

Transitioning to a sustainable healthcare sector

STATE
OF
GREEN

x



Healthcare
Denmark

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Foreword

The Danish health system delivers more services today than ever before. More patients are treated, and more patients receive highly specialized treatment. These accomplishments come with significant carbon footprints, which need to be reduced. It is important that emission reductions go hand in hand with a high performing and effective health system.

The transition towards a greener health system is a complex task, which involves workflows, use of medical equipment, pharmaceuticals, heat and energy consumption in our buildings etc. Nonetheless, we are determined to reduce the greenhouse gas emissions from our hospitals and clinics, while working to continuously ensure a resilient and effective health system of high quality.

The Danish regions, which own and operate public hospitals and are responsible for the planning and delivery of specialized health services in Denmark, have set a common goal to reduce CO₂ emissions from energy and transport with 75 percent by 2030.

Furthermore, the Danish government and the Danish regions are actively working to enhance and accelerate sustainable public procurement. Procurement of products and services accounts for the majority of the hospitals' CO₂ emissions. Also, The Danish Medicines Agency and the regions are actively exploring the prospects of reprocessing single-use medical devices.



In our efforts to deliver sustainable healthcare in the future, we highly depend on numerous partners and stakeholders. Private companies and innovative suppliers play a pivotal role in developing a more sustainable health system. The Danish Life Science industry has reduced its CO₂ emissions, while amplifying revenue and value creation. This illustrates the possibilities, when sustainable development and growth go hand in hand.

Sustainability is no longer an option, but a necessity. As we move forward, we believe that we should do so with the understanding that our human health and the health of our planet are intrinsically linked.

We hope this publication – by sharing best practices, innovative solutions and strategies – can serve to inspire and contribute to the green transition in healthcare globally.

Sophie Løhde, Minister for the Interior and Health & **Anders Kühnau**, Chairman of Danish Regions

Introduction

As we navigate the 21st century, the importance of sustainability has never been more prominent. With a growing global population, dwindling natural resources, and the escalating threat of climate change, the world is increasingly realising the significance of shifting towards more sustainable practices¹.

Sustainability is no longer a choice but an imperative for our collective well-being and survival.

The healthcare sector holds a unique position in this context. It stands at the forefront of addressing the challenges we face today as it plays a pivotal role in improving and safeguarding human health but also has a substantial environmental footprint. From energy-intensive hospitals and production facilities to high waste production and resource consumption, the impact on the climate and environment is remarkable. An impact that contributes to and intensifies the challenges of climate change, which in turn, affect human health and well-being negatively².

Sustainable development

is development that meets the needs of the present without compromising the ability of future generations to meet their own needs

This dual role also presents an exceptional opportunity. The healthcare sector has a unique position for creating solutions to some of our most pressing health needs, contributing to both societal well-being and economic development. By integrating sustainability into its core practices, the healthcare sector can not only significantly reduce its own environmental impact but also enhance human health outcomes.

Through introducing more sustainable practices, the healthcare sector can inspire and drive changes across society, becoming a beacon in the transition towards a more sustainable world.

The Life Science industry

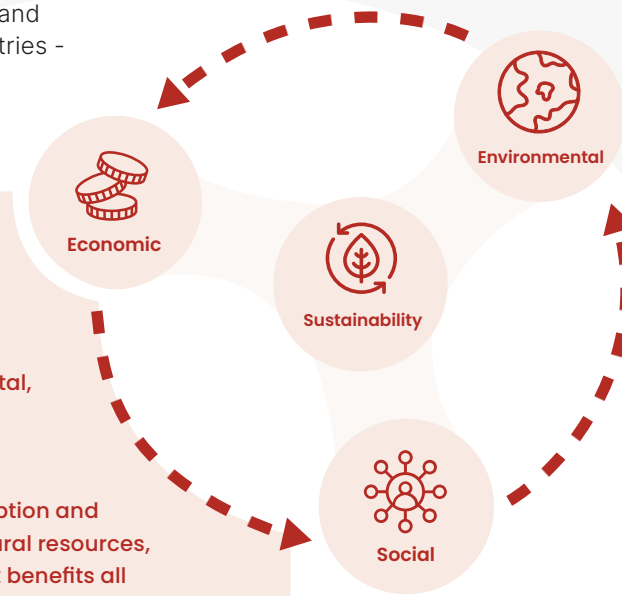
is defined as all companies that work in parts of the value chain within medical products as well as pharmaceuticals and biotechnological preparations.

Resilient and advanced practices are gradually being embedded into healthcare, with a growing trend towards developing and implementing innovative solutions. Visionary solutions which are progressively permeating healthcare, setting the stage for a brighter, more sustainable future.

Denmark prides itself as a pioneer in clean technology in the energy and water sectors, and now innovative and green solutions in the Danish Life Science industry - the medical technology (*medtech*) and pharmaceutical (*pharma*) industries - are following.

The concept of sustainable development was introduced in 1987 in The Brundtland Report³ and highlights the interdependence of environmental, social and economic issues.

It called for a shift towards more sustainable patterns of consumption and production, conservation of natural resources, and equitable development that benefits all people.



This paper will delve into the multifaceted aspects of sustainability within healthcare underlining its critical importance and showcasing potential paths towards a more sustainable future. For years, Danish companies and hospitals have searched the way in creating and deploying innovative solutions which provide a blueprint on how to transition to a sustainable healthcare sector.

Throughout the paper, we will explore a variety of Danish initiatives and projects – primarily national cases, but also some international ones – which collectively illustrate how we are transitioning into a greener and more sustainable healthcare sector.

Initiatives and projects which all actively contribute towards the achievement of the United Nations Sustainable Development Goals (SDGs), ensuring that no one is left behind.

It is crucial to recognise that social sustainability emphasises the importance of not leaving anyone behind. The role of social sustainability is therefore pivotal in our quest to cultivate a sustainable and healthy healthcare sector for the long haul. While we acknowledge the significance of social sustainability, the primary focus of this paper will concentrate on the environmental and economic dimension, particularly the “green” aspects of transitioning the healthcare sector into becoming more water, energy and resource efficient and reducing its impact on climate and environment.

The Sustainable Development Goals serve as a roadmap for building a brighter and more sustainable future for everyone – ensuring that no one is left behind.

The 17 interconnected goals address various global challenges such as poverty, promoting good health and well-being, reducing inequality, and addressing environmental issues. To attain these goals, multi-sector collaboration across the globe is essential.



Climate change and health

Climate change and health are inextricably linked; the climate crisis is, in essence, a health crisis. It affects us all, disrupting care and influencing health outcomes throughout our lives. The inseparable link between the two is becoming more and more pronounced, threatening the fundamental prerequisites for good health, including clean air, safe and clean drinking water, ample food, and secure shelter as well as stable weather conditions⁴.

Our environment’s deteriorating condition contributes to an array of human health issues such as cardiac disorders, respiratory diseases, infectious diseases and cancer². Lowering CO₂-emissions could consequently alleviate the prevalence of these non-communicable diseases⁵. When the connection is known, it becomes evident for our healthcare system - and society at large - to reduce CO₂-emissions.

Embracing the green transition is therefore not only a concept to understand but also an ethos to embody and actualise. A transition to a more sustainable healthcare sector offers benefits for the environment, healthcare professionals and patients, but also the broader community.

Declaration on Climate and Health delivers a breakthrough moment

At COP28, 124 countries endorsed a new Declaration on Climate and Health⁶. The Declaration, presented at the first ever Health Day at a COP, marks the first time that the health impacts of climate change have taken centre stage in 28 years of UN climate talks. While the Declaration is not legally binding, the Declaration serves as a voluntary call to action to protect communities and prepare healthcare systems to cope with climate-related health impacts such as extreme heat, air pollution and infectious diseases.

What role does the healthcare sector play?

Globally, the healthcare sector contributes to approximately 5% of greenhouse gas emissions while delivering care and procuring products, services, and technologies from a carbon-intensive supply chain⁷.

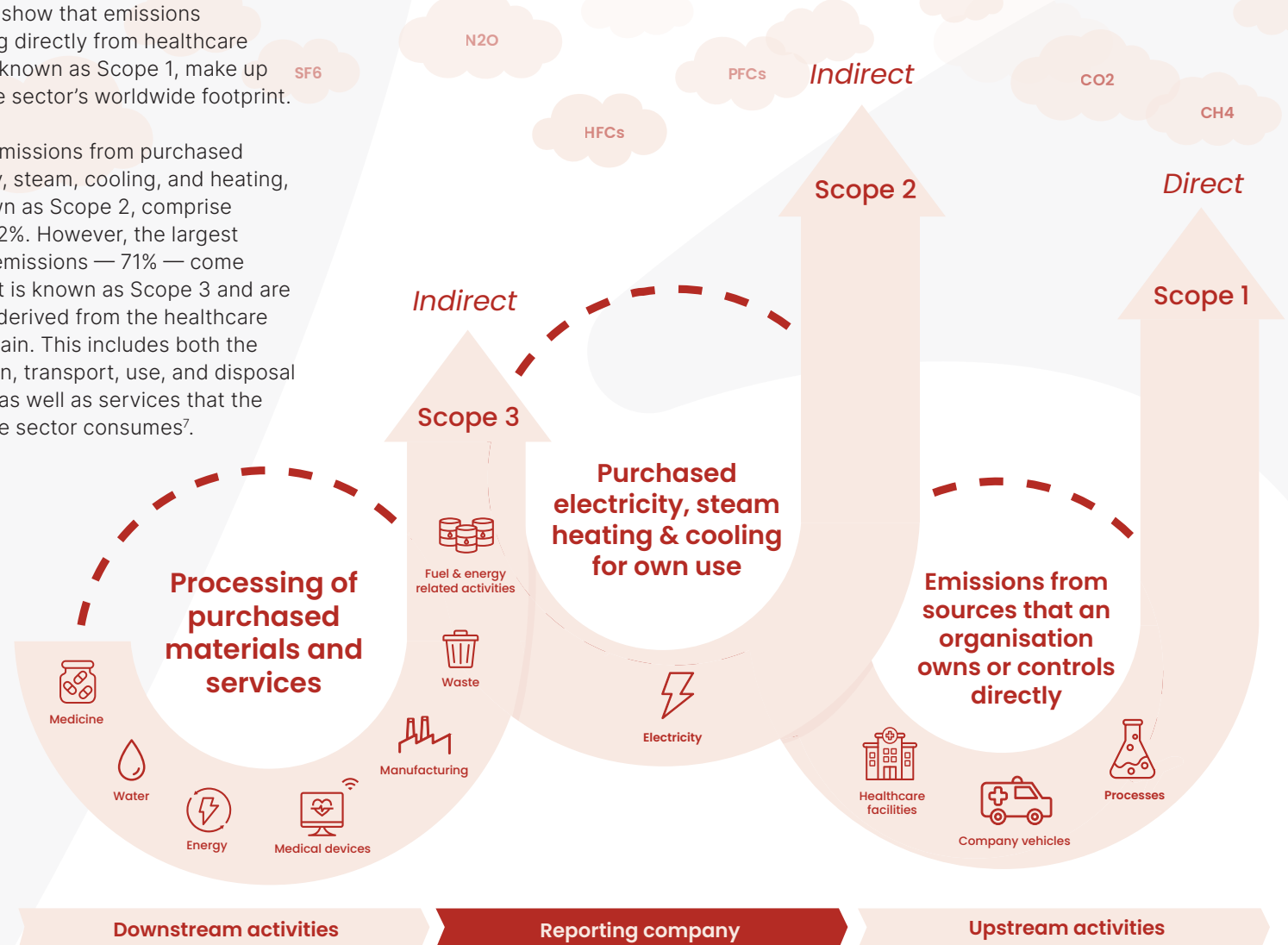
Healthcare facilities are the operational heart of service delivery, protecting health, treating patients and saving lives. However, these facilities are a large source of carbon emissions, contributing to the current climate changes.

In Denmark, the healthcare sector is responsible for 6% of the annual CO₂-emissions⁸.

The majority of CO₂-emissions within the healthcare sector originate from the consumption of goods and services, including the consumption of healthcare products, pharmaceuticals and not least surgical equipment. Especially operating facilities are a large contributor to the emission of greenhouse gases due to the large consumption of disposable equipment, medicines, and anaesthetic gases.

Numbers show that emissions emanating directly from healthcare facilities, known as Scope 1, make up 17% of the sector's worldwide footprint.

Indirect emissions from purchased electricity, steam, cooling, and heating, also known as Scope 2, comprise another 12%. However, the largest share of emissions — 71% — come from what is known as Scope 3 and are primarily derived from the healthcare supply chain. This includes both the production, transport, use, and disposal of goods as well as services that the healthcare sector consumes⁷.



Did you know that the EU has implemented new rules on corporate sustainability reporting?

In January 2023, the EU introduced new corporate sustainability reporting rules known as the Corporate Sustainability Reporting Directive (CSRD)⁹. These rules aim to enhance and modernise the reporting of social and environmental information by companies.

The CSRD introduces a classification system of environmentally sustainable economic activities, which is designed to promote sustainable investments and prevent the misleading promotion of financial products as sustainable when they are not, thus combatting greenwashing.

The directive applies to a wide range of companies, including large corporations and listed SMEs, who are required to report on their sustainability efforts using mandatory EU standards. These rules will come into effect for the first time in the 2024 financial year, with reports published in 2025.

Denmark – one of the leading Life Sciences nations

Denmark has played a significant role in shaping the global market for medicines and medical devices, benefiting from a skilled workforce, robust digital infrastructure, and renowned for its research-driven and innovative approach, often collaborating with universities and research institutions.

Since 2008, the Danish Life Science industry has more than tripled its exports to approximately €23.5 billion in 2020, currently accounting for 20% of Denmark’s total exports.

The total turnover of the Life Science industry in the Danish economy was €38 billion in 2020, which corresponds to an increase of 116% since 2008. And today, one-fifth of Denmark’s total goods exports originate from the Life Science sector¹⁰.



The Life science industry and sustainability go hand-in-hand

The Life Science industry has a significant environmental footprint due to energy consumption, waste generation and CO₂-emissions. By adopting sustainable practices, such as using renewable energy, reducing waste, resource efficient and circular solutions, and minimising pollution, the industry can mitigate its impact on the environment without jeopardising the health of the patients.

Governments and international bodies are increasingly imposing stricter environmental regulations and sustainability requirements. By proactively focusing on sustainability that continue to focus on patient safety, Life Science companies can stay ahead of regulatory changes.

Embracing sustainability aligns with the principles of Corporate Social Responsibility, showing ethical and social responsibility enhancing a company’s reputation and improving stakeholder relationships, attracting environmentally conscious customers, investors, and employees.

Sustainable practices can contribute to the long-term viability of the Life Science industry by ensuring the availability of vital resources, such as clean water, raw materials, and energy. By conserving resources and implementing circular economy principles in supply chains, companies can secure their operations for the future.

A sustainability focus within Life Science can enhance the healthcare system’s overall sustainability by developing preventive and efficiency-improving solutions, thus reducing the healthcare system’s burden on the environment and climate – and hereby indirectly reducing the burden on health caused by instability in the environment and climate.

CASE Compatible goals for high climate ambitions and economic growth

The Life Science industry has been concerned with the environmental sustainability agenda for many years, and as a result, many Danish companies have already implemented a wide range of measures to reduce their own CO₂-emissions in production.

The numbers speak for themselves: Since 1990, the medical industry has reduced CO₂-emissions by 40%*

At the same time, the industry's gross value added increased by almost 14-fold and Denmark has achieved the highest value-added growth in the field of Life Sciences among selected European countries (Belgium, Finland, Germany, Austria, Sweden, France, and Ireland). The industry contributed €3.6 billion solely in corporate taxes in 2020 for the benefit of Danish society at large¹⁰.

Novo Nordisk, Lundbeck, and LEO Pharma - three leading pharma companies, and Coloplast - a leading medical device producer, are some of the large Danish Life Science companies who are leading the charge in ambitious climate action by adopting strategies to reduce their environmental footprint and promote more sustainable practices across their operations and supply chains.

Novo Nordisk is committed to achieving zero CO₂ emissions from its operations and transport by 2030.

Novo Nordisk has adopted a Circular for Zero approach to create recyclable products and promote supply chain sustainability, with the ultimate goal of reaching net zero carbon emissions by 2045.

At the same time, Lundbeck has received international recognition for their climate efforts.

Lundbeck aims to minimise the environmental impact from manufacturing of Active Pharmaceutical Ingredients (API's) and having zero emissions in the entire value chain by 2050.

Likewise, LEO Pharma targets a 50% reduction in carbon emissions in scope 1 & 2 by 2030 (baseline 2020), having already achieved a 25% reduction.

Additionally, LEO Pharma anticipates that 75% of their suppliers will establish science-based carbon reduction targets by 2026.

Coloplast's Strive25 corporate strategy focuses on improving products and packaging and reducing emissions.

Coloplast has implemented the eco-design approach in new products, focusing on converting packaging to be 90% recyclable by 2025, phasing out hazardous substances and recycling production waste. The overall goal is to reduce 50% value chain (Scope 3) emissions per product and 100% emissions from production (Scope 1 & 2) by 2030.

* The emission of greenhouse gases and other air pollutants stemming from both business and household energy consumption, as well as emissions from activities not related to energy use. Scope 3 not included.

Government strategies towards sustainable development

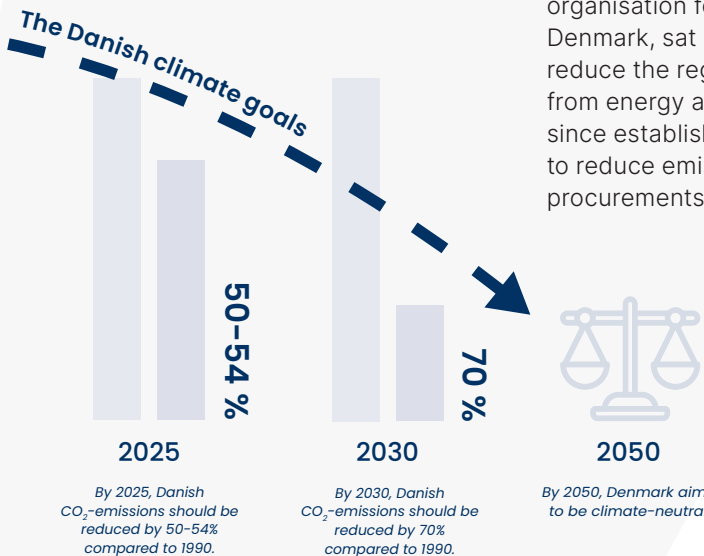
For years, Denmark has been at the forefront of introducing proactive strategies aimed at addressing climate change and promoting environmental responsibility. In 2022, for the second year in a row, Denmark was named the world's most sustainable country by the renowned Environmental Performance Index¹¹.

Denmark's commitment to sustainability is evident in its ambitious national climate targets, which include legally binding objectives.

Denmark is furthermore a frontrunner for its focus on renewable energy, efforts to transition away from fossil fuels, public-private partnerships, and investment in innovative green technologies.

On local and regional level, Danish municipalities and regions have either climate action plans or sustainability strategies. Furthermore, all five regions work actively to reduce the hospitals' CO₂-emissions.

In 2020, Danish Regions, the interest organisation for all five regions in Denmark, sat an ambitious goal to reduce the regions' CO₂-emissions from energy and transport. It has since established several initiatives to reduce emissions from healthcare procurements from which the majority of the hospitals' CO₂-emissions derives from.



Ambitious goals for green hospitals

In 2020, Danish Regions sat the goal for all public hospitals to reduce their CO₂-emissions from energy and transport with 75% by 2030 compared to 2018 levels. Measures include climate-friendly buildings, heating conversion and hybrid ambulances. By committing to a common goal, the regions hope to drive the green transformation of the entire public sector in Denmark.

Since 2020, the regions have taken their ambition one step further by intensifying their focus on CO₂-emissions from products and services bought from their suppliers. Procurement counts for the majority of the hospitals' CO₂-emissions, and the regions are increasingly setting more "green" criteria in their procurement deals (described on page 34-35). Likewise, they have an increased focus on how the hospitals can reuse more medical equipment and avoid waste.

The Climate Alliance is a partnership between all 98 Danish municipalities, the five regions, and the association Realdania, with the Danish green think tank CONCITO and C40 as knowledge partners.

The partnership creates a common framework for local and regional climate action and aims to lift their climate solutions to the highest international standard.

The Climate Alliance builds on the experiences and collaboration in the prior project, DK2020, where municipalities developed, or are developing, Paris Agreement-compatible climate action plans based on C40's Climate Action Planning Framework. With the new partnership, municipalities and regions collaborate on translating their plans into effective climate actions that reduce CO₂-emissions and improve climate resilience in Denmark.

The Danish Climate Act

In 2022, the Danish Climate Act (*Klimaloven*) was passed, legally committing the sitting government to work to reduce Denmark's greenhouse gas emissions by 70% by 2030 compared to 1990 levels¹².

Denmark is also dedicated to fulfilling the Paris Agreement's objective of limiting global warming to 1.5 degrees Celsius, and has set even more ambitious targets, aiming for climate neutrality by 2050¹³. However, the current government (2021-present) wants to move even faster and advance the goal of climate neutrality to 2045 and has set a new target of an impressive 110% reduction in carbon emissions by 2050 compared to 1990¹⁴.

The Danish Climate Partnerships

Building on the Danish tradition for public-private partnerships and recognising the private sector as a central actor, the Danish government has formed 14 climate partnerships. Each representing the different sectors in the Danish economy. The partnerships provide the framework for a mutually reinforcing dynamic, where the business sector contributes with substantial investments in new technology and infrastructure, while policymakers create the framework to implement the transition from fossil to green energy and from energy wastage to efficient utilisation.

The Climate Partnership for Life Science and Biotech is one of the partnerships, which specifically works to ensure a "green" transition in the sector through a focus on energy efficiency, reduced and circular resource consumption and rethinking the use of materials¹⁵.

Explore the climate partnerships and Danish green solutions at:

climatepartnerships2030.com

Denmark – a specialist in Life Cycle Assessments

Life Cycle Assessment (LCA) or cradle-to-grave assessments are vital for understanding the impact that our activities have on the environment. It is a tool, which assesses the cumulated potential environmental impact.

LCA has been used to assess the carbon footprint of the healthcare sector on global and national levels, assessing the environmental impacts of healthcare products such as face masks, blood pressure cuffs and bronchoscopes, as well as pharmaceuticals including anaesthetics, antibiotics, and antidepressants.

LCA has also been applied to medical interventions such as the treatment of type 2 diabetes¹⁶.

The Technical University of Denmark (DTU) has with its Section on Quantitative Sustainability Assessment been active in the field for +30 years and has been instrumental in shaping the field and providing quantifiable sustainability metrics, being recognised as a world leader in this field¹⁷. DTU has a strong focus on the environmental impact assessment part of LCA and has over the last decade introduced an absolute sustainability perspective in LCA.

CASE *What is the carbon footprint of an artificial hip?*

The Technical University of Denmark (DTU) and The Department of Orthopaedic Surgery at Zealand University Hospital, Køge, are collaborating on a research project to assess the environmental impact of orthopaedic procedures using LCA.

In Denmark, around 10,000 hip replacements are performed yearly, ranking among the most frequent surgeries.

The project will provide valuable insight into the environmental hotspots of surgeries such as total hip replacement for the treatment of osteoarthritis.

This information is important to make informed decisions on what to target if medical interventions are to be improved from a sustainability perspective¹⁸.

Circular economy in value chain cooperation

For years, our economy has been linear: we extract raw materials, manufacture products, consume, throw away and incinerate – often after only a single use. As a result of a linear economy, an incredible amount of valuable resources are lost every day. Resources which could have been reused or recycled.

Circular economy

is defined as a sustainable alternative to a linear economy, where resources throughout the value chain are reused and recycled in loops, producing minimal or no waste at all⁹.

With a circular economy model, it is possible to grow, but without growing beyond ourselves and exceeding the planetary boundaries. How? By utilising our innovativeness and creativity to reduce and redesign patterns of consumption, products and materials, and by developing new business models. By doing so, it is possible to create positive, sustainable and still profitable economies.

Within the healthcare sector, this involves looking into behavioural patterns and culture of consumption, design processes and systems that prioritise the use of sustainable materials, reduce water consumption and pollutions, promote the reuse of products and parts and recycling of materials wherever possible, as well as supporting the optimisation and development of innovative sustainable products and services.

For the Life Science industry, this approach also aids in meeting growing regulatory requirements for sustainability, stimulating innovation in product and process design. It fosters the use of safer materials, which contributes to patient well-being on both short and longer term.

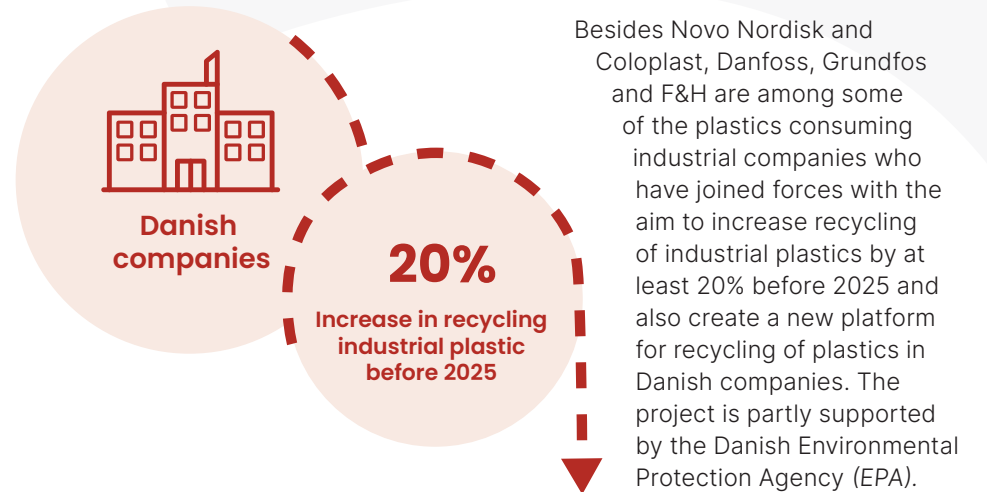
CASE The Circular Industrial Plastic (CIP) Partnership

Today, many industrial products contain a large amount of specialised, technical plastic. Many of these products end up in landfills or are incinerated due to limited recycling technologies or because the products are not designed to be recycled.

17 Danish companies across industries, academia and recycling technologies have joined forces in the Circular Industrial Plastic (CIP) partnership to obtain knowledge and solutions for the future.

To map plastic materials currently in use across industries, identify barriers for recycling and create better infrastructure and technologies for recycling,

The partnership demonstrates new recycling paths for industrial plastic materials including plastic from medical products, which is challenging due to strict legislation and limitations of circularity.



Besides Novo Nordisk and Coloplast, Danfoss, Grundfos and F&H are among some of the plastics consuming industrial companies who have joined forces with the aim to increase recycling of industrial plastics by at least 20% before 2025 and also create a new platform for recycling of plastics in Danish companies. The project is partly supported by the Danish Environmental Protection Agency (EPA).

CASE Kalundborg Symbiosen – a leading illustration of circular economy principles in practice

Situated in Kalundborg, the Kalundborg Symbiosis exemplifies an industrial ecosystem within a municipality where waste and/or by-products of one enterprise serve as resources for another. This pioneering industrial symbiosis which began evolving back in the 1970s, now stands as a prominent example of circular economy principles in action.

Bringing together a diverse group of stakeholders including power stations, healthcare and biotechnology companies, agricultural sectors, as well

as municipal heating, water and waste management services, the symbiosis has more than 30 different residual flows of water, energy, and materials.

This ecosystem of shared resources leads to significant environmental and economic benefits, such as reductions in CO₂-emissions, water consumption, and costs. Moreover, it promotes resource efficiency and sustainability, contributing to Denmark's status as a global leader in green technology and sustainable development.

Annually, the Kalundborg Symbiosis saves its partners and the environment for

- 4 million m³ of groundwater by using surface water
- 586,000 tonnes of CO₂
- 62,000 tonnes of waste material recycled

Additionally,

- 80% of CO₂ emissions in the symbiosis have been reduced since 2015
- The local energy supply is CO₂ neutral

Examples of the symbiotic relationships within the network are

- Kalundborg Utility manages the final treatment of wastewater from Kalundborg Symbiosis companies. Partners conduct initial treatment to meet individual company requirements, with separate pipes for specific wastewater types to optimise treatment and minimise energy use. The treated wastewater undergoes further processing in a heat exchanger at the heat pump, generating approximately 80,000 MWh annually. This covers over 30% of Kalundborg Utility's annual district heating purchase.
- At Asnæs Power Plant, water released during wood chip combustion is treated and sent to Kalundborg Refinery, covering 1/3 of its boiler water needs. The refinery would otherwise have to process surface water from Lake Tissø for the same purpose.
- At Kalundborg Bioenergy, residues from insulin and enzyme production by Novo Nordisk and Novozymes are converted into biomethane, meeting natural gas quality standards. This biomethane is then distributed through the natural gas grid to Kalundborg Refinery and other end consumers.



CASE Reducing carbon footprint of hearing aids packaging

Taking a closer look at the most carbon-intensive elements in the hearing aids packaging portfolio, Demant has reduced the carbon emissions by 12%-23.5% across the portfolio (cradle-to-gate). The hearing aids brands of Demant now presents better designed packaging in recycled plastic (PCR PET) and with less waste to their customers.

In 2022, the company managed to reduce the carbon footprint of its commercial hearing aids packaging with more than 1,000 tonnes of CO₂.

Demant furthermore encourages packaging suppliers to invest in establishing their CO₂ baseline and reduce their energy consumption.

Cradle-to-gate

refers to the carbon impact of a product from the moment it is produced to the moment it enters the store.

Among their key packaging suppliers, several initiatives were carried out in 2022 such as certified life cycle assessment calculations, new power installments and reduced transportation.

Customer centric packaging

Desk charger packaging (Oticon and Bernafon brand)

23.5% less carbon emissions

12% less carbon emissions

Plastic blisters: 50% recycled plastic (PCR PET)

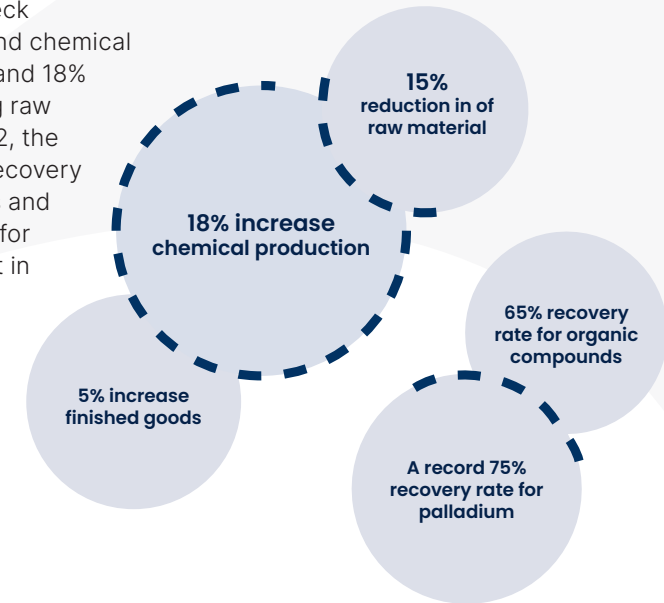
CASE Optimising circularity in resource flows

Over the years, the pharmaceutical company Lundbeck has refined the skills and technical capabilities of chemical production to increase recycling of organic compounds and reduce hazardous waste in its production sites.

Lundbeck has furthermore managed to substitute the harmful dichloromethane with toluene in two of its production processes in 2022, which is a very positive development enhancing environmental and workplace safety.

From 2020 to 2022, Lundbeck increased finished goods and chemical production volumes by 5% and 18% respectively, while reducing raw material use by 15%. In 2022, the company achieved a 65% recovery rate for organic compounds and a record 75% recovery rate for palladium, a crucial element in the processes.

Recycling palladium reduces CO₂-emissions and preserves a rare metal. The adoption of green chemistry principles has yielded several circular savings for Lundbeck in its Active Pharmaceutical Ingredient (API) production, improving both yield and quality, and decreasing the use of reagents, catalysts, and solvents.



CASE Production waste recycling in medical device manufacturing

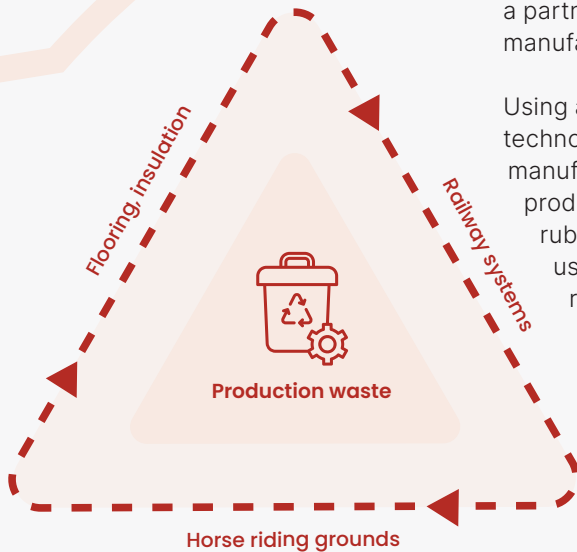
As a producer of medical devices, Coloplast faces unique challenges in relation to circularity, not least because its products are often contaminated after use.

Coloplast is focused on improving its products and packaging, focusing on making packaging more recyclable, using renewable materials, and has set a target to recycle 75% of its production waste.

2021–2023
75 % recycled production waste

Its ambition is to increase focus on recycling and circularity. In 2021 and 2023, a total of 75% of Coloplast's production waste was recycled, primarily at its main production facility located in Hungary through a partnership with a recycling manufacturer.

Using an innovative waste recycling technology, the Hungarian manufacturing partner uses Coloplast's production waste as a component in rubber-based composite products used for flooring at schools, horse riding grounds, sport fields, railway systems, or as building insulation. Thereby, promoting a circular sustainable approach to waste instead of a wasteful linear one.



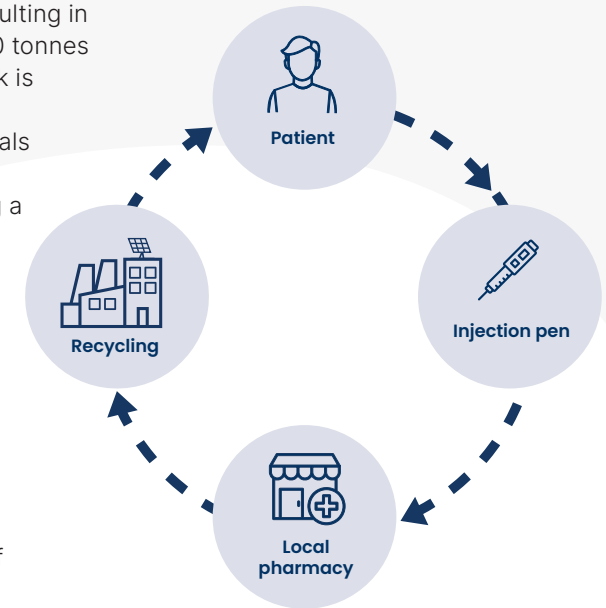
CASE ReturPen™ – a national return programme for injection pens

Every year, millions of injection pens are produced for people around the world. The injection pens are made of 70% plastic and contain other materials such as metal and glass, which cannot be thrown into the usual plastic recycling bin.

Initially, it was only possible to hand in used pens from Novo Nordisk in Denmark, however, in May 2023, the ReturPen™ initiative was expanded to an industry pilot. Injection pens from Novo Nordisk, Eli Lilly, Sanofi, and Merck can now be handed in for recycling in Denmark.

Novo Nordisk manufactures over 750 million injection pens yearly, resulting in a consumption of around 13,000 tonnes of plastic annually. Novo Nordisk is focused on contributing to the recycling of valuable raw materials and transforming product end-of-life management by adopting a circular approach.

To avoid plastic ending up in landfills or being incinerated, Novo Nordisk launched a return initiative in Denmark in 2020, where insulin users can return their used pens at the local pharmacy for recycling. ReturPen™ has yielded positive results in Denmark: Hundreds of thousands of pens have already been recycled, and further recycling pilots have been initiated in the United Kingdom, France and Brazil.



Driving sustainability in hospitals and healthcare facilities

Hospitals – and healthcare facilities in general, must adapt to the global climate crisis by becoming energy, water, and resource-efficient, as well as climate resilient institutions. This transformation is not just an opportunity but a necessity. By embracing new sustainable practices, hospitals can reduce their environmental impact while improving the quality of care, saving costs, and contributing to a healthier future for all.

To achieve this, hospitals need to invest in solutions that efficiently reduce carbon footprint and environmental impact without compromising patient health. This includes improving facility design and operations to reduce waste, promote responsible water management, optimise practices, use recyclable and reusable materials, and enhance energy efficiency. Energy-efficient solutions can lead to significant cost savings over time, allowing hospitals to allocate resources

towards patient recovery and health. Research suggests that the way healthcare facilities are designed can have positive effects on both patient and staff outcomes. By incorporating natural lighting, minimising noise pollution, and introducing natural surroundings with recreational value, hospitals can improve recovery time, reduce demand on the healthcare system, and enhance employee satisfaction^{20, 21}.

Investing in sustainability not only benefits the environment but also supports hospitals in meeting the needs of the population and improving patient outcomes. Hospitals therefore have the opportunity to serve as an example to follow by promoting and integrating an understanding of sustainability, which encompasses both the environmental, social, and economic pillar.

Being a place of healing and recovery, hospitals hold a unique societal role and have a responsibility to foster health in all aspects. The whole transition is of course, also depending on healthcare professionals - the staff and the leaders' understanding and willingness to contribute.

Building up competencies already during education, is therefore of utmost importance. By adopting sustainable practices, hospitals not only demonstrate leadership in addressing climate change but also inspire broader shifts towards sustainability in society.

This chapter highlights cases that address the challenges of resource optimisation, waste reduction and efficiency improvement through promotion of knowledge sharing across hospitals and sectors, intelligent use of smartphone apps to reduce waste and increase efficiency, sustainable procurement criteria, and healthcare at home initiatives. The cases demonstrate the transformative potential of sustainable practices in healthcare settings. Moreover, fostering collaborations across hospitals, sectors, and nations encourages cooperation and cross-sectoral exchange of best-practice solutions and new innovations.



CASE Centre for sustainable hospitals

The Centre for Sustainable Hospitals (CfSH) is a pioneering initiative established by Central Denmark Region. A sustainable transition within hospitals is a complex task, especially when quality, patient safety, hygiene, efficiency, and the working environment cannot be compromised. The centre is designed to gather and disseminate knowledge on the sustainable transition in the healthcare system, as well as to generate new insights through research, developmental projects and networking.

The centre illustrates the power of innovation and development within daily clinical practice, in cross sectoral collaboration alongside research-based solutions. It aims to make sustainability an integral part of the healthcare profession by developing new solutions in close collaboration with staff as well as external partners.

CfSH addresses sustainability in healthcare in a broad sense, focusing on the transition towards Circular Economy; how to reduce, reuse and recycle in a hospital setting.

Through a number of leading clinical projects, the challenges and potentials linked to clinical behaviour, products, guidelines, legal framework and organisational culture are analysed, tested and implemented.

These objectives will be achieved by gathering and communicating sustainability knowledge, microfinancing local development projects, and maintaining a close relationship with hospital sustainability advisors. This knowledge sharing on 'how-to-implement' is a cornerstone of the agenda. Larger, cross-hospital and cross regional initiatives are also undertaken in collaboration with both internal and external partners.

Aarhus University Hospital, situated in the Central Denmark Region, is one of Denmark's largest hospitals, and is a fusion of six old hospitals, now consolidated under one roof in Skejby. The hospital is the size of and has been laid out in the image of an archetypal small Danish town.

The concept of "healing architecture" has influenced the design of the hospital - from the layout of single-bed wards, to the use of daylight and light inflows, to the design of landscape and garden spaces. The hospital is also designed to flexibly meet future requirements of technology, treatment methods and working routines.

Ongoing projects

An important part of the Centre for Sustainable Hospitals' mission is to facilitate the development and implementation of new sustainable workflows in the hospitals in the Central Denmark Region.

Sustainability should not negatively affect hygiene, efficiency, and working conditions. Therefore, CfSH believe that new sustainable workflows should be developed in the clinical daily life in the individual departments, with a focus on professionalism and consideration for local conditions.

Examples of research areas:

- From single to multiple use metal instruments & medical textiles
- The first 1000 days – towards no plastic and toxic chemicals in maternity, neonatal and paediatric wards
- Recycled and reused furnitures
- A journey towards a more sustainable hospital kitchen



CASE The Sustainable Surgery Project

Motivated by the necessity to curb waste production in surgery departments, Centre for Sustainable Hospitals in the Central Denmark Region embarked on a journey to scrutinise local consumption habits and devise a practical strategy for decreasing the usage of utensils in general surgery, all while maintaining stringent standards of patient safety, hygiene, and workplace environment.

Collaborating with clinicians from four hospitals within the region focusing on elective un-cemented hip surgeries, the usage of surgical equipment and procedural workflows were examined.

The range was substantial, with waste generation varying from 7.0 kg to 12.4 kg per surgery. The findings suggest that by implementing changes in

workflows and choice of products, e.g., choosing to use only the single use equipment that truly adds value to the quality of treatment, hospitals could potentially reduce the use of single use instruments by an average 4 kg per surgery without compromising the patient safety and the work environment for the staff. In practical terms, this could lead to an annual reduction of 8.4 tonnes of single use instruments in the region, which translates to cutting approximately 23 tonnes of CO₂-emissions.

This being just one specific type of operation within one surgical area, the findings and method represent a potentially significant step towards environmental sustainability in healthcare.

4 kg
per surgery

23 tonnes less
CO₂-emission

8.4 tonnes
per year

CASE HRM Udløb – a smartphone app that optimises workflows and reduces medicine waste

In the Central Denmark Region, checking expiry dates of medicine used to involve both manual and time-consuming workflows with the use of paper forms. In a response to this, Central Denmark Region's Digital Innovation department DIAS and the Hospital Pharmacy developed a smartphone app called HRM Udløb. With this app, Hospital Pharmacy staff can optimise resource use, reduce waste and even boost efficiency in healthcare. HRM Udløb is another example of a project initiated by the CfSH.

The app facilitates:

- Efficient scanning of medicine package data-matrix
- Sorted overview of medicine and expiry dates
- Registration of medicine packages as used, discarded, or released
- Availability of medicine to colleagues in different rooms

Transitioning from the use of paper forms to the HRM Udløb-app, the management time to check and scan expiry dates has been significantly reduced (59%) and 6,321 medicine packages were relocated from March 2022 to December 2023 before expiry date and used in other departments.

This resulted in an economic saving of €375,000 corresponding to 28% of the total amount of discarded medicine in the same period.

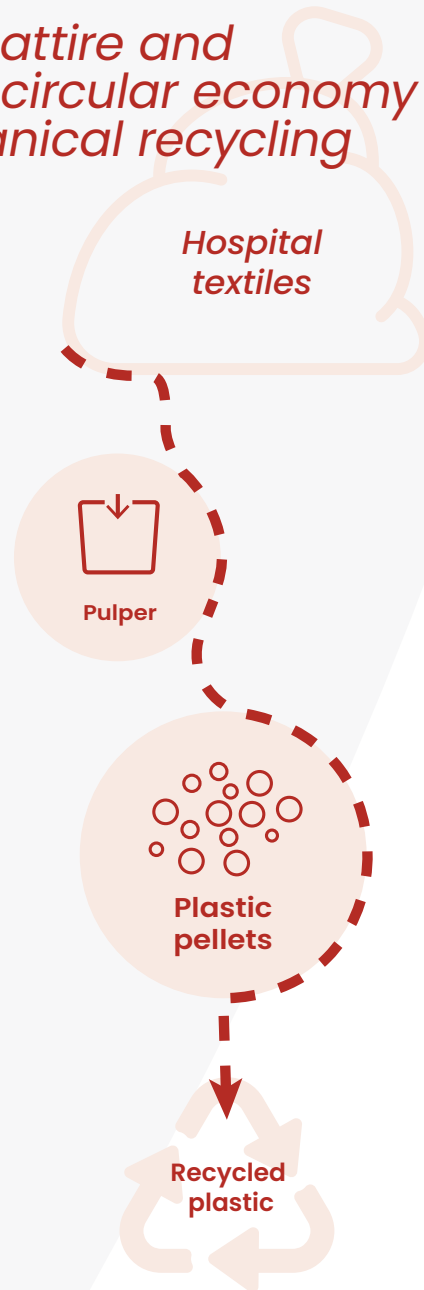
CASE Turning patient attire and disposable linens into circular economy assets through mechanical recycling

In close collaboration with three Danish regions, ABENA has embarked on a pilot project to make disposable textiles for the healthcare system recyclable and thus reduce residual waste.

ABENA, a provider of hygienic, disposable hospital textiles, seeks to find a balance between reducing cross-contamination risks within hospitals and minimising environmental impact. While the individually packed attire and linens offer hygienic benefits, they also add to the large waste load hospitals currently have.

In response, ABENA is reinventing this process, striving to create disposable textiles that can be mechanically recycled without compromising hygiene or quality.

If successful, the concept will foster a circular economy in which production and consumption create a reduction in the amount of waste depending on quality of the material and cleanness of the waste fraction, thereby significantly reducing residual waste in hospitals.



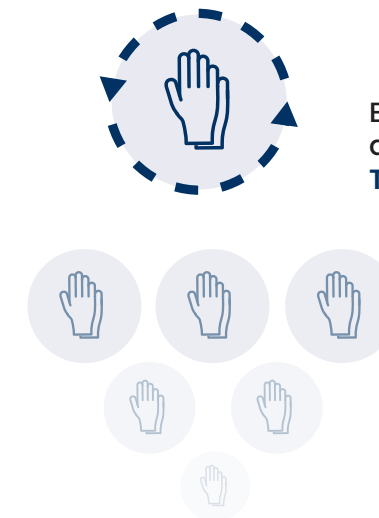
CASE ReGlove – Reusable gloves for the health sector

One of the most used single-use items in the health sector is the blue nitril examination glove. Each year hundreds of millions of gloves are used once and disposed to incineration. The ReGlove project will develop a new washable nitril glove and washing process and integrate the gloves into the current similar logistic for hospital clothing handled by Textilia.

Besides reducing the environmental footprint of used gloves in the health sector it will also secure the supply chain of gloves and reduce the need for an additional amount of gloves stored at each hospital.

The project is a collaboration between Bait A/S, Textilia, and Danish Technological Institute and is partly supported by the Danish Environmental Protection Agency under the Environmental Technology Development and Demonstration Programme (called MUDP).

ReGlove is a lighthouse project, which means that the solution must work on a full scale and not just in a petri dish or pilot setup. By the end of the project period in the summer of 2024, the consortium must therefore have a viable concept, where nitrile gloves designed for reuse can be distributed, collected, sorted, washed, and delivered back to the users again and again.



Each year **hundreds of millions of gloves** are used once and disposed to incineration. The ReGlove project aims to change this.

The reusable gloves from ReGlove are going to be tested in a pilot project at Vejle Hospital in the Region of Southern Denmark

CASE Sustainable green procurement at Danish hospitals

Hospitals are major consumers of packaging, ranging from knee implants to gowns and needles. Packaging is a key necessity to protect healthcare products, but also constitutes a complex type of waste for the healthcare sector with consequences for the environment and climate. In 2019 alone, plastic waste from Danish hospitals amounted to approximately 4,000 tonnes, equating the average annual plastic waste from around a mid-size Danish city with around 75,000 households.

To counter and reduce the growing volumes of plastic waste, the regions, AMGROS and Danish Regions have developed a set of Nordic criteria for more sustainable packaging. The criteria have been developed in close collaboration between national, regional and local stakeholders responsible for public green procurement in healthcare in Norway, Sweden, Denmark, Finland, and Iceland.

The Nordic Criteria for More Sustainable Packaging for Healthcare Products aim to reduce climate and environmental impacts of the products and packaging provided to the healthcare sector.

The criteria are divided into three levels: “basic”, “advanced”, and “spearhead” and may be applied depending on market maturity in the given procurement situation.

In spring 2021, the criteria were launched and are now gradually being applied in the Nordic region. By the end of 2022, the regions applied the criteria in more than 20 public tenders totaling contract values in the vicinity of €188 million.

The Criteria are setting a new direction for suppliers with regard to stimulating more environmental and climate-friendly packaging for products for the healthcare sector. Also, at European and international level, there is a similar vast potential for reducing the environmental and climate impact from healthcare products. Thus, key target and next step for The Nordic Criteria for More Sustainable Packaging for Healthcare Products is to expand use outside the Nordic region.

CASE Sustainable procurement of medicines

In the future, the supply of medicines to Danish public hospitals will focus on more than quality, price and reliable deliveries. Supply will also to a greater extent focus on delivery of sustainable and environmentally friendly products.

To promote sustainable procurement of medicine, the Danish procurement organisation Amgros - owned by all five Danish regions - has started to include environmental requirements in their tenders, applying the Nordic Criteria for More Sustainable Packaging for Healthcare Products.

Agreements between Amgros and suppliers now clearly state that the supplier are expected to organise activities “to safeguard nature and the environment, thus ensuring social development on a sustainable basis in respect of human conditions of life and for the conservation of flora and fauna”. Suppliers are furthermore obligated to act “ethically and with social responsibility”.

On average, Amgros purchases medicines for public hospitals for over €1.2 billion annually, and by implementing sustainable – and responsible – procurement, Amgros contributes with an important step towards a green transition.

Key targets of the criteria for more sustainable packaging are to help and assist (public) procurement departments to:

- Promote recycling
- Encourage the use of recycled or renewable materials
- Minimise emissions of fossil fuels

CASE *My e-hospital*

A digital solution bringing hospital care to patients at home

In collaboration with Nordsjællands Hospital, Netcompany has developed My e-hospital, an app and web-based medical tool that efficiently monitors patients at home, promoting safe recovery while optimally prioritising care resources across all patient groups.

Once “admitted” at home – and after training to independently measure vital signs, patients self-report data at specified times, attend daily video ward rounds, and can request contact with the hospital via the app. At the hospital, the medical team utilise a care plan management system to monitor patient data from the app, promptly addressing emerging issues with a “traffic light” system.

The app helps to release beds, reduce the risk of infection, free up time for doctors and nurses, and enable patients to be “admitted” and monitored in their own homes, as modern telemedicine solutions enable them to report their condition themselves.



Patient



Video consultations



Self-report



Vital signs

CASE *Healthcare at Home*

The Most Sustainable Approach to Healthcare Delivery

Healthcare systems worldwide are grappling with a multitude of challenges and mounting pressures. An ageing population and the increasing burden of both infectious and chronic diseases have created a demand for healthcare that surpasses current and projected capacities.

In response, Falck, a global healthcare company, is revolutionising the healthcare delivery model by exploring sustainable approaches to provide more healthcare while minimising the strain on our climate and healthcare personnel. Healthcare at Home initiatives are being implemented in Poland, Denmark, and the US, where Falck monitors vital parameters of vulnerable or elderly patients and provides necessary treatment in the comfort of their own homes.

These initiatives not only enhance the daily lives of citizens but also prevent hospitalisations, alleviate the burden on healthcare systems, and reduce unnecessary ambulance trips. By embracing Healthcare at Home, Falck is paving the way for a more sustainable future in healthcare.

Healthcare at Home initiatives represent a paradigm shift in healthcare delivery, offering a sustainable alternative to traditional ambulance trips. With a commitment to innovation and a focus on sustainable solutions, Falck is leading the charge in transforming the healthcare landscape.



Designing resilient hospitals of the future

In the face of growing energy demands and environmental concerns, hospitals are increasingly recognising the importance of adopting sustainable practices. By reducing energy consumption and implementing innovative solutions, hospitals not only save costs but also contribute to mitigating the impact of climate change and promoting a healthier environment.

Proper treatment of wastewater from hospitals and pharmaceutical production sites is for example crucial to eliminate the presence of pharmaceutical residues, hazardous substances, and infectious pathogens in our water environment. These substances are hazardous to both human health and the environment and most municipal treatment plants are not equipped to treat this complex mix of substances.

This chapter delves into the design of hospitals, focusing on key aspects such as energy efficiency, water management, and the benefits improving physical surroundings can have on the well-being of the patients and hospital staff. By exploring a number of cases, we aim to highlight the transformative power of designing sustainable solutions in healthcare settings.

From wastewater treatment systems to energy-efficient high-pressure water mist pumps for fire protection systems, climate-resilient measures and healing architecture, these examples showcase the tremendous potential for hospitals and other healthcare facilities to reduce their ecological footprint and ultimately provide better care for patients and staff.

Rigshospitalet, located in the Capital Region of Denmark, is a highly specialised hospital, housing over 100 specialised departments and offering a wide array of advanced medical treatments to patients from all over Denmark. Additionally, Rigshospitalet serves as a key educational facility for the University of Copenhagen, providing clinical training to a majority of the university's medical students.

CASE *New cooling system improves energy efficiency at Rigshospitalet*

Energy efficiency is essential in minimising environmental impact of hospital services. Rigshospitalet, Denmark's largest hospital with 12,000 employees, has replaced its old cooling system with a new and more efficient one.

The renovation – which is part of an extensive energy efficiency programme in the Capital Region of Denmark – was completed in summer 2022 and has increased the hospital's cooling capacity while utilising excess heat to heat water and buildings through new pipes.

The improvements are integrated with modern control technology and a new energy management system, ensuring better operations. The new cooling system has a larger and more efficient capacity, reducing energy consumption while providing greater cooling. Today, with the new sustainable cooling system, hospital staff, patients and relatives benefit from a better indoor climate while the upgrade at the same time has enhanced the hospital's cooling reliability.

**11 million kWh
of energy saved
annually**

**650 tonnes of CO₂
saved annually**



CASE Energy-efficient pumps save hospitals energy and costs

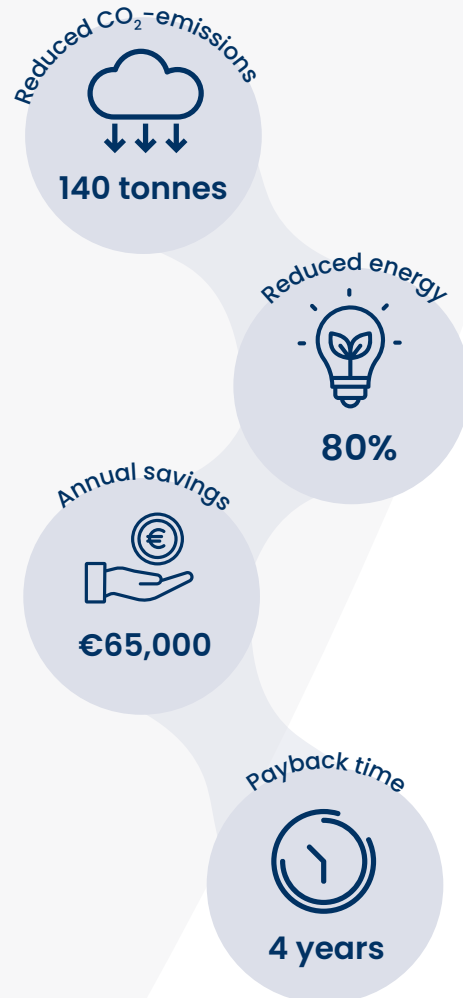
Investing in energy-efficient pumps proved to be a green and cost-efficient solution for University Hospital Brussels

Energy demand – especially for heating and cooling – is on the rise for many hospitals due to a growing disease burden. This typically includes circulation of hot or cool water.

Investing in energy-efficient pumps can offer a smart, green, and sustainable solution. To mitigate greenhouse gas emissions while accommodating the projected 40% hospital growth, University Hospital Brussels (UZ Brussel) required new energy-efficient pumps from Grundfos.

By installing the pumps, the hospital reduced its energy consumption by up to 80% for pumping hot water, resulting in annual savings of €65,000 and reduced their CO₂-emissions by 140 tonnes. The investment paid off in just four years, showcasing the economic and environmental benefits of the pumps.

Additionally, the new pumps are easier to maintain and control compared to their predecessors, contributing to overall hospital efficiency.



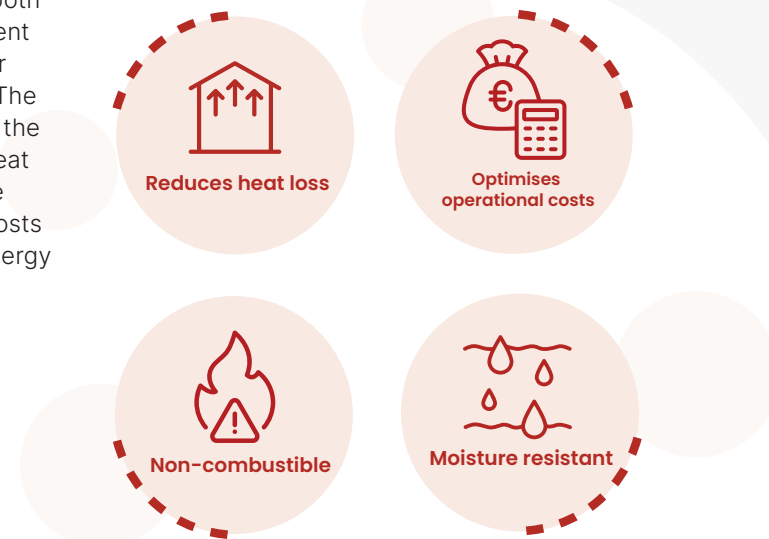
CASE A warm and safe welcome for babies at hospitals

Energy-efficient building upgrade increases comfort and safety for parents and babies at Bradford Royal Infirmary

At the Women's and Newborn Baby Unit at Bradford Royal Infirmary in the United Kingdom, the five-storey building's 50+ year old façade leaked heat and let in draughts and noise, challenging the well-being of patients and staff.

As part of a multi-million-pound building upgrade, ROCKWOOL provided insulation and ventilated façade cladding, which helped make the hospital both more energy-efficient and comfortable for patients and staff. The thermal benefits of the solution reduced heat loss and helped the hospital optimise costs by increasing its energy efficiency.

Additionally, ROCKWOOL's stone wool insulation is non-combustible achieving a Euroclass A1 rating, meaning it meets the stringent fire safety requirements for exterior cladding in the UK. The stone wool products are also recyclable and highly durable with a confirmed lifetime of over 50 years, as well as being resistant to the effects of moisture, temperature, and the weather.



CASE Safe discharge of hospital wastewater

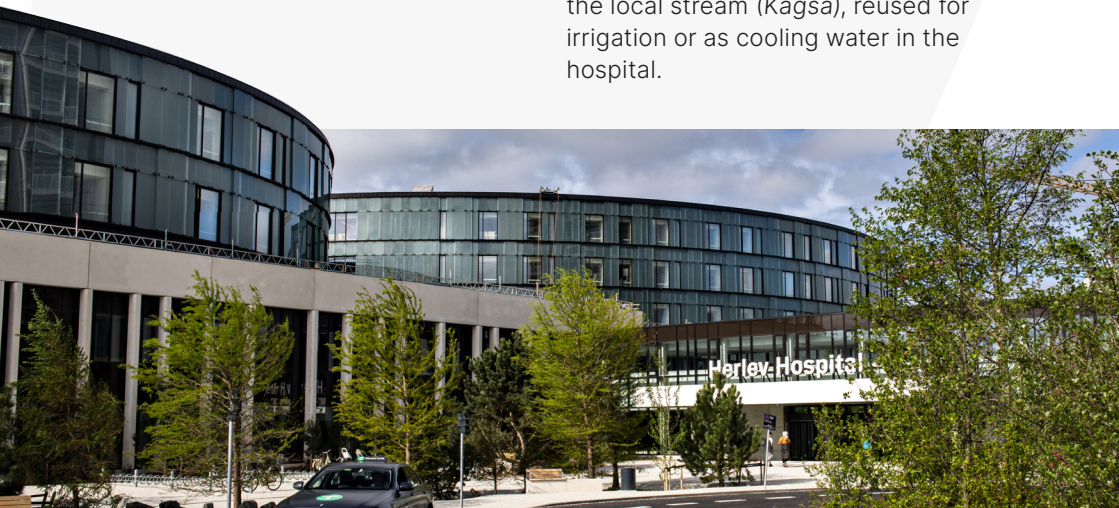
Treating hospital wastewater onsite with advanced wastewater treatment system

Herlev Hospital is a 900-bed Danish university hospital. As hospital wastewater contains hazardous pharmaceuticals and can cause serious infectious diseases, the environmental authorities have required that the wastewater is to be treated before being released to sewers and the aquatic environment.

Herlev Hospital needed an advanced and robust treatment system to remove both hazardous substances, like active pharmaceuticals, and pathogens like antibiotic-resistant bacteria.

The technology provided by ULTRAAQUA is able to treat the wastewater so efficiently that it is no longer toxic to aquatic organisms and therefore can be released directly to a local stream. Further, the technology is also effective in removing all traces of viruses and bacteria, including antibiotic-resistant bacteria, which cause hard-to-treat diseases.

With the implemented full-scale solution by ULTRAAQUA, the wastewater from the hospital can now be used for recreational purposes in the local stream (Kagså), reused for irrigation or as cooling water in the hospital.



Herlev Hospital, located in the Capital Region of Denmark, is one of the country's largest acute care hospitals. In 2021, it unveiled its new, impressive buildings, featuring an emergency reception, a maternity ward, a paediatric department and a modern ward section equipped with nearly 300 single-patient rooms.

CASE Wastewater management at pharmaceutical company

Treating pharmaceutical wastewater at the source before discharge to municipal wastewater system

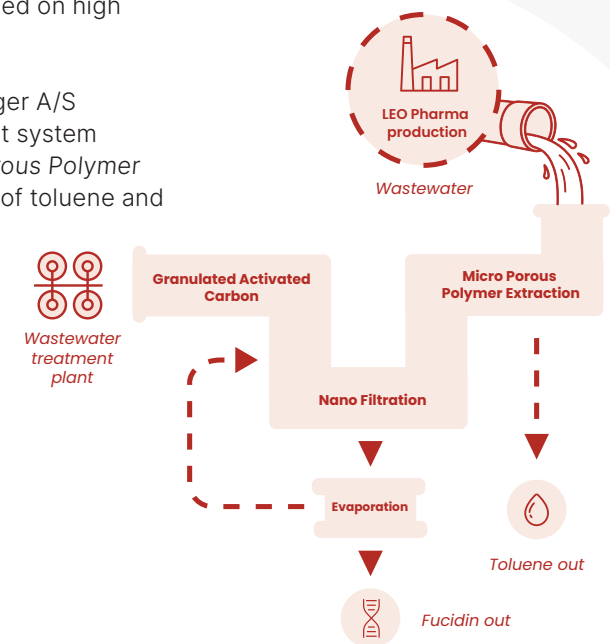
Due to a forecasted growth in market demand for Fucidin – an antibiotic extracted from a fungus and used for the treatment of bacterial skin infections – the leading manufacturer of the API fusidic acid, LEO Pharma, aimed to increase its production. This required a new production plant at its production site in Ballerup. Strict requirements for effluents to the municipal wastewater system require treatment at the source of the toluene and fusidic acid-containing precipitation residuals. LEO Pharma also wanted to establish a manufacturing process based on high sustainability standards.

To meet the demands, Krüger A/S delivered a waste treatment system with absorption (Macro Porous Polymer Extraction) for the removal of toluene and a Nanofiltration membrane (NF) for the removal of fusidic acid and reduction of sulphate content.

An evaporation unit reduces the volume of waste, i.e., to concentrate the retentate from the NF, and an Activated Carbon filter (GAC) polishes NF permeates for traces of fusidic acid.

Finally, the waste treatment systems include a Neutralisation station where pH is chemically adjusted before discharge to the municipal wastewater sewer system.

The treatment process proved successful in a small-scale pilot testing of the entire concept before the final design of the facility was completed. The plant is under commissioning in spring 2024.



CASE Incorporating rainwater basins into hospital design and infrastructure

Rainwater basins can mitigate extreme weather events and promote recreation and biodiversity

The frequency and severity of extreme weather events are rising. Hospitals and healthcare facilities are essential infrastructures in society, and their climate resilience is crucial to ensure a sustainable healthcare system in the future.

As part of the new hospital constructions in Gødstrup and Odense, climate resilience has been incorporated into the design of both the hospitals and their surroundings. Rainwater will be redirected to water basins located in the surrounding landscape, where it will flow to nearby creeks and protect the hospitals from flooding during future cloudbursts and extreme rain.

The new hospital facilities and surroundings are designed to withstand a 100-year extreme weather event.

Furthermore, the basins have been designed to resemble natural lakes with paths, trees, and green surroundings. By integrating green and blue spaces, the design supports patients in the healing process and contributes to the well-being of patients, visitors, and hospital staff. Over time, the basins are also expected to increase biodiversity in the area by creating environments that both animals and plants can thrive in.

Rainwater basins



Biodiversity



Healing improvement



Green spaces

CASE An innovative fire protection solution

A fire safety system that facilitates economic and environmental sustainability without compromising safety

Fire safety is a prerequisite of hospitals: crucial for patient and staff safety, protecting medical equipment, contributing towards continuity of services while complying with regulations. It can help prevent property damage and maintain public trust.

The SEM-SAFE® fire protection system from Danfoss Fire Safety is based on high-pressure water mist, a technology that can meet the safety, and sustainable needs of hospital buildings. The system uses up to 80% less water than traditional fire protection systems. Water damage is reduced significantly, thus minimising downtime and enabling faster post-clean up. The Danfoss pumps are lubricated by water and are highly energy-efficient.

The SEM-SAFE® system provides an opportunity to rethink the traditional ways of designing fire-safe buildings as it takes the characteristics of the building into account by addressing each specific fire risk.

The system empowers designers, engineers, and architects to think and design creatively. It makes design possible that would not be feasible with a straight prescriptive design, while addressing needs such as life safety, property protection, business continuity, and sustainability targets. In addition, the solution is particularly suitable for areas such as psychiatric wards.

Aarhus University Hospital, one of the largest hospitals in Denmark, has installed the SEM-SAFE® system and has experienced the economic benefits of this solution, with savings accomplished by, e.g., the use of standard glass instead of expensive fire glass, replacement of automatic fire doors with water curtains and of isolation and insulation of the ventilation system.

Faster post-cleanup

80% less water

Energy efficient

Economic benefits

CASE *Healing architecture*

Psychiatric hospital designed to support patient recovery by maximising the therapeutic benefits of daylight

When designing healthcare centres, the physical surroundings and architecture can be designed to support patients' recovery. Maximising the benefits of daylight can serve as a therapeutic tool for the well-being and health of patients and staff.

In collaboration with VELUX Commercial and Karlsson Arkitekter, the new state-of-the-art psychiatric hospital in Slagelse has incorporated daylight to enhance the healing environment for psychiatric patients in Denmark's largest psychiatric facilities built in recent times. Strategically positioned skylights help to ensure optimal daylight intake while providing patients and staff with an unobstructed view of the sky. Natural ventilation through hidden in-built chain actuators secures a well-ventilated indoor climate.

The concept emphasises the connection between interior spaces and the outside world, making the dynamics of the daylight perceivable to the inside residents. Complying with standards and guidelines, the design aims to improve physiological, psychological, and emotional health by making an effort to ensure that the spaces are boosted with the necessary light to regulate the daily rhythm of patients.

Slagelse Psychiatric Hospital, situated in Region Zealand, constitutes a professional beacon within the field of psychiatry, as the hospital is located close to the somatic hospital. Together they form a new, cohesive health campus with shared use of access roads and adjacent park areas. The psychiatric hospital is using its design to support the treatment courses of its patients with light, transparency and openness as well as access to outdoor areas and nature.



Future perspectives

In the 21st century, sustainability has transformed from being a choice to an essential strategy for the global community's well-being and survival. The healthcare sector with its energy intensive hospitals and production facilities, its resource consumption and waste generation, holds a unique position to create solutions for both social well-being, the environment and not least economic development. By integrating sustainable practices into the health sector's core practices, it can minimise its environmental footprint, improve health outcomes, and foster broader societal shifts towards sustainability.

Recognising the sector's role is imperative to ensure that healthcare systems evolve to become more resilient and less carbon-intensive, especially given the exacerbating effects of climate change on health, highlighting the urgent need for action. This urgent need is underscored with the Declaration on Climate and Health, endorsed at COP28 by 124 countries.

Having been recognised as a frontrunner in implementing green and sustainable technologies, particularly in the energy and water sectors, Denmark is now extending its innovative and sustainable approach to encompass the medico and pharma industries.

The Danish approach has led to the implementation of a wide range of measures aimed at reducing CO₂ emissions, all actively contributing to the achievement of the SDGs. Valuable know-how that can benefit countries worldwide and contribute to a global transition to a sustainable healthcare sector. If adopted on a large scale, they can make a significant dent in global emissions.

The Danish transition towards a more sustainable healthcare sector offers inspiration for global replication, providing a roadmap on how to transition towards a greener and more sustainable healthcare sector without compromising the safety of its patients.

The importance of social sustainability

Sustainability encompasses more than just reducing CO₂-emissions; it encompasses a holistic perspective that includes a crucial social dimension. In striving for sustainability, we must consider the broader well-being of our communities, acknowledging that environmental responsibility goes hand in hand with social equity. It is not only about preserving our environment but also about ensuring that society's most vulnerable and marginalised members are not forgotten in this process.

This holistic approach recognises the interdependence of environmental, economic and social factors, emphasising that true sustainability ensures that no one is left behind. By embracing sustainability in its entirety, we not only mitigate environmental impact but also promote social cohesion, equity, and the overall welfare of our global society. In closing, it is essential to remember that our journey towards sustainability is a collective endeavor when we face the complex challenges ahead.

Partnering for change

a public-private partnership between Novo Nordisk, the International Committee of the Red Cross, and the Danish Red Cross is an example of collaborative work in the field of social sustainability. Together with their academic partner, the London School of Hygiene & Tropical Medicine (*LSHTM*), the partners have been working together to gain a better understanding of the challenges faced by people with non-communicable diseases (*NCDs*) in a vulnerable setting and to build capacity around specifically diabetes and hypertension in humanitarian crises.

References & Credits

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- Page 46-47: Region Zealand

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Healthcare Denmark arranges roundtables, delegation visits and represents Danish life science and healthcare at conferences and meetings abroad.

**We look forward to
hearing from you.**