#)

² Source: Forest Stewardship Council, [Construction](#)

“Forests have the potential to play a central role in the circular economy by providing renewable raw materials so sourcing products from SFI-certified forests is a great way to support the circular economy and conserve our planet’s precious resources,” says the Sustainable Forestry Initiative.¹

As with other resources, reuse is better than using virgin materials where possible. Reclaimed wood or wood from climate-smart forests can reduce the harmful impacts of a construction project. Engineered woods are also an option but it is important to ensure that products do not contain formaldehyde resins or other harmful additives.

“Responsible sourcing of wood can benefit construction projects in many ways. Wood is more carbon- and energy-efficient in comparison to other building materials”

Forest Stewardship Council

Softwoods

Timber from softwoods is popular in construction projects as the pine or spruce trees from which it is most commonly sourced are usually in forests that are sustainably managed. As the name suggests, these woods are soft enough to be easy to work with.

Hardwoods

These dense, often slow-growing woods mostly come from deciduous trees. Temperate hardwoods such as beech, birch and oak are common in Europe, North and South America and Australasia. Tropical hardwoods such as mahogany and teak are grown in Central and West Africa, Central and South America, and South East Asia. Unsustainable cultivation practices can be an issue with tropical hardwoods.

Future materials

New construction materials are emerging, tailored to overcome the problems associated with existing materials. The UK’s Henry Royce Institute is using computational design and machine learning techniques to develop new materials. The possibilities of improving sustainability of materials through biomanufacturing is also being explored at the Institute.²

Cruise and ferry designers can look to aviation for ideas regarding the materials of the future. Six sustainable cabin materials identified by the FlyZero initiative have good prospects for marine interiors: bio-plastics; bio-composite reinforcements; grape waste for bio-leather; bio-elastomers for natural rubber; silica fire coatings and aerogels in which liquid is replaced by gas.

¹ Source: Sustainable Forestry Initiative, [ESG](#)

² Source: Henry Royce Institute, [Chemical Materials Design](#)

The quest for more sustainable products

The case for making more sustainable design choices is clear, both from an environmental perspective and because doing so increasingly makes good business sense as responsible sourcing is rewarded and the old ‘take, make, use and dispose’ model is actively discouraged by regional, national and global regulatory mechanisms.

By embracing the principles of the circular economy through intelligent use and reuse of scarce resources, designers can improve their own sustainability profiles while empowering ship owners to achieve their green targets. Similarly, businesses that supply materials and products for interiors can make themselves attractive to their customers and the end users of the items by committing to a low-carbon future. “If suppliers manage to achieve carbon neutrality for themselves and/or their products, this has a direct effect on the Scope 3 emissions of the companies who purchase from them and contributes to minimising their upstream carbon footprint.”¹

Designing sustainable products

Responsibly sourced materials are the building blocks of any construction-related sustainability initiative. There has never been more information readily available to businesses engaged in specifying materials for projects. The will to make positive change happen is also at an all-time high, with many industry bodies nailing their colours to the mast. “We are working towards moving from a sustainable products approach to a sustainable raw materials approach,” says the Textile Exchange.² However, while the shift to more sustainable ways of working is still at a relatively early stage, it remains a challenge for designers to sort through the available options to choose the most sustainable for a particular project.

Green claims should always be backed up with proof of how suppliers are achieving their promised outcomes. As covered in more detail elsewhere in this report, the A to Z of sustainability standards for materials is long, including ANSI Standards, Cradle to Cradle, Declare, Environmental Product Declaration, FSC Certified, Health Product Declaration, ISO/EN Standards, LEED v4 Material Ingredient Disclosure, PVC Free, VOC content and VOC emissions, and Zero Waste, among others.³

These frameworks, certifications and standards allow design companies to specify materials with confidence that they are likely to meet certain sustainability standards. But even where these ‘stamps of approval’ are not available, there are a few basic principles that can help narrow down the choice of materials to those that will do the least harm.

¹ Source: ClimatePartner, [Available, Reliable and Comparable](#)

² Source: Textile Exchange, [Biodiversity Insights Report](#)

³ Source: Mindful Materials, [Mindful Materials Toolkit](#)

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Design for low-impact materials

As discussed elsewhere in this report, sustainability initiatives in the passenger shipping sector have until recently focused largely on reducing harmful emissions while ships are at sea. The chance to improve the sustainability of ships by making better choices of construction and design materials and products therefore represents a significant opportunity to cruise and ferry companies, as there is still so much scope for improvement in these areas. And for the design companies that work in this sector, there are great opportunities to provide services such as environmental consulting and eco-design, which can future-proof both the ships they work on and the business processes of their clients.

Regulation is an important factor in driving uptake of sustainable design solutions. The European Commission is considering developing sustainability principles and other appropriate ways to regulate a variety of aspects of products, including improving product durability, reusability, upgradability and reparability, addressing the presence of hazardous chemicals in products, and making them more energy- and resource-efficient. It is also looking at ways to increase recycled content in products; enable remanufacturing and high-quality recycling, reduce carbon and environmental footprints; and restrict single-use products.

“80 per cent of the environmental impact of any product comes from the materials used to make it. Find out what went into the product you’re considering”

Sustainable Furnishings Council

Other ideas it is considering are to introduce a ban on the destruction of unsold durable goods and incentivise product-as-a-service models. Digitalisation of product information and rewarding products based on their different sustainability performance are also being debated.¹

Given that sustainable products should be built for the long haul, it is important to look for qualities such as longevity, durability and modularity, featuring open source designs that allow for easy dismantling, disassembly, reconstruction, adaptation and reparability. “Consider reversible interconnection technologies (for example, screws are better than glue) and labelling the parts,” is the advice of Interreg,² while the Sustainable Furnishings Council says: “80 per cent of the environmental impact of any product comes from the materials used to make it. Find out what went into the product you’re considering.”³

¹ Source: European Commission, [Communication from the Commission](#)

² Source: Interreg, [Product Sustainability Guide](#)

³ Source: Sustainable Furnishings Council, [Quick Buying Guide](#)

Sustainable sourcing checklist

The EU sustainability body Interreg lists the following principles for sourcing materials:

- Use smart, green materials that are renewable and recycled and are designed to have a lower environmental impact in manufacturing, use or disposal. Design for recyclability
- Reduce the number of materials, components and parts through modularisation/standardisation. Design to reduce the number of materials required to create a product, with labelling to identify materials and reduced raw materials
- Choose strong, long-lasting materials with reduced weight and size. Prioritise durable, indestructible structures that are shock-, water- and dustproof
- Use clean materials that don't contain hazardous substances and are safe in manufacturing and use.
- Ensure that components feature low energy consumption throughout the life cycle
- Adopt smart production techniques, reduce complexity and ensure supply chains are optimised.

Source: Interreg, [Product Sustainability Guide](#)

Sustainable manufacturing

Circular business models, zero-waste and cradle-to-cradle approaches and industrial symbiosis are all aspects of a manufacturing mindset that supports sustainability. In addition, new technologies are helping manufacturers to streamline their processes and eliminate wasteful and damaging practices. From optimisation software to the IoT, AI and 3D printing, the possibilities available to organisations to leverage the green benefits of 'Industry 4.0' are impressive. However, the basic principles remain the same, no matter how high- or low-tech the practices adopted: minimise environmental damage; reduce energy consumption; design for low-to-no waste; and build in recycling and reuse from the start.

Cabin products

When specifying products for cabins on new passenger ships or for refits, designers are under pressure to meet a wide range of requirements for sustainability, from bathroom fittings that reduce water consumption to soft furnishings that do not cause indoor pollution or contain hazardous substances.

A number of schemes, some of which were originally designed for the hotel sector but are often equally applicable in cruise or ferry vessels, can help narrow down the choices for cabins to the best green options. The European Bathroom Forum Scheme provides access to a database of bathroom products which, it says, "when installed and used correctly will use less water, save energy and save money."¹, while the EU Ecolabel vets bed mattresses to ensure high quality, long-lasting products and a reduction in hazardous substances.² Clean the World partners with hotel properties to recycle their discarded soap and bottled amenities such as shampoo, conditioner, lotion and body wash.³ Soap is made into new bars while bottles are either recycled or converted to energy.

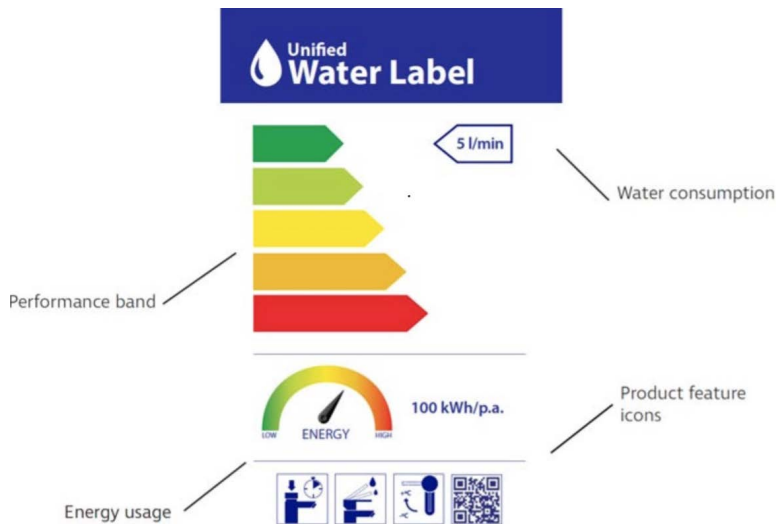
¹ Source: European Bathroom Forum, [The Label](#)

² Source: European Commission, [Bed Mattresses](#)

³ Source: Clean the World, [About us](#)

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Unified Water Label, European Bathroom Forum



Source: European Bathroom Forum, [The Label](#)

Adhesives

Ensuring that adhesives are safe and do not contain dangerous toxins can be a major challenge. Green Seal certifies adhesives as safe for human health and the environment and advises commercial buyers to check that products have restrictions to prevent adverse health effects and limit toxicity, ozone depleting substances and volatile organic compounds. In addition, they should not have content above 1000ppm of carcinogens, reproductive toxins and persistent, bioaccumulative and toxic compounds. Resealable product packaging, reusable or recyclable shipping packaging and minimum 30 per cent recycled corrugated shipping packaging are other waste-reduction solutions to look for. “Criteria that help preserve the environment include content limits on volatile organic compounds, limits on phosphorous and prohibition of ozone-depleting substances,” says the organisation.¹

“Criteria that help preserve the environment include content limits on volatile organic compounds, limits on phosphorous and prohibition of ozone-depleting substances”

Green Seal

¹ Source: Green Seal, [Adhesives Snapshot](#)

Ceiling systems

Ceilings should have a Noise Reduction Coefficient of at least 0.80 (80 per cent) and a light reflectance greater than 0.85, according to BuildingGreen, which also advises the use of formaldehyde-free binders for acoustic ceiling tiles and third-party testing to verify compliance with CDPH.¹

Cleaning products

Although not strictly design-related, cleaning products can affect the sustainability of interiors when it comes to the provision of cleaning and maintenance programmes. The International Association for Soaps, Detergents and Maintenance Products (AISE) sustainable cleaning product standards require packaging to use recycled cardboard and to provide clear information about whether plastics are recyclable, and reusable. Products should not contain microbeads and users should have access to information on sustainable use of products, says the organisation.²

Electronic devices

The European Commission is working to reduce the risks posed by dependence in its Member States on critical raw materials used in electronic devices, as these materials may be vulnerable to supply disruption. Addressing the current low rate of recycling is a first step in this process. “Increasing the recovery of critical raw materials is one of the challenges that must be addressed in the move to a more circular economy,” says the Commission.³

“Increasing the recovery of critical raw materials is one of the challenges that must be addressed in the move to a more circular economy”

European Commission

Fabrics

Emissions related to various processes in the fabric supply chain, along with hazardous chemicals used in fabric production, mean that fabrics can come with a heavy environmental load. In addition, labour abuses in some factories mean that many manufacturers fall short of the social aspect of ESG ideals.

While the list of ‘less sustainable’ fabrics is unsurprisingly dominated by fossil-fuel-derived and non-degradable examples such as acrylic, elastane, nylon, polyamide, polyurethane and sequins, natural fabrics such as cotton and linen also take a toll on the environment during the cultivation and manufacturing of textiles.

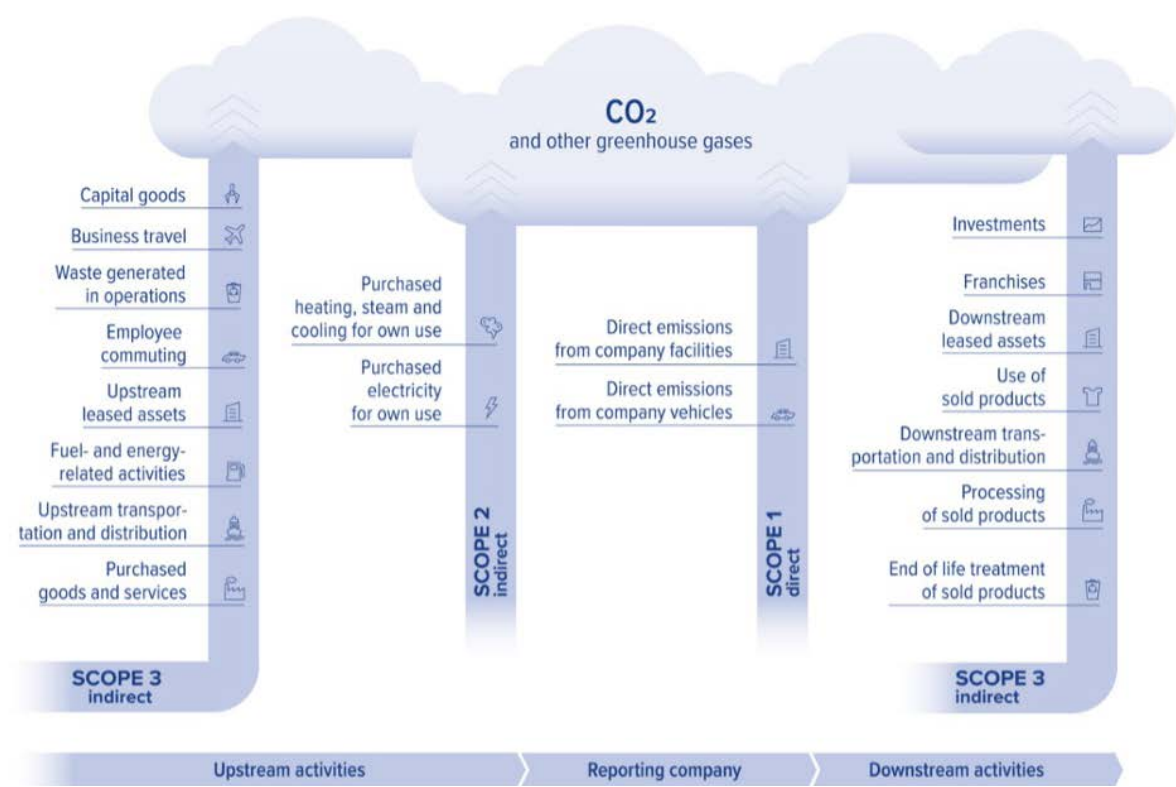
¹ Source: BuildingGreen, [Ceiling Systems](#)

² Source: The A.I.S.E. Charter for Sustainable Cleaning, [AISE Charter](#)

³ Source: European Commission, [Communication from the Commission](#)

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Emissions are divided into three different scopes



Source: ClimatePartner, [Available, Reliable and Comparable](#)

Facts and Cradle to Cradle are two certification systems to look out for in fabric production, along with the Oeko-Tex 100 and Global Organic Textile Standard (GOTS). The Nordic Swan label covers manufacturing of textiles and leather and requires a range of actions including use of organic or recycled fibre and management of chemicals, as well as the implementation of a 'best available technology' approach to water and energy use.

The CDPH Standard for VOC emissions is another important resource, as is the EU Ecolabel for textiles, which guarantees that efforts have been made to reduce substances harmful to the environment and human health or those causing pollution.

Floor coverings

Hard flooring

Products containing PVC (vinyls) have become popular in recent years due to their low cost and the availability of increasingly high quality designs. However, their high carbon impact and disposal issues mean that durable natural options such as linoleum and rubber are more sustainable choices. The CDPH standard should be applied to reduce risks from VOCs. Nordic Ecolabelling also offers advice on selecting durable, sustainable floors.

Specifying sustainable furniture and fitments

The Nordic Swan label advises those specifying interiors to look out for:

- Use of sustainable and renewable raw materials, requirements for traceability and a minimum of 70 per cent certified wood raw material
- Environmental and health properties of chemicals used in production, added to the materials, or used in surface treatment substances. (such as carcinogens, halogenated flame retardants, fluorinated substances and antibacterial additives including nanoparticles)
- Limits for content of, and low emissions of, formaldehyde and VOC in relevant chemicals and materials such as adhesives, padding materials, textiles, wood-based panels and laminate
- Limits for energy consumption in the production of wood-based panels and laminate, as well as stand-by energy consumption for height adjustable furniture such as desks and beds.

Source: Nordic Ecolabelling, [Group](#)

Carpet

Carpet has a particularly high environmental cost throughout its production, use and disposal phases. Embodied carbon is particularly high due to the plastics and petrochemicals carpet contains. Although natural fibres such as wool are better choices, their comparative sustainability depends on how they are processed. Issues for carpet sustainability include reducing the waste, emissions and other factors inherent in production, as well as provision of safe and eco-friendly disposal when carpets reach the end of life, avoiding landfill. Carpet certifications include CRI Green Label Plus (for VOC emissions), Cradle to Cradle and NSF 140 Platinum.

Modularity in carpets is achievable by specifying carpet tiles that can easily be removed and updated. For nylon carpets, solution-dyed nylon yarn and carpets with high recycled plastic content can reduce the environmental impacts. Low-pile carpets win out over deep-pile versions from an eco-friendly perspective too.¹

Furniture

Much furniture is made of wood and wood products. FSC certification and the EU Ecolabel for Furniture provide reassurances to businesses specifying these products that the items they choose meet certain minimum sustainability standards such as being sourced from legal, sustainably managed forests, and being free of harmful substances and emissions.

The Furniture Industry Sustainability Programme (FISP) provides audits that cover the following environmental options: Environmental Management System, Energy Management and Efficiency, Waste Management, Sustainable Packaging Management, Sustainable Procurement, Sustainable Transport, Sustainable Timber, Air and Water Management, Eco-design and End of Life Management.²

¹ Source: Carbon Smart Materials Palette, [Carpet](#)

² Source: Furniture Industry Sustainability Programme, [How FISP Works](#)

PRODUCTS AND MATERIALS

Paints and finishes

Many paints and coatings or finishes contain high levels of VOCs, although growing awareness of the problem means that there is an increasingly wide choice of low-VOC alternatives. The persistence in the indoor ship environment of VOCs after installation of means it is especially important to look for healthier choices in enclosed spaces such as cabins.

Hard covering products

In Europe, companies sourcing hard covering products such as floor tiles, wall tiles, panels, tabletops, vanity tops and worktops can use the EU Ecolabel to ensure sustainability. The Ecolabel requires that products should reduce land use impacts caused by quarrying of raw materials and restrict the use of hazardous substances. They should also require production processes to be energy efficient; encourage the use of renewable energy; require production processes to be material efficient, including the reuse/recycling of process waste; and limit emissions of pollutants that contribute to global warming, acidification, and eutrophication, which are detrimental to human health.¹

“There should be 50 per cent or greater recycled content and adhesives should contain no formaldehyde, antimicrobials, or hazardous airborne pollutants”

BuildingGreen

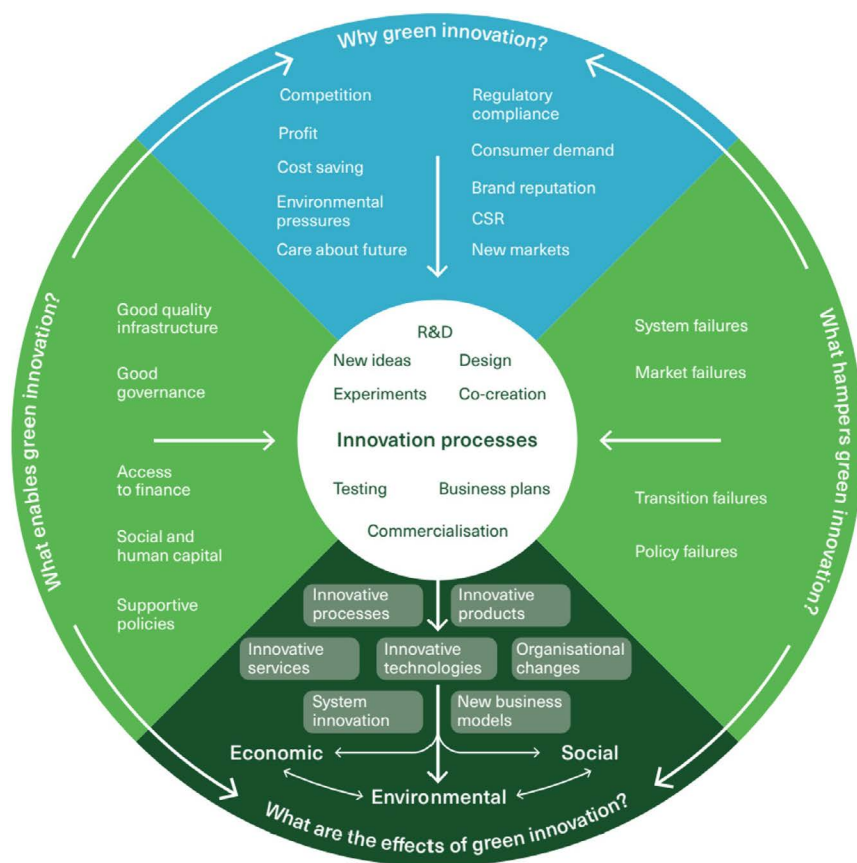
Tiles and wall coverings

According to BuildingGreen, solid surfaces should meet CDPH Standard Method emissions requirements. Natural stone should be certified to ANSI/NSC 373 and/or C2C Silver or higher and composite surfaces should contain 100 per cent post-consumer-recycled content or FSC-certified content, while the best glass composites must have high recycled content and no epoxy. Engineered stone/quartz should have NSF/ANSI 51 food contact safety certification and proof that these products contain post-consumer recycled materials or have other environmental benefits. Wood products should be FSC-certified, sustainably reclaimed, or made of rapidly renewable bamboo. Tiles should be certified to ANSI A138.1 Green Square and also to Cradle to Cradle Silver level or higher. There should be 50 per cent or greater recycled content and adhesives should contain no formaldehyde, antimicrobials, or hazardous airborne pollutants. Wall coverings should meet the emissions requirements of CDPH Standard Method; be PVC-free; and have no PFAS coating.²

¹ Source: European Commission, [Criteria for Hard Covering Products](#)

² Source: Building Green, [Solid Surfaces](#), [Wall Coverings](#) and [Tiles](#)

The dynamics of green innovation



Source: [Green Alliance](#)

Striving for sustainability: featured suppliers and products

A sustainable product or service forms part of a supply chain that can remain efficient over the long term, without having harmful effects on the environment or people involved. Many companies would like to claim that their products fit that description but in the absence of a 360° protocol for sustainable maritime interiors with clear requirements for interior products, businesses are left to find their own way through the maze of regulations, best practices and evolving norms for greener production.

The most sustainable interior products are those that provide environmental, social and economic benefits while protecting public health and the environment over their whole life cycle, from the extraction of raw materials until final disposal. This can include developing sustainable manufacturing solutions by designing products out of waste, working with the circular economy, reducing emissions, making supply chains more transparent, or reducing the carbon footprint.

Other options are to specialise in longer-life products, reduce energy usage in production processes, target 100 per cent CO₂ neutral energy usage, or base production in one location. Some suppliers even offer sustainability score cards for their products, allowing designers to gain a sustainability rating by choosing them.

Those specifying products for interiors in cruise ships and ferries are looking primarily for products that meet existing IMO fire-load criteria and fit weight and durability requirements. Choosing items with sustainability as the main deciding factor is still something of a 'nice to have' in many of these environments, although this is changing fast. And with sustainable products often carrying a price premium, it is clear that the companies selling them need to have very compelling eco-stories to tell about their green offerings.

The companies and products profiled in this section have undertaken to comply with an impressive range of certification and verification systems, from IMO and MED Wheelmark to LEED and BREEAM certification, Cradle to Cradle, various ISO standards and more. What is perhaps surprising is that some of those most passionate and active in their pursuit of sustainability are not global giants with entire sustainability departments to call on but rather, are small local businesses that have elected to carve a niche for themselves in greener commerce. Some of their stories are included in this section of the report.

Developing sustainable products

Sustainability is a long-term vision that requires commitment if it is to be authentic and measurable. This requires tracking each product from the raw material extraction, through production and distribution, to user experience and disposal.

To produce a sustainable product takes investment on many levels. Evaluation of the entire life cycle of materials and products is possible with the help of tools that help designers understand, compare and evaluate a product's environmental impact in distinct phases of the life cycle.

When products are designed with sustainability in mind, they have a far higher chance of achieving this aim than if green processes are introduced further along the production process in attempts to improve inefficient products.

By taking a circular approach and planning for the ability to disassemble for reuse, it is possible to create products that consume minimal resources to create, have a long lifetime, and are either biodegradable or can be reused time after time.

This can include ensuring that materials used are not toxic for people or the environment and can be reused or recycled after use. Mapping and assessing materials throughout the value chain is required to guarantee responsible production, minimise waste and prepare in advance of installation for how to manage the end of life of components.

For now, the cost of sustainable alternatives is often higher than for mainstream options. However, it is worth noting that if the disposal of plastic compound materials were to be priced to reflect the full environmental impacts, it (and consequently the materials themselves) would be prohibitively expensive. Currently, the cost analysis for most products does not include the follow-up (and clean-up) costs of unsustainable practices. By supporting those companies that are pioneering better ways of making things, the balance will swing towards sustainable options that are affordable over time.

Between them, the companies and products listed below are making strides in many areas of sustainability, demonstrating what is possible when individual organisations commit to greener practices. However, for sustainability to become embedded in all businesses producing products for maritime interiors, it is necessary for the industry to invest in further research and development for sustainable products. This includes finding solutions for the availability of the raw materials which are necessary to produce long-lasting, durable products that are ethically sourced and environmentally conscious, use less additives and chemicals and have lower environmental footprints throughout the value chain.

Highlighted suppliers

The following suppliers were highlighted by two or more contributors for their sustainability approach, performance or ambitions. The suppliers and products referenced do not necessarily have the required certifications for maritime use.

PRODUCTS AND MATERIALS

Company	Sustainability insight
Agua Fabrics	Developed FirmSoft PU biodegradable faux leather range and uses bio-packaging
Bio-Dek	Bio-renewable and bio-infused material made with recycled glass and cashew shell liquid
Bolidt	Long lasting replacement for rare raw materials such as tropical hardwood. Sustainability R&D leadership
Chelsom	ISO 14001 Environmental Management System, energy saving and carbon footprint schemes, Ecosurety member
Dampa	Environmental Product Declarations, prioritises use of recycled and recyclable materials
Dansk Wilton	Cradle to Cradle certification for Colortec RE:THINK, recognised sustainability leadership
Dauerflora	Champions use of preserved plants to reduce water use without compromising aesthetics
Dodds and Shute	Responsible sourcing and supply of furniture products through robust supplier audits
Ege Carpets	ISO 14001 environmental management and Cradle to Cradle certifications
Egger Laminates	Transparent reporting of impressive sustainability performance, fully certified
Elmo Leather	Pioneer in sustainable clean-water tanning, 100 per cent CO2 neutral, water-based coatings
Eumar Design	GelCeramic Lightweight technology, products made of durable and recyclable stone and resin
Forbo Flooring	Working through a thorough circular economy action plan and keen focus on a range of issues
Formica	Prioritising cradle-to-gate activities identified in the company's life-cycle assessment
Gerflor	Established Second Life Programme prioritising recovery, recycling and reuse of old material
Gislavid Folie	Environmental policy supported by ISO 14001 certified environmental management system
Green Furniture Concept	Circular design Indicator and checklist to lower CO2 footprint and extend product lifespan
Gudbrandsdalens Uldvarefabrik	EU-Ecolabel certified products made from inherently sustainable and locally sourced wool
Hansgrohe	EcoSmart technology requires up to 60 per cent less water than conventional products to reduce water and energy costs
Hera	Specialist in energy efficient lighting, provides expert counsel on four types of LED
Hespera	Mattresses made from 100 per cent recyclable materials, product tracking for life-cycle audits

<u>JAB Anstoetz Group</u>	Cradle to Cradle certified. After use, product fibres can be homogeneously separated and 100 per cent recycled
<u>Kvadrat</u>	Participant in UN Global Compact, significant circularity and decarbonisation initiatives
<u>Lonseal</u>	GreenVinyl Programme and Environmental Product Declarations, utilises recycled content
<u>Magicman</u>	Not a product but a recognised expert in extending product-life through skilled maintenance and repair
<u>Malone Fabrics</u>	Two product ranges made from recycled waste from the oil industry, 100 per cent upcycled and recyclable, no PFCs
<u>Mapei</u>	Type III Environmental Product Déclarations, focus on lightweight, recycling and low VOCs
<u>Medite Smartply</u>	Environmental Product Declarations, FSC certified and 60 per cent of raw material is sawmill waste.
<u>Morbern Europe</u>	Highly rated MorGreen FR-free vegan textiles with Oeko-Tex standard 100. EvoHide range launching in 2022
<u>Muraspec Wallcoverings</u>	Life-cycle assessment rating with BRE Group and Environmental Product Declarations
<u>Peninsula Contract Furnishings</u>	Advocates restoration of furnishings, offers full survey and refurbishment service
<u>Polyrey</u>	Environmental Passports and Environmental Product Declarations to support life-cycle impact assessments
<u>Proman</u>	Innovative real wood veneer from sustainably sourced forest products, REACH-compliant
<u>Richloom Contract</u>	Achieves zero yarn waste (100 per cent of yarn is woven into fabric), water-use leadership and MindClick Leader Status
<u>Solarglide</u>	ISO 14000:2015 Environmental Management standard and seeking cradle to cradle certification
<u>Spared</u>	Interior products created from ocean and land plastic and recycled shells from fishing waste
<u>Table Place Chairs</u>	Joint venture with Stansons to create curtains from 100 per cent PET from used plastic bottles
<u>Tarkett</u>	PA6 carpet tiles with EcoBase backing are 100 per cent recyclable. EcoBase backing is cradle to cradle Gold level certified
<u>Trevira</u>	Trevira Management Process, ISO 14001 Environmental Management System and Oeko-Tex Standard 100
<u>Ulster Carpets</u>	ISO 14001 Environmental Management System, 100 per cent of post-industrial waste is diverted from landfill
<u>Waterbury Bathroom Accessories</u>	Working on cradle to cradle certificates and recycling old bathroom accessories
<u>Yarn Collective</u>	Climate-positive company, achieved through effective partnership with suppliers and Ecosphere+

Featured products

The following products have received third-party praise for their sustainability performance and collectively provide good examples of how manufacturers are seeking to achieve gains against various environmental metrics. Until there is a common industry set of requirements for sustainable products, designers and specifiers will have to judge for themselves whether these and other products meet their own environmental standards.

Bio-Dek Butterr

Ultra Lightweight Underlayment is a bio-renewable/bio-infused, three-component, 100 per cent solids epoxy ultra-lightweight underlay material designed with performance characteristics which include low odour, flexibility, excellent adhesion, hydrophobicity and low temperature cure. The resin structure design is based on cashew nutshell liquid and the aggregate structure is based on recycled glass, which creates a high-performance system. This levelling material will provide a seamless, waterproof barrier designed to work in wet spaces, galleys, passageways and all other areas where deck irregularities need to be removed from a deck plate. Material can be applied from a feather edge to three inches in a single application. The structure is designed to receive all top-coat systems.

Bolideck, Bolidt

A synthetic decking system is an unlikely product to feature in a sustainability report but Bolidt has earned a reputation for R&D advances that continue to improve the environmental performance of its products. In the first instance, synthetic decking has become the default choice for passenger ships, replacing teak – a precious tropical hardwood. Bolideck is light and its inherent properties mean that it can be applied thinly (base layer of 10-15mm and top layer of 5mm depending on deck levelling and soundproofing requirements) to minimise material use. Bolideck is light, delivering fuel savings, and durable, with an expected life of over 15 years. It can also be refreshed and repaired during its life to maintain high aesthetic standards. At the end of its life it can be lifted cleanly off the deck, having protected the steel beneath it, then ground down and added to the base levelling layer of a new project. The company has recently released bio-based cleaning products that contain bacteria which will continue to clean the deck even after it has been rinsed. Looking to the future, Bolidt is currently testing a bio-based hardener and is working on the logistics of offering a service to grind old decking material for the levelling layer on site during a refurbishment project.

Colortec ORIGIN, Dansk Wilton

Cradle to Cradle certified, this product is based on undyed wool. In addition, no fire retardants are added as wool itself is flame retardant. Wool is a natural and rapidly renewable resource. The backing is made of recycled material. 98 per cent of all substances are mapped and assessed, and all suppliers and sub-suppliers have signed the Cradle to Cradle 'Banned List of Substances.' The company's energy consumption is covered by wind energy and it buys offsets (UN Certified Emission Reductions) to compensate for its remaining CO2 emissions from internal production processes (specifically providing financial support to a project in Columbia aiming at reducing the CO2 emissions from a landfill). Manufacturing takes place in Denmark with good working conditions and the management team consists of 75 per cent women. The company is working towards Cradle to Cradle Gold certification. To obtain this, it must use GOTS-certified wool (right now this is not available for carpet manufacturing, only clothing) and is seeking a new backing material of traceable, recycled material, as well as documentation for the remaining 2 per cent of all substances used (or new suppliers who can provide the documentation). Dansk Wilton aims to offer a recycling service after end of life. Life expectancy of the carpets is 10-15 years depending on density and if it is installed in a cabin or public area. The company is also looking into life-cycle analysis and Environmental Product Declarations.

Dried plants, Dauerflora

The company has always put a strong focus on working with sustainable products. The current trend towards decorations composed of dried natural materials fits in perfectly with the philosophy of the Hamburg company, which works with stabilised, live and dried plants whose natural origin means they can easily be disposed of as they are compostable. Stabilised products are IMO certified, if not, decorations are often added to the fire load. For years, Dauerflora has been working with preserved plants, using a glycerine-water mixture. Gorgeous rose bouquets can be created with preserved roses which are durable for years, unlike live plants. And when they are not as beautiful anymore, dried and preserved plants can be simply composted and the containers and vases can continue to be used with new decoration.

PRODUCTS AND MATERIALS

Elmosoft, Elmo Leather

Elmosoft is a chrome-free, soft and pliable grain leather by-product of the Scandinavian meat and dairy industry and is by some distance the company's most sold product within the cruise ship industry. Outstanding comfort, combined with excellent durability (up to 25 years) and an extensive shade card, makes it very suitable for the public environment. Leather is sometimes criticised as being unsustainable, but for as long as the meat and dairy industries continue to breed cattle it is more sustainable to use all of the natural by-products. Elmo Leather practises local sourcing, upcycling, 100 per cent renewable energy use, low air emissions and a clean water tanning process. The company's production plant is 100 per cent CO₂ neutral and fulfils the EU Best Available Techniques (BAT) directive. The company uses untreated river water instead of municipal water and has its own biological water treatment plant. It is LEED certified for lower VOCs and its chrome-free process. Leather normally ends up in energy recovery, but it is also biodegradable. Elmo Leather holds a Reutiligin Certification that tests for hazardous materials such as lead, gaseous emissions, and other harmful products that may be used in a tanning process.

EvoHide, Morbern Europe

EvoHide is a textile made from bio-attributed PVC resins originating from agricultural and forestry biomass, bio-based plasticisers derived from soya bean oil and 100 per cent recycled polyester back fabric from used plastic water bottles. The combination of these International Sustainability & Carbon Certification certified and Roundtable on Sustainable Biomaterials certified renewable ingredients delivers a 75 per cent sustainable content vegan leather, suitable for all indoor and outdoor marine upholstery applications. The appearance and properties of Evohide can be tailored with plain leather-looking surfaces or textile-inspired grains. The EvoHide range launching in 2022 is Mistral Free and a recipient of a DAME award special mention at METS 2021.

Fenix NTM Bloom, Formica

Fenix is a long-lasting material. The decorative surface is characterised by a multilayer coating and the use of next-generation acrylic resins, hardened and fixed with Electron Beam curing process. Thermal healing of superficial micro-scratches is also possible. With these features, Fenix products have been designed to last. As of December 2021 Fenix is carbon neutral. This has been achieved by refining product build-up and the implementation of a long-term strategy for carbon offset projects. The core of Fenix NTM is predominantly paper and phenol-based thermosetting resins. Approximately 60 per cent of Fenix is made of bio-based material. Fenix NTM Bloom has been developed with lignin technology to significantly reduce the amount of phenol included in the resin by 50 per cent. Lignin is a natural polymer in wood fibres and so the key ingredients for this product originate from the same place: responsibly managed forests. Fenix NTM holds multiple certifications: LBC Compliant, Nordic Swan, FSC CoC, Greenguard Gold, M1 Emission and Environmental Product Declarations.

Green showers, Hansgrohe

Hansgrohe Green showers have LowFlow faucets together with EcoSmart technology, offering optimal water saving with no compromise on comfort thanks to AirPower. Energy saving is provided by CoolStart technology, delivering hot water only when needed.

Hespera H-series and C-series mattresses

20 million mattresses in the USA and 30 million mattresses in Europe are landfilled or incinerated every year. Hespera mattresses are made from 100 per cent recyclable materials such as cashmere, cotton and handpicked GOTS wool. These natural materials can be recycled for use in other products and the remaining materials can be produced again at the same quality level and can be used over and over again. By applying a replaceable top mattress and using natural materials, the life span of the mattresses is extended and the ecological footprint is reduced. In cooperation with DTGroup using RFID/QR labelling, Hespera can trace the delivered mattress at the end of its life cycle and ensure full recycling of the materials. In cooperation with DTGroup and EcoChain, the company can also offer full life-cycle footprint compensation.

Limartec, Proman

High-pressure laminate is replaced with real wood veneer (regrowing, farm grown, popular wood like in ALPI or TABU veneers). The surfaces, which are made from waste materials which would have been discharged otherwise, are halogen-free and compliant with REACH requirements. Since aluminium honeycomb panels are used as the main core materials, the decorative wood veneer will be discharged and recycled with the aluminium and reused as such.

Mango and berry ranges, Malone Fabrics

Manufactured from recycled waste from the oil industry, these fabrics are 100 per cent upcycled and recyclable. No water is used in the dyeing or processing and production is 100 per cent local. Requiring less raw material to produce more fabric, Harmolan fabric can be recycled up to 10 times. No PFC chemicals are used and because it is easy to clean and hard-wearing, the life of the fabric can be extended massively, reducing the need for replacement.

PRODUCTS AND MATERIALS

Natura, Ulster Carpets

The sustainability of Natura carpet is not unique to this collection, but its name underlines the emphasis that Ulster Carpets places on continually improving the environmental performance of its products. Natura is 80 per cent wool and 20 per cent nylon, making it suitable for heavy-wear applications including public areas, corridors, cabins and suites. Ulster Carpets is ISO 14001 certified, ensuring high environmental standards. Manufacturing efficiencies are key to sustainability advances which include a new Dye House and Energy Centre, which has reduced water (40 per cent), heat (25 per cent) and chemical (5-10 per cent) use per kilogram of yard produced. In addition, 100 per cent of post-production waste is diverted from landfill and the company participates in the UK government's Climate Change Agreement to reduce energy consumption.

Setesdal, Sirdal and Suldal, Gudbrandsdalens Uldvarefabrik

The Setesdal, Sirdal and Suldal trio was created in 2014 with a wish to reintroduce Norwegian wool in upholstery fabric. Inspired by Norwegian nature, hand knitting and traditional fences (skigard), the fabric is meant to evoke authenticity paired with chic and modern comfort. This fabric travels uniquely short distances in every part of the process, being 100 per cent pure Norwegian wool manufactured in Norway. All three have the EU flower certification. The life expectancy depends on where it is to be used and what wear and tear it is exposed to. For normal commercial use, a 10-year warranty is applied, which requires a standard maintenance programme, although the product often lasts much longer – GU is known for designing and producing long-lasting fabrics. All processes are under one roof and the natural raw material is biodegradable and has great technical properties without the use of chemicals.

Spared, Volume Creative

This is not a single product but a service that creates different products from waste. Born from a desire to support brands in reusing their own waste in their own environments, Spared offers a service to reuse waste in innovative ways. It has also developed a composite material, a modern 'waste' terrazzo. Molelk is made from seafood waste and Plarix from plastic waste. Customers can also send the company their own waste and receive bespoke products in return. Spared material takes direct action to reduce waste going to landfill. Made with chipped waste and an eco-, water-based, zero-VOC composite, it is highly durable and can last decades if maintained properly. Depending on its use/application, if it is in high-traffic areas, resealing is recommended every 12-24 months.

Streamo Sailer, Gerflor

Gerflor is fully engaged in circular economy principles and is investing in eco-design for all products and processes through providing high product durability and reducing the environmental footprint of installation (cut-at-size flooring solution, no installation waste and a second-life programme). Streamo Sailer, a homogeneous flooring which contains recycled content, is REACH-compliant, has a surface treatment optimising maintenance costs (reduced water consumption and detergent use), is light (2850 gr/m²), is 100 per cent recyclable, improves indoor air quality (VOC < 10µg/m³) and is FloorScore- and IMO-certified. Its recommended after-life is to be collected, recycled and reused.

Trevira CS eco

Trevira CS eco is a trademark for sustainable products with at least 50 per cent recycled content. Using pre-consumer and/or post-consumer materials, the products have the same high flame-retardant performance as virgin products, while compared to cotton they have a better carbon footprint. They have a high level of flame-retardant performance and are durable with many designs possible. Produced in accordance with human rights and energy-saving principles (low energy and water required when washed), they have GRS and Oeko Tex Standard 100 certification and can last more than 10 years even under extreme use. At the end of life these products should be recycled (closing the loop), either mechanically or chemically.

THE ROAD AHEAD



The chapters in this 'The road ahead' section of the report consider perspectives on the future of sustainability, which have been distilled from suggestions submitted by the industry participants who contributed to this report. Comments were provided on the basis of anonymity to encourage frank and open discussion.

The benefits of building more sustainable interiors

There are multiple advantages to building sustainable maritime interiors, including opportunities to reduce waste, improve health, cut emissions, save energy and reduce costs. Add to that the potential to increase sales and yield by meeting the growing demand for greener ships from guests and it is likely that improvements in this area of shipbuilding will become the norm sooner rather than later, given the availability of appropriate industry support for change.

“The social tide has shifted towards sustainability and as much as affordability remains a consideration, ethical consumerism has not only arrived – it is the future”

Seeking out sustainable materials and creating greener interiors can be a means of communicating a brand's core principles and ethics to guests, who are increasingly looking to brands to be more transparent about their values. They will choose to travel with cruise lines, for example, which can reassure them that they are taking steps to reduce their environmental footprint.

Making sustainability visible to guests

For cruise and ferry brands, the chance to attract new passengers is always compelling and the trend towards sustainable interiors is a major global wave they can ride to pull in guests who have already begun to choose land-based holidays at environmentally built and operated hotels or resorts and are looking to replicate this type of experience onboard ships.

Reputational benefits accrue to visibly sustainable companies as travellers develop higher social and environmental expectations. The green travel sector is no longer a niche group these days as sustainability has become central to thinking about the social and economic future of countries as well as about the threat and reality of climate change. Growth in demand for more environmentally friendly lifestyles is reflected in consumer buying behaviours that reflect ethical and sustainability concerns.

Under these circumstances, investment in building sustainable vessels is a win-win strategy that helps secure the economic future of shipowners and operators while reducing impacts on the planet. The interiors of cruise and ferry vessels make an impact on guests because they are the first thing they see when they step onboard the ship. Creating 'sustainability stories' for these interiors is a great opportunity to give customers peace of mind that the brand they have chosen to travel with respects and cares for the environments they will visit on their journey.

Passenger shipping companies are often criticised in the media for their carbon emissions and their impacts on vulnerable ecosystems. In all aspects of their business ethics, they are scrutinised, perhaps even more than land-based resorts or other forms of mass travel. In this context, it makes sense for cruise and ferry brands – and the companies that work with them – to take whatever opportunities arise to show how they are giving back to the environment and being part of solutions to save it.

Sustainably sourced interiors provide a positive advertisement that is always on display, while ensuring long-term savings and enabling each of the many stakeholders involved in the project to make their own contributions to ESG principles and to the SDGs. And, in an age when members of the public are now likely to be aware of the global climate crisis, it is ever more important for ship owners to be seen to be making strides towards greener ships and bringing positive change to the industry. This in turn can deepen customers' loyalty to the brands they choose over the long term.

Increasingly, consumers' spending habits are driven by their own value systems, creating loyalty with brands that resonate with their own ethics. In the age of conscious travel, which sees guests taking ownership of their own ecological impact, there are many opportunities for powerful eco-marketing messages that can arise from responsibly sourced interiors.

Many customers are already deciding to travel only with sustainable brands, especially for cruises. As this trend intensifies, they are likely to require more transparency around sustainability efforts and claims. Where it is possible to show evidence of concrete actions towards a more sustainable way of living, companies have the opportunity to turn a green product into a marketing tool. In particular, each verifiable story they can release about how they are tackling pollution, waste management, ethical and green sourcing and recycling can be a public relations coup.

“When passengers support the ship-owners' sustainability message by buying cruises, this revenue increase is positive affirmation that the message is a common and desired goal.”

A responsible approach to sustainability has become more than simply a mechanism enabling passenger shipping companies to demonstrate to their clients that they care about a greener future. For operators, debating whether to incorporate sustainability into their business strategy is no longer an option. Without it, companies will themselves become unsustainable, especially as new regulations are passed that penalise those companies that are not taking the required steps to manage waste or pollution.

THE ROAD AHEAD

Financial and reputational rewards

Being an early mover in sustainability has its risks but as operators and owners invest in more sustainable interiors, they can look forward to lower costs of refurbishment in the future thanks to reduced waste and longer-lasting fixtures and fittings. For green suppliers, more work leads to a better return on investment over time. And as companies establish themselves as leaders in the field of sustainability, their reputations improve too, leading to industry awards and more loyal customers.

There are already financial incentives for passenger shipping companies to turn green in the shape of lower costs and higher revenues, as well as payback schemes for reduced energy impacts. Becoming part of the solution rather than part of the problem is rewarding in other ways, both in relation to governments' strategies for carbon and emissions reduction and in the business case for better efficiency that can accompany more sustainable practices.

“Investing more in creating sustainable spaces not only meets an increase in consumer awareness but also builds trust and respect that as a large commercial company, you are genuinely accountable for your business's impact on the environment”

Other ways in which choosing sustainable interiors can improve overall future sustainability and profitability include savings in fuel usage by incorporating lightweight materials into designs; energy savings from more efficient lighting systems; flexible designs which allow interior spaces to be multifunctional and therefore revenue generating at different times of the day; cost savings with more durable recyclable products; less waste creation and less maintenance with the right products; and more functional interiors with less environmental impact. In addition, a commitment to responsible interiors is likely to lead to more motivated employees who are willing to go the extra mile to support brand promises of which they are proud.

Making progress with easy wins and giant steps

For all those involved in passenger ship interiors, there are currently many opportunities to embed sustainability wins in their activities. Higher levels of public awareness of green issues and a growing focus on enhanced regulatory oversight to reduce environmental harm, make it essential that organisations position themselves to play more responsible roles while supporting others in the industry to do the same.

“It seems that the sustainability theme is now becoming more than just an empty word or a marketing idea. We all have to change our minds and behaviour to achieve meaningful input. Even if our contribution as interior designers – seen globally – is rather small, our many small steps will help”

Steps to take right now

While there needs to be more discussion and education within the industry about sustainability, there is no benefit in putting off taking feasible actions now. All stakeholders should be prioritising sustainability in projects they become involved with while also stressing its importance to their supply chain partners, pushing for alternative specifications and making an effort to integrate these into real projects. The message should be that everyone needs to become equipped to make a responsible choice in order to ensure sustainable products and project outcomes.

An easy implementation win for sustainable refurbishments may be conducting an inventory of existing materials and assemblies and determining what is to be repurposed, reused, recycled or refurbished. Focusing on waste segregation on site and improving planning processes to combine loads going on and off site can also yield quick rewards.

Actions those choosing designs can take include selecting high quality materials with a long life and getting the support of owners to that end, along with persuading yards to segregate waste and maintain warehouses of materials that have come off ships and can be used on other projects. Although there is a lot of recycling that can be done at the shipyard, there is always more that can be done. Through multiple small changes, the balance can start to shift towards normalising greener options.

Some easy sustainability wins that leverage technology seem almost too simple – for example, installing sensors that close the curtains when the passengers aren't present in their cabins to allow operators to make energy savings.

“It might be difficult to build the whole interior in a sustainable way. But every time we manage to implement just one more sustainable material than before, it is a win”

The interiors supplier community also has a responsibility to extend the available ranges of sustainable products and materials. Suppliers interested in capitalising on a growing market potential can embrace the opportunity to focus on the sustainability of their products.

Finally, defining baseline sustainability performance can help reduce the choice paralysis that can prevail in mainstream markets regarding what materials and systems to choose for interiors. Committing to use only certified products or recyclable or compostable protective material can simplify the planning and decision-making process as well as subsequent choices regarding disposal, recycling and reuse of materials and components.

Planning for the longer term

Many companies engaged in maritime interiors are in favour of the creation of a dedicated legislative and/or certification body for the industry that could enforce sustainability standards. Among the suggested responsibilities of such a body are checking waste is properly managed and volumes recorded for recycling or reuse and items sent to landfill.

A roadmap to greater sustainability that covers the contributions of all stakeholders involved in interiors projects on ships has also been suggested as a useful tool, supplemented by regular in-depth reports, industry awards and competitions to promote the growing importance of sustainable products and design.

Given that the major land-based construction standards are well established, many respondents to this report are interested in what can be learned from these and some are already engaging with systems such as LEED and BREEAM to determine whether they could in future obtain certification for maritime interiors through these bodies.

“Let’s tell the world that we’re looking for more sustainable and certified products and see who knocks on our door!”

Other suggestions regarding ways to set up better practices for the long term include establishing a CLIA-Interferry and/or IMO-backed industry working group comprising all stakeholders, from the smallest supplier to the largest ship owners; creating a global and well-supported forum could be a platform to turn to for answers on sustainable sourcing, materials and products; getting flag states involved (through IMO) to help owners and yards find ways to make better use of the waste material coming off ships; creating a maritime interiors information hub to increase awareness of best practice; and listing suppliers that are at the forefront of sustainable production.

New technologies have great potential to turbocharge cruise and ferry companies' green ambitions. For example, traditional suppliers may decide to start testing the possibilities of new sustainable materials, especially bio-based textiles. Meanwhile, parametric planning software could help companies to be more sustainable in the design phase through minimising off-cut waste.

The maritime design community has a massive opportunity to enable more responsible behaviour through making it easier to do things in a more sustainable way. As can be seen from the above suggestions and elsewhere in this report, there are many routes that organisations can take towards making sustainability a bigger part of their business practice. Making small changes well is better than setting unrealistic goals. Getting the word out and educating the industry will not be an instant achievement but once the conversations are taking place, every step forward is a step in the right direction.

A roadmap for the future

Increasingly, there is demand for stakeholders across the maritime interiors value chain to calculate and disclose the carbon footprint or ecological footprint of all items specified so that customers can choose those that have a low footprint or even opt for production facilities that are climate-neutral.

Efforts to formally measure or rate sustainability using LEED, BREEAM, CASBEE, DGNB, Green Star and other methods could work for ship interiors with some adaptation. Likewise, sustainability reporting and measurement provides a format for quantifying sustainable transitions, although the lack of sector-specific indicators means measures can go unrecognised and negate motivation to further achieve sustainable development. But whichever formal method is adopted, it should cover all aspects including sourcing, design, operations and guest experience to provide an inclusive and rounded measurement.

“The use of data technology solutions and AI is increasing and could be the way forward to measure aspects including energy use and waste from spaces. However, ship owners and operators will need to see tangible benefits from cooperating on any new measurement scheme that has the potential to increase costs”

While many design companies have opted for certifications, standards and labelling systems used in land-based construction, this report has revealed that there is wide consensus that the maritime interior design sector would benefit from an industry-specific global standard or certification system.

Such a system for the interior design activities of the global cruise and ferry industry would benefit all stakeholders, allowing suppliers to reassure purchasers of the ethical procurement and manufacture of their products. It would also enable a long-term view of the impacts and effects of materials used in maritime design projects by measuring aspects such as the percentage of recyclable or environmentally friendly material used.

Suppliers could reveal the full production processes and materials used to make onboard interior products, leading to a tiered sustainability certificate or rating. This would provide information on the properties of each material, including which are more sustainable than others and might fulfil the same purpose. All of the components of an interior product could be listed, not just the primary component. It would also consider the full life span of materials and products, including the CO₂ footprint in production along with the impact of reuse and eventual disposal.

Ship interior designers already have to contend with fire-load limits in their work. A system similar to this could be instituted so that only a certain amount or volume of non-biodegradable materials would be allowed in any interior design. Alternatively, it has been proposed that an index similar to that already being used for energy labels could help narrow down the choice of materials and products. This type of star rating system could set limits in the form of aggregate sums for each area (flooring, surfaces, ceilings, lighting, furniture etc.) Materials could be scored according to standardised ranking methods, for example their reusability and recyclability as well as their energy performance and durability.

The following actions towards more sustainable maritime interiors were proposed by contributors to this report. These actions have not been audited against any initiatives that may currently be underway and not all of these suggestions will be viable or prudent. There is some duplication in this list and there are also sometimes conflicting suggestions – we have avoided removing these issues to maintain the independent approach that we have applied throughout the report.

Contributors were overwhelmingly in favour of the establishment of a sustainable maritime interiors industry group, supported by all stakeholders, to take ownership and progress these recommendations and other related industry-wide priorities. Perhaps this task should be our primary focus in the short-term?

The following pages detail a checklist for recommended actions towards sustainability.

Recommended actions

Policy and governance

- ☐ Engage with IMO to discover how it might be able to support the industry's ambition to achieve significant improvements in the environmental performance of ship interiors.
- ☐ Engage with IMO to establish if it is possible to create an open-source library of interior products that have achieved the Wheelmark.
- ☐ Publish a definitive interior supplier guide to the processes and costs associated with obtaining the IMO Wheelmark to assist new sustainable suppliers to enter the market.
- ☐ Engage with regional and national authorities in refurbishment yard locations to explore opportunities to repair and reuse unwanted materials coming off a ship.
- ☐ Engage with classification societies to establish if existing green notations can be extended to incorporate maritime interiors, or if they are able to create a new notation for this purpose.
- ☐ Scope the primary land-based building assessment frameworks to set a base example for the development of a ship interior sustainability framework.
- ☐ Agree the basis of measurement for calculating the environmental performance of a ship interior (e.g. percentage of recycled material used, distance travelled per kg of material used, etc.).
- ☐ Create and maintain a repository of existing and in-progress global sustainability policies and recommendations that relate to maritime interiors or have the potential to do so.
- ☐ Research and publish a proposal for a new regulatory framework for maritime interiors that prioritises safety but also elevates the importance of sustainability.
- ☐ Explore the options available to reward (with financial or other incentives) owners and operators that deliver high sustainability performance levels.

Owner/operator

- ☐ Reach a consensus on the definition of a sustainable maritime interior, supported by a checklist to direct design and build processes and actions.
- ☐ Identify all of the sustainable interior initiatives successfully completed across all passenger shipping companies and make this list widely available so that all companies can benefit from known successes (e.g. LED lighting, low-flow faucets, energy-efficient appliances etc.).
- ☐ Create a sustainable maritime interiors working group (supported by IMO, CLIA and Interferry) to prioritise actions, solve problems and otherwise contribute to the improved environmental performance of passenger ships.

- ☐ Publish a roadmap towards sustainable maritime interiors (evaluating and incorporating the ideas shared in this report and elsewhere) and seek pledges of support from owners/operators.
- ☐ Conduct a full ship interiors sustainability impact assessment to identify the most problematic products and materials currently in use.
- ☐ Engage with land-based building assessment organisations to establish if they are able and willing to develop a version specific to ships. Poll owners to estimate the size of the opportunity for these organisations.
- ☐ Create a sustainability assessment framework to measure the environmental performance of passenger ship interiors.
- ☐ Create a sustainability requirements model and policy for tender documents that dictate the extent to which design and specification choices should be influenced by environmental performance.
- ☐ Create a sustainability requirements model and policy for shipbuilding and refurbishment tender documents that dictate construction choices.
- ☐ Set reuse goals for designers, outfitters and yards in the brief for refurbishment projects to retain as many products and materials as possible during projects.
- ☐ Ensure that the life expectancy of an interior (before refurbishment or change of use) is provided in the design brief so that designers can prioritise the use of sustainable products and materials that may not last as long as less sustainable options but will last long enough.
- ☐ Set a clear ranking for sustainability within design decision making alongside other factors (e.g. IMO approved, availability, aesthetics, cost, sustainability, manufacturer trust, lifespan, quality, maintenance, etc.).
- ☐ Compile and maintain a list of raw materials that are banned, undesirable or otherwise to be avoided (for sustainability reasons).
- ☐ Provide more time for drydock projects to reduce transportation inefficiencies and to increase opportunities to research more sustainable product and material choices.
- ☐ Explore the viability of establishing a used marketplace for unwanted products and materials that can be refurbished, stored and made available for other ships or land-based venues to use.
- ☐ Build the Green Room, the most sustainable interior lounge (or other) at sea. Employ a suitably qualified design team to make design decisions based on the highest possible environmental criteria and publish a report that justifies every decision and records all available sustainability performance data.

THE ROAD AHEAD

Interior design and outfitting

- ☐ Create and maintain an industry-approved list of certifications trusted by designers and specifiers and encourage suppliers to pursue these in favour of less meaningful options.
- ☐ Generate concept designs of the most sustainable interiors that can be achieved today for a range of room types (e.g. cabin, lounge, restaurant), to include maintenance, repair and disassembly plans.
- ☐ Develop or adopt a common environmental performance calculator so that products and materials can be judged and compared against a standard data set (note: appropriate weightings for each criteria will need to be established).
- ☐ Develop an industry standard set of sustainability questions to ask suppliers in order to provide transparency and to ensure that all products are judged consistently on their environmental performance.
- ☐ Create a template sustainability report/reference manual for interior spaces that provides instructions for its cleaning, maintenance, refurbishment, disassembly and recycling – incorporating life-cycle principles.
- ☐ Investigate and list all of the interior construction phases that require chemical adhesives and explore alternatives that will enable reduced use of adhesives for easier disassembly and recycling.
- ☐ Research and rate the most sustainable adhesives, fillers and other non-specified construction materials.
- ☐ Collaborate with airline, automotive and land-based hospitality sectors to share best practices and coordinate on shared priorities.
- ☐ Prioritise the specification of products that use recycled metals over those that use virgin metals.
- ☐ Create a minimum recommended sustainability standard for each product and material type used within a passenger ship interior.
- ☐ Outfitters to collaborate and implement an industry standard way to share and record data about which materials meet IMO requirements.
- ☐ Write a charter or set of principles that interior designers and specifiers can elect to follow that guides their creative decision making towards more sustainable interiors.
- ☐ Create templates for the most sustainable cabin design.
- ☐ Flag products and materials that have been specified for their sustainability features to protect these choices from being replaced by outfitter or yard during the interior build.
- ☐ Publish and maintain a forward-thinking list of new sustainable products and materials that will be required, with an indication of volumes, to enable suppliers to judge the likely return on their R&D investment.
- ☐ Draft a full set of sustainability goals and best-practice guidelines for refurbishment yards (e.g. used carpet containers, onsite waste sorting, restrictions limiting reuse of unwanted items, etc.).

Building and refurbishment

- ☐ Drydock yards to explore the provision of temporary storage so that used materials can be retained ready for use on the next project for collection by suppliers for repair, recycling and reuse.
- ☐ Research all of the options that may lead to reducing the volume of material sent to landfill during a refurbishment project.
- ☐ Identify all of the interior build areas where significant weight savings may be achieved through R&D activities and share with all stakeholders.
- ☐ Recognise the products and materials that have been specified for their sustainability features and protect against replacements being used unless they have the same, or better, sustainability performance.
- ☐ Work with adhesive and silicon suppliers to find a way to dramatically reduce the volume of plastic containers used during interior build.
- ☐ Shipyards, designers and outfitters to collaborate to set industry standards that determine best practices for building to enable easy disassembly of interior spaces.
- ☐ Produce a common industry best practice strategy for waste management during shipbuilding and refurbishment projects, to include sorting, storage of reusable goods, recycling and landfill.
- ☐ Find the most practical and sustainable temporary protection material to use during newbuild and refurbishment projects.
- ☐ Analyse average waste material volumes by type from refurbishment projects to inform a resulting recycling strategy report.
- ☐ Design or adopt an industry standard cost comparison model so that sustainable products can be fairly judged against alternatives (e.g. cost versus required life-span of products of different quality but the same function and aesthetic).
- ☐ Prioritise finding industry consensus on best interim solutions for carpet, mattresses and other bulk-item waste.
- ☐ Introduce incentive scheme for suppliers to collect and reuse unwanted materials coming off a ship during refurbishment (part funded by reduction in waste handling cost).
- ☐ Analyse the financial variance of building the most sustainable interiors possible versus the current default practice to make the premium for sustainability entirely transparent.
- ☐ Specify and report recycling and landfill targets and actuals for refurbishment projects.

THE ROAD AHEAD

Products and materials

- ☐ Suppliers to create a life cycle plan for every product that they manufacture, including recommendations to extend life, repair, reuse, recycle and eventual disposal.
- ☐ Explore the opportunities to replace unsustainable materials used in interior products with existing and new sustainable materials.
- ☐ Create a list of trusted certifications that identify the suppliers of sustainable raw materials to be used in the manufacture of interior products.
- ☐ Create a database of suppliers that are at the forefront of sustainable product and material development.
- ☐ Routinely state the percentage of recycled metal and other materials used in interior products.
- ☐ Routinely provide full transparency of all raw materials (including specific source and country of origin) used in interior products.
- ☐ Research the highest performing bio-based flame retardancy treatments and collaborate with suppliers to establish whether they are sufficiently protective to pass the Marine Equipment Directive's tests in various uses.
- ☐ Identify which interior spaces, products and materials currently require chemical-based cleaning products and explore opportunities to replace with bio-based solutions.
- ☐ Create a standard quality comparison model for each product/material type to enable fair and consistent judgements (e.g. for a chair: strength of legs and back rest and their fixings, type of foam used in seat, life-expectancy of upholstery, etc.)
- ☐ Create a portal that provides suppliers with a forum to seek advice (not pitch) about the development and supply of sustainable products and materials.
- ☐ Assess predicted development timeframes for new materials with good potential for use in maritime interior products and materials.
- ☐ Seek alternatives to using chemical fixatives in products, in favour of screws or other joining systems.
- ☐ Identify and publish a list of the most unsustainable product types currently in common use in maritime interiors and prioritise finding more sustainable alternatives.
- ☐ Research thoroughly the barriers that currently impede the development and sale of more sustainable products and materials.
- ☐ Publish a list of product and material categories that are currently underserved with IMO-approved options to help direct a valuable supplier response.
- ☐ Create and maintain or adopt an existing register of new sustainable materials that are being developed.

- ☐ Create and maintain or adopt a sustainability index of raw materials that provides a clear comparative ranking to encourage suppliers to manufacture with sustainable materials and designers to specify products made with the most sustainable materials.
- ☐ Research colourants to establish if/how natural products can replace chemical alternatives for different product and material applications.
- ☐ Explore how it may be possible to share and reuse recycled materials across industries.
- ☐ Prioritise the development of wall coverings made from natural materials that are durable, lightweight and easy to apply and remove while retaining the fire retardancy features and aesthetics of current synthetic products.
- ☐ Create a register of products and materials that rates maintenance requirements (from low to high) and their impact on lifetime sustainability.
- ☐ Design products for easy repair and keep stocks of spare parts so that broken components can be easily fixed to avoid unnecessary replacement.

FURTHER INFORMATION



Featured organisations

Aerospace Technology Institute	www.ati.org.uk
Agence de la Transition Ecologique	www.ademe.fr
Aitex	www.aitex.es
Allergy Standards Limited	www.allergystandards.com
Alliance for Responsible Mining	www.responsiblemines.org/en
American National Standards Institute	www.ansi.org
American Society for Testing & Materials	www.astm.org
ANEW	www.anewfound.org
B Corp	www.bcorporation.uk
Berkeley Analytical	www.berkeleyanalytical.com
Better Cotton	www.bettercotton.org
Biodegradable Products Institute	www.bpiworld.org
Blue Angel	www.blauer-engel.de/de
Bluesign	www.bluesign.com/en
BRE Group	www.bregroup.com
BRE Trust	www.bretrust.org.uk
British Broadcasting Corporation	www.bbc.co.uk
British Furniture Manufacturers	www.bfm.org.uk
British Institute of Interior Design	www.biid.org.uk
British Interiors & Textiles Association	www.interiortextiles.co.uk
British Plastics Federation	www.bpf.co.uk
British Standards Institution	www.bsigroup.com
Building Research Establishment Ltd	www.breeam.com
BuildingGreen	www.buildinggreen.com
Business & Institutional Furniture Manufacturers Association	www.bifma.org
Carbon Leadership Forum	www.carbonleadershipforum.org
Carbon Neutral	www.carbonneutral.com
Carbon Smart Materials Palette	www.materialspalette.org
Carbon Trust	www.carbontrust.com
CDP Worldwide	www.cdp.net
CHAS	www.chas.co.uk
Clean the World	www.cleanttheworld.org
ClimatePartner	www.climatepartner.com
Comunidad par el Clima	www.porelclima.org
Copper Development Association	www.copper.org
Cradle to Cradle Products Innovation Institute	www.c2ccertified.org
Cruise Lines International Association	www.cruising.org
CSA Group	www.csagroup.org
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH	www.giz.de/en
DGNB	www.dgnb-system.de
Earth Overshoot Day	www.overshootday.org
ECARF	www.ecarf.org
Ecolabel Index	www.ecolabelindex.com
EcoVadis	www.ecovadis.com
EFQM	www.efqm.org

Ellen MacArthur Foundation	www.ellenmacarthurfoundation.org
Energy Star	www.energystar.gov
Eurofins	www.eurofins.com
European Bathroom Forum	www.europeanwaterlabel.eu
European Chemical Agency	www.echa.europa.eu
European Chemical Industry Council	www.cefic.org
European Commission	www.ec.europa.eu
European Environment Agency	www.eea.europa.eu
Fairmined	www.fairmined.org
Fairtrade International	www.fairtrade.net
Food Standards Agency	www.food.gov.uk
Forest Stewardship Council	www.fsc.org/en
Forest Trends	www.forest-trends.org
Furniture Industry Research Association	www.fira.co.uk
Furniture Industry Sustainability Program	www.fispfurniture.com
German Sustainable Building Council	www.dgnb.de
GCL International	www.gcl.uk
Glass Alliance	www.glassallianceeurope.eu
Global Ecolabelling Network	www.globalecolabelling.net
Global Electronics Council	www.epeat.net
Global Organic Textile Standard	www.global-standard.org
Global Reporting Initiative (GRI)	www.globalreporting.org
Global Sustainable Tourism Council	www.gstcouncil.org
Good Environmental Choice Australia	www.geca.eco
Green Alliance	www.green-alliance.org.uk
Green Building Initiative	www.thegbi.org
Green Gold	www.greengoldlabel.com
Green Key	www.greenkey.global
Green Marine	www.green-marine.org
Green Mark	www.greenmark.co.uk
Greenpeace	www.greenpeace.org.uk
GreenScreen	www.greenscreenchemicals.org
Green Seal	www.greenseal.org
GreenBook Live	www.greenbooklive.com
GreenCircle Certified	www.greencirclecertified.com
Greenhouse Gas Protocol	www.ghgprotocol.org
GreenScreen for Safer Chemicals	www.greenscreenchemicals.org
Health Product Declaration Collaborative	www.hpd-collaborative.org
Henry Royce Institute	www.royce.ac.uk
Higg	www.higg.com
Indoor Air Quality Association	www.iaqa.org
Institute of Scrap Recycling Industries	www.isri.org
Interferry	www.interferry.com
Intergovernmental Panel on Climate Change	www.ipcc.ch
International Accreditation Forum	www.iaf.nu/en/home
International Association for Soaps, Detergents and Maintenance Products	www.sustainable-cleaning2020.com
International Association of Classification Societies	www.iacs.org.uk
International Code Council	www.iccsafe.org
International Council of Chemical Associations	www.icca-chem.org

FURTHER INFORMATION

International Federation of Interior Architects/Designers	www.ifeworld.org
International Institute for Applied Systems Analysis	www.iiasa.ac.at
International Institute for Sustainable Development	www.iisd.org
International Living Future Initiative	www.living-future.org
International Marine Purchasing Association	www.impa.net
International Maritime Organization	www.imo.org/en
International Organization for Standardization	www.iso.org
International Stainless Steel Forum	www.worldstainless.org
International Tin Association	www.internationaltin.org
International WELL Building Institute	www.wellcertified.com
International Zinc Association	www.zinc.org
Interreg	www.interreg.eu
ISEAL Alliance	www.isealliance.org
MindClick	www.mindclick.com
Mindful Materials	www.mindfulmaterials.com
National Geographic	www.nationalgeographic.com
National Oceanic and Atmospheric Administration	www.noaa.gov
Natural Stone Council	www.naturalstonecouncil.org
Nordic Ecolabelling	www.nordic-ecolabel.org
North American Space Agency	www.nasa.gov
Network of Executive Women in Hospitality	www.newh.org
Nickel Institute	www.nickelinstitute.org
NSF	www.nsf.org
Oeko-Institut	www.oeko.de/en
Organisation for Economic Co-operation and Development	www.oecd.org
Plastic Free Certification	www.plasticfreecertification.org
Programme for the Endorsement of Forest Certification	www.pefc.org
Project Drawdown	www.drawdown.org
Rakennustietosäätiö	cer.rts.fi
Reeve Consulting	www.reeveconsulting.com
ReFlow	www.re-flow.io
Responsible 100	www.responsible100.com
Royal Institute of Chartered Surveyors	www.rics.org
Royal Institute of Naval Architects	www.rina.org.uk
Science Based Targets	www.sciencebasedtargets.org
SDG Academy	www.sdgacademy.org
SDG Compass	www.sdgcompass.org
Sea2Cradle	www.sea2cradle.com
SCS Global Services	www.scsglobalservices.com
Statista	www.statista.com
Sustainable Development Solutions Network	www.unsdns.org
Sustainable Forestry Initiative	www.forests.org
Sustainable Furnishings Council	www.sustainablefurnishings.org
Sustainable Hospitality Alliance	www.sustainablehospitalityalliance.org
Sustainable Shipping Initiative	www.sustainablesipping.org
Textile Exchange	www.textileexchange.org
The Aluminium Association	www.aluminum.org
American Institute of Architects	www.aia.org

The Better Cotton Initiative	www.bettercotton.org
The Carpet and Rug Institute	www.carpet-rug.org
The Chartered Institution of Building Services Engineers	www.cibse.org
The Circular Lab	www.thecircularlab.com/en
The Earth Project	www.theearthproject.com
The EPD Registry	www.theepdregistry.com
The Greenhouse Gas Protocol	www.ghgprotocol.org
The Institution of Structural Engineers	www.istructe.org
The Nature Conservancy	www.nature.org
The Network of Executive Women in Hospitality	www.newh.org
The Travel Foundation	www.thetravelfoundation.org.uk
TÜV Rheinland	www.tuv.com
UL	www.ul.com
Umwelt Bundesamt	www.umweltbundesamt.de
Unified Water Label	www.uwla.eu
United Nations	www.un.org
United Nations Development Programme	www.undp.org
United Nations Environment Programme	www.unep.org
United Nations Foundation	www.unfoundation.org
United Nations Framework Convention on Climate Change	www.unfccc.int
United Nations Global Compact	www.unglobalcompact.org
United Nations One Planet Network	www.oneplanetnetwork.org
United Nations University Institute For the Advance Study of Sustainability	www.ias.unu.edu/en
University of Cambridge	www.cam.ac.uk
US Department of Agriculture - Biopreferred	www.biopreferred.gov
US Environment Protection Agency	www.epa.gov/saferchoice
US Green Building Council	www.usgbc.org
Waste and Resources Action Programme (WRAP)	www.wrap.org.uk
Water Revolution Foundation	www.waterrevolutionfoundation.org
World Benchmarking Alliance	www.worldbenchmarkingalliance.org
World Business Council for Sustainable Development	www.wbcsd.org
World Green Building Council	www.worldgbc.org
World Resources Institute	www.wri.org
World Steel Association	www.worldsteel.org
World Tourism Organisation	www.unwto.org
World Travel & Tourism Council	www.wttc.org
Yordas Group	www.yordasgroup.com

Futher reading

Title	Publisher
A Net Zero Roadmap for Travel and Tourism	World Travel & Tourism Council
A New Circular Economy Action Plan for a Cleaner and More Competitive Europe	European Commission
A targeted approach to the UN Sustainable Development Goals	The Institution of Structural Engineers
Aesthetic Sustainability	Routledge
An Architecture Guide to the UN 17 Sustainable Development Goals	KADK
Basic Information About Landfill Gas	United States Environment Protection Agency
BIID Sustainability Strategy, 2021-2024	British Institute of Interiors Design
Biodiversity Insights Report	Textile Exchange
BRE Global Product Category Rules	BRE Trust
Building Biodiversity	United Nations Environment Programme
Building Planning and Design Standard	EarthCheck
Business Case for Sustainable Hotels	Sustainable Hospitality Alliance
Business Models for the Circular Economy	OECD
Circular Economy – Principles for Building Design	European Commission
Circular Transition Indicators v2.0	World Business Council for Sustainable Development
Corporate Sustainability Reporting Directive	European Commission
Cradle to Cradle	Vintage
Design for the Real World	Thames & Hudson
Endangered Elements: Critical Thinking	Royal Society of Chemistry
Engaging the Chain: Driving Speed and Scale	CDP Worldwide
Environmental Commitment, Innovation and Results of the Cruise Industry	Cruise Lines International Association
Environmental Sustainability for River Cruising	The Travel Foundation
Executive Briefing: BS 8001 – a Guide	The British Standards Institution
FlyZero Executive Summary	Aerospace Technology Institute
Foundations of Science-based Target Setting	Science Based Targets
Global Material Resources Outlook to 2060	OECD
Performance Indicators for Ship Owners	Green Marine
Guide L Sustainability	The Chartered Institution of Building Services Engineers
Handbook of Sustainable Building	James & James
How To Avoid A Climate Disaster	Penguin Books
IMO and Sustainable Development	International Maritime Organization
Mapping the Role of Raw Materials in Sustainable Development Goals	European Commission
Measuring Sustainable Development (Course)	SDG Academy
Measuring What Matters Most	World Benchmarking Alliance
Metals for a Climate Neutral Europe	Institute for European Studies
Montréal Design Declaration	Montréal World Design Summit
Moving beyond sustainable design	TED Talks
Natural Resources for Sustainable Development (Course)	SDG Academy
Origin User Guide for Mindful Materials Library Participants	Mindful Materials
Our Common Agenda	United Nations
Our Common Future (The Brundtland Report)	World Commission on Environment and Development

<u>PEFC Annual Review</u>	Programme for the Endorsement of Forest Certification
<u>Plastic Atlas, 2019</u>	Heinrich Böll Foundation
<u>Prescription for Healthier Building Materials</u>	The American Institute of Architects
<u>Product Design and Sustainability</u>	Routledge
<u>Product Life Cycle Accounting and Reporting Standard</u>	Greenhouse Gas Protocol
<u>Product Sustainability Assessment</u>	Öko-Institut
<u>Project Team User Guide: Using Health Product Declaration</u>	Health Product Declaration Initiative
<u>Quality Policy Guiding Principles</u>	United Nations Industrial Development Organization
<u>Recyclability by Design</u>	British Plastics Federation
<u>Report of the World Commission on Environment and Development: Our Common Future</u>	United Nations
<u>Routledge Handbook of Sustainable Design</u>	Routledge
<u>Safe and Sustainable-By-Design</u>	The European Chemical Industry Council
<u>SBTi Criteria and Recommendations</u>	Science Based Targets
<u>SDG Action Manager</u>	B Lab
<u>SDG Compass – The guide for business action on the SDGs</u>	SDG Compass
<u>Solutions Driving the Circular Transformation</u>	PYXERA Global
<u>Strategies for reducing embodied carbon</u>	AIA and Carbon Leadership Forum
<u>Strategy, Planning and Reform (Implementation of 2030 Agenda)</u>	International Maritime Organization
<u>Summary of SOLAS chapter II-2</u>	International Maritime Organization
<u>Sustainability in the Maritime Domain</u>	World Maritime University
<u>Sustainability Leadership</u>	World Travel & Tourism Council
<u>Sustainability of Products</u>	European Chemical Industry Council
<u>Sustainability Resource Map</u>	The Institution of Structural Engineers
<u>Sustainable Cabin Design</u>	Aerospace Technology Institute
<u>Sustainable Design</u>	Springer Nature
<u>Sustainable Design Basics</u>	Wiley
<u>Sustainable Hotel Siting, Design and Construction</u>	Sustainable Hospitality Alliance
<u>Sustainable Materials Management: The Road Ahead</u>	US Environment Protection Agency
<u>Sustainable Procurement</u>	International Organization for Standardization
<u>Sustainable Products</u>	De Gruyter
<u>Sustainable Products Initiative</u>	European Commission
<u>The Built Environment and the Future of Sustainability</u>	BRE Trust
<u>The Cambridge Sustainable Design Strategy Cards</u>	University of Cambridge
<u>The Circular Design Guide</u>	Ellen MacArthur Foundation and IDEO
<u>The Drawdown Review</u>	Drawdown
<u>The Paris Agreement</u>	United Nations
<u>The Roadmap for the Circular Economy: the 50 measures (Fr)</u>	Ministère de la Transition écologique et solidaire
<u>Towards A Green Economy</u>	Umwelt Bundesamt
<u>Transformations to Achieve the Sustainable Development Goals</u>	International Institute for Applied Systems Analysis
<u>UN Sustainable Development Goals</u>	United Nations
<u>Understanding Product Environmental Footprint and Organisation Environment Footprint methods</u>	European Commission
<u>USBGC+</u>	US Green Building Council
<u>Waste Location – Spatial Aspects of Waste Management, Hazards and Disposal</u>	Routledge

