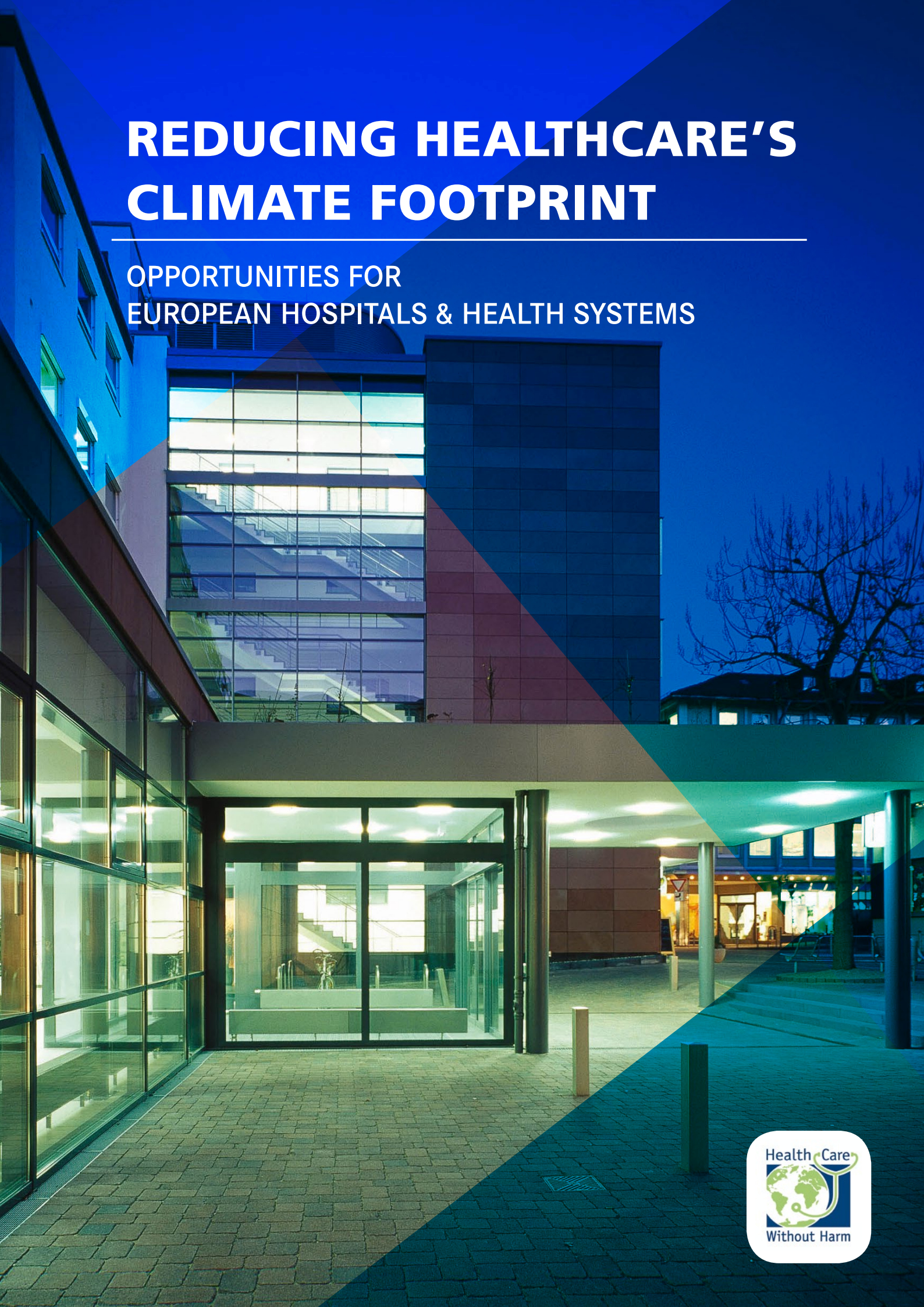
REDUCING HEALTHCARE'S CLIMATE FOOTPRINT

OPPORTUNITIES FOR EUROPEAN HOSPITALS & HEALTH SYSTEMS



Health Care Without Harm

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CONTENTS

INTRODUCTION

CLIMATE CHANGE, HEALTH, AND THE HEALTHCARE SECTOR

Climate change is linked to an increase in the frequency and intensity of extreme weather events. This means more heat waves, changing rainfall patterns, rising sea levels, wildfires, drought, and intense cold spells. The exacerbation of these events can have a direct or indirect effect on human health by disrupting ecosystems, agriculture, food and water quality and availability, air quality, and damaging infrastructure.[1] In turn, the disturbance of these systems can directly affect human health by causing heat-related illnesses, infectious diseases, cardiovascular diseases, injuries, and respiratory diseases. Climate change is already contributing to the global burden of disease and premature deaths.

Climate change induced events place great burden on health systems to cope with the consequences of such events. These range from a hospital's ability to support a flood of patients after an extreme weather event, to the potential damage to infrastructure, or the ability to control infectious diseases. The burden of responsibility that lies with health systems in the face of climate change is enormous. For this reason, strengthening public health services must be a central component of all nations' climate change **adaptation** measures and policies.

According to the World Health Organization (WHO), health systems comprise *"all the organizations, institutions and resources that are devoted to producing actions principally aimed at improving, maintaining or restoring health."*[2] As the organisations that exist to be the protectors of health, the health sector has the moral responsibility and social obligation to be a **leader** in the fight against climate change. This must be done by eliminating health systems' own toxic emissions, and minimising their contribution to harming human health and the environment.

Healthcare infrastructures have a large climate footprint. The approximately 15,000 hospitals across the European Union[3] (EU) have a high demand for heating and electricity and require a large amount of energy for transport, lighting, ventilation, air conditioning, and electric and electronic equipment. Health systems are also major consumers of medical goods and equipment, which are often produced in carbon-intensive processes in the developing world under unsafe, toxic, and unregulated conditions. It is within the role of health systems as health stewards to make responsible decisions that guarantee both human and environmental health throughout their entire supply chain. Sustainable alternatives to health sector-related products and activities - that contribute to the **mitigation** of climate change, save money, and ultimately protect human health - already exist. It is merely a matter of structural transition and policy implementation.

Climate change has been declared the greatest threat to global health of the 21st century; yet responding to this threat is also the greatest public health opportunity.[4] This report sets out to identify the threats that climate change poses to European public health, and the opportunities for action against climate change within the healthcare sector. The report showcases a number of initiatives, including eight case studies of hospitals in Europe and one in Morocco, that are already working towards reducing the climate footprint of healthcare facilities. We hope this report can be used as a guide and inspire other health systems to adopt green practices, and to become leaders in the fight against climate change.

METHODOLOGY

The case studies presented in this report began with a questionnaire. The information entered into the survey by respondents was used to develop the case studies presented in this report. The survey process was then followed up by telephone interviews with the environmental representatives of the participating hospitals and organisations.

The hospitals showcased in this report were hand picked by Health Care Without Harm (HCWH) Europe for their impressive efforts in reducing their institution's climate footprint. These case studies provide examples of current best practices, yet the scope of European hospitals' efforts to address climate change is not limited to these examples.

The report also takes a look at some useful tools and systems developed by the NHS Sustainable Development Unit in England, a behaviour change programme in UK, and a German NGO. Their projects encourage analysis and provide ways forward in tackling the environmental footprint of healthcare facilities. The diversity of programmes and strategies presented in this report demonstrate that reducing an institution's impact on climate change requires collective input from many different sources with different areas of expertise, and a recognition that responsibilities need to be shared.

BACKGROUND

HOW CLIMATE CHANGE IMPACTS HEALTH IN EUROPE

Vulnerable Europe

The impacts of climate change in Europe vary between regions. Europe can expect to see an increase of certain weather events in the years to come.[5,6]

- **Southern and central Europe:** Increased heat waves, forest fires, and droughts;
- **Mediterranean region:** Expected intensification of heat waves, droughts, and wildfires;
- **Northern Europe and The Arctic:** Higher temperatures will cause melting of ice caps, more intense precipitation events, and increased winter flooding;
- **Urban centres:** Expected intensification of heat waves, worsening of air pollution, rising sea levels, and flooding.

Heat waves

The heat wave of 2003 claimed approximately 70,000[7] lives in 12 countries of western and central Europe. In 2010, another heat wave caused an estimated 55,000 deaths in Russia alone.[8] The elderly are most at risk of death from heat stroke and cardiovascular, respiratory, and metabolic disorders that are caused by high temperatures. Without the implementation of adaptation measures, heat-related mortality is expected to increase across Europe, particularly in the South/Mediterranean regions. The European Environment Agency (EEA) predicts that by 2050, heat waves will cause 120,000 deaths per year in the EU alone, and this will create an economic burden on public health of €150 billion.[9]

Air pollution

Rising temperatures aggravate the effects of air pollutants. Recent research by the European Respiratory Society predicts that an increase in temperature of 1°C will produce a 1-3% increase in mortality within the general population, but this will result in a 6.5% increase among people with respiratory illnesses.[10] Given that asthma affects 30 million people in Europe,[11] rising temperatures will have significant impacts. Over 80% of Europeans are exposed to particulate matter (PM) concentrations exceeding the WHO recommended levels, already reducing the life expectancy of each citizen by an average of nearly nine months.[12]

In 2012, 403,000 premature deaths in the 28 Member States of the EU originated from long-term exposure to air pollution;[13] this is equivalent to 8% of all deaths that year.[14] Air pollution is the largest contributor to the burden of disease from the environment and the number one environmental cause of premature death in the EU. Heart disease and strokes are the most common causes of premature deaths due to air pollution, and are responsible for 80% of these deaths, followed by lung diseases, such as cancer.[15] Air pollution also has considerable economic impacts: increasing medical costs, and reducing productivity through lost working days. All of these figures are due to increase as temperatures keep rising and air pollution is aggravated.

Cold spells

Extreme cold spells will continue to be a public health challenge, although winter mortality is decreasing across Europe due to better social, economic, and housing conditions. Nevertheless, inadequate indoor temperatures are a key contributor to rates of cardiovascular and respiratory diseases. Low-income households will continue to be the most vulnerable to deaths and diseases related to cold temperatures due to poor housing conditions and inability to pay for heating. In the winter of 2011, much of Europe was engulfed by a hostile cold front, and poorer populations, particularly the homeless, were the ones to suffer the consequences. More than 300 deaths were reported across Europe, and in Ukraine alone the death toll exceeded 130, of which the majority were homeless people.[16]

Flooding

Increased glacial melting and sea level rise leading to winter flooding, as well as river and coastal flooding, are all expected to increase due to climate change, threatening more than 1.6 million people across Europe. Health effects from flooding range from drowning, injuries, heart attacks, infec-

tions, water-borne diseases, vector-borne diseases, respiratory infections, and psychological problems, as well as health consequences caused by the disruption of services, damaged infrastructure, and loss of food production. Flooding can lead to contamination of drinking, recreational, and irrigation water, and to the disruption of water supply and sanitation systems, as is already happening on a significant scale across much of the developing world. Flooding may also lead to the vast displacement of people.[17]

Drought

Prolonged rainfall shortage and high temperature anomalies often lead to severe drought. This phenomenon is not foreign to Europe. Countries including Belgium, The Czech Republic, France, Germany, Hungary, Italy, Luxembourg, The Netherlands, and Spain have all been affected by droughts. Droughts are expected to increase in duration and severity across the Mediterranean. In 2015, (one of the hottest years in recorded history), Europe was hit by the worst droughts since 2003.[18]

Droughts also contribute to the increased risk of large wild fires, which in turn increase deforestation. In the face of climate change, those regions not currently vulnerable to fires may soon find themselves affected.

Severe droughts can result in food and water shortages, malnutrition, and water and food-borne diseases. Some of these effects are already being felt across Europe. For example, Spain is already seeing a decrease in agricultural productivity, and experts from the region fear that many of the agro-regions will simply dry up and become fruitless deserts. In 2015, Spanish mandarin and clementine farmers suffered a 25% decrease in productivity, and in 2011, maize production across Europe dropped by 13% due to heat-stress. Galicia, in north-western Spain has experienced adverse impacts to its hydrological system due to persistent droughts since 2014.[19]

Droughts can also have indirect effects on human health; they can cause dams to dry up and become inefficient, which may lead to energy shortages that could affect health systems. These systems must be prepared to cope with the adverse effects of periods of severe drought.

CLIMATE CHANGE AND HEALTHCARE

Financial burden

The environmental and health impacts of climate change place great financial burden on health systems, and can also place substantial economic strain on local, national, and global economies.

The health sector is a highly carbon-intensive sector that uses a lot of energy for all of its functions and activities. These basic activities can have an impact on the budget of hospitals and health ministries when their demand increases in times of climate-related stress. An over-extended health system can have an overwhelming financial burden on a nation's economy. The WHO estimates there will be an increase of $2 to $4 billion USD in annual health sector costs by 2030 as a direct result of the adverse effects of climate change on human health (excluding indirect costs from impacts on agriculture, sanitation, etc.).[20]

During extreme weather events, hospitals and health institutions may become physically damaged, resulting in significant re-construction costs. Health professionals are also at risk from the everyday threats of climate change, such as aggravated air pollution and the spread of climate change-related diseases in hospital settings. This reality may result in more staff having to take sick leave, thus reducing productivity and causing economic loss.[21]

Capacity

The vulnerability of health professionals to climate change events is particularly important due to the crucial role that they play in a hospital's disaster response systems. Measures must be taken to minimise the risk to health workers, in order to maintain high productivity for both human health and economic efficiency.

The increased frequency and intensity of climate change-induced events can lead to some social, health, and emergency organisations and systems being unfit to cope with the consequences of such events. Having stable access to energy, clean water, food, and all other medical resources is indispensable.

As well as the burden that climate change places on health systems - which threatens their ability to serve their communities - other unexpected consequences, such as a surge in mass migration, must also be considered as a real and pressing factor that will increase the financial burden on health systems, while impacting their ability to respond to the health impacts of climate change.

Migration burden

Climatic variability has long had an impact on global migration. Throughout history people have abandoned their homes in times of deteriorating environmental conditions. Whether from sudden natural disasters, such as floods and landslides, or disasters that cause more gradual environmental degradation (such as droughts and sea level rise), climate change undoubtedly contributes to the mass displacement of people.

Migrants are highly vulnerable to both communicable and non-communicable diseases during their journey and adaptation to a new location. They often experience socioeconomic inequalities and related stress that can lead to poor daily habits, such as unhealthy diet and physical inactivity, use of tobacco, and harmful consumption of alcohol. Many migrants avoid seeking medical attention due to fear of police arrest, language barriers, inability to pay for treatment or, ultimately, fear of deportation. Avoiding medical attention not only puts migrant`s health and potentially lives at risk, it can also become a great threat to their communities if they suffer from a communicable disease. Although the provision of healthcare for all is a human right that requires nations to provide care to all citizens, legal status is the main barrier to a migrant's access to health services.

In light of the worsening adverse effects of climate change being felt all across the globe, climate induced migration is bound to continue and potentially accelerate. For the sake of public health, it is urgent that all citizens, including undocumented migrants, receive necessary medical attention. Health systems must enhance their ability to deliver "migrant-sensitive" care by guaranteeing the ability to support a greater capacity of patients, by including cultural and interpretation services, and by pushing to remove the social, legal, and economic barriers that lead migrants to refrain from seeking medical care.[22]

HEALTHCARE'S CLIMATE IMPACTS

It is now widely recognised that the excessive burning of fossil fuels across all sectors is a major contributor to the accelerated rate of global warming we are experiencing today, and the health sector is a major emitter of greenhouse gasses. For example, in 2012, the total carbon footprint of England's public healthcare sector was 32 million tonnes of carbon dioxide equivalents ($MtCO_2e$) (CO_2 equivalent refers to a combination of harmful greenhouse gases, not just carbon dioxide), accounting for 38% of public sector emissions in England.[23] This serves to illustrate how the healthcare sector is contributing an enormous amount of harmful emissions, which in turn undermines the health of the same population the sector is meant to heal. The scope and size of health systems varies across all regions of Europe. Nevertheless, regardless of their size, health systems and all of their activities and services have an important influence on their communities and their surrounding environments.

In the following section, we describe some of the health sector's most intensive greenhouse gas (GHG) producing activities.

Procurement

The EU healthcare sector, which provides care across the 28 Member States, is a major public purchaser of goods and services. In the process of treating patients, the healthcare sector consumes significant amounts of energy, water, building materials, food, pharmaceuticals, and medical devices, and produces vast amounts of waste. The processes, supply chains, and end uses involved in this consumption create health risks and can have serious environmental impacts.

The majority of the healthcare sector's CO_2e emissions come from the procurement of goods and services.[24] While hospitals might be working to cure diseases at home, the carbon-intensive production of medical products and pharmaceuticals is often simultaneously polluting the air, water, and soil of developing nations across the globe, while also contributing to the health impacts of climate change.

Sustainable procurement practices (by which authorities, including hospitals and health systems, address green and social/ethical considerations in all purchasing practices throughout their supply chain)[25] are becoming more commonplace in European hospitals, and expectations for health systems to be held accountable for the GHG emissions of all activities throughout their value chains are growing.

Pharmaceuticals

Hospitals are by far the largest contributors of CO_2e emissions within the health sector. The second largest polluter, providing goods for the health sector, is the pharmaceutical industry. For example, in the case of the National Health Service (NHS) in England, the entire life cycle of pharmaceuticals accounts for 22% of the their total CO_2 emissions. The CO_2-intensive activities of the pharmaceutical industry include water use, energy consumption in buildings, manufacturing processes, and disposal of waste.

While the majority of pharmaceutical pollution takes place outside the hospital setting, expectations for health systems to take responsibility for the full carbon footprint of their value chains is growing. There is also growing pressure for the pharmaceutical industry to adopt more sustainable strategies to reduce their carbon emissions and to clean up their production sites. Due to resource scarcities, the strengthening of environmental regulations, and concerns about reputation, companies are being driven to explore solutions. The health sector can also contribute by ensuring sound prescription and drug management practices to minimise waste are in place.

Energy and buildings

A major contributor of GHG emissions within health systems is the high-energy consumption of buildings and medical procedures. Hospitals need to have an uninterrupted power supply for heating, cooling, lighting, ventilation, medical treatments and devices, cleaning, and much more. Health systems also rely heavily on the use of secondary generation capacity for emergency uses.

A Health and Environment Alliance (HEAL) expert assessment found the health impacts caused by coal power plants in the EU cost between €15.5 to €42.8 billion per year in total health costs, and cause approximately 18,200 premature deaths each year.[26] With astounding numbers such as these, health systems have the moral obligation to make a full transition from the use of dirty energy to clean, renewable energy sources that can help protect public health from climate change. Health systems can also reduce their carbon footprint by reducing energy consumption through a series of efficiency measures. Combined, greater efficiency and the transition to renewable energy can also help to improve outdoor air quality, which directly benefits human health by reducing harmful chemicals emitted from fossil fuel combustion and electricity generation.

Transportation

The burning of gasoline and diesel fuels used to power motor vehicles produces large amounts of CO_2 and also releases traces of methane (CH_4) and nitrous oxide (N_2O), which are even more potent and harmful greenhouse gasses. Hospitals and other health facilities rely on transportation systems to transport patients, families, staff, supplies, and waste. Therefore, the careful evaluation and redesign of hospital transportation systems and the transition to less polluting vehicle fleets can have significant climate change mitigation benefits.[27]

Food

Emissions from food consumption take place at all stages of the food supply chain: agriculture, manufacturing, transportation, consumption, and disposal. It is estimated that agriculture in Europe accounts for around 15% of GHG emissions from all EU food production. In agriculture, GHG emissions result from the cultivation of certain crops, from livestock excretion, and from the use of petroleum-based resources such as fertilisers, pesticides, herbicides, and fuel used for farm operations, processes, and transportation. Food waste is a major avoidable contributor to GHG emissions; when food is wasted, all of the resources used in it's production and supply are also wasted. According to the European Commission, the EU wastes around 88 million tonnes of food each year.[28]

Apart from providing care to patients, health systems are also significant providers of food services. Hospitals offer their staff and patients at least three meals a day, and in some EU nations the average number of meals per day is even higher. Therefore, the food that hospitals choose to procure and the way it is produced, processed, and transported can have a profound effect on the environment. Also, taking into account the health benefits of providing healthy, organic, and sustainable food, health systems have the opportunity to both reduce carbon emissions from food and improve human health.

Waste

Health facilities create significant amounts of daily waste of all types of materials, ranging from recyclable materials such as paper, plastics, and metals, to compost materials, electronics, chemicals, pharmaceuticals, and other waste considered hazardous. Many of these materials must undergo special treatment and disposal methods, in order to reduce harmful impacts on humans and the environment.

Waste that is classified as hazardous is a minor part of healthcare waste. Globally, materials that are classified as similar to domestic waste make up between 75% to 90% of hospital waste.[29] While some of these materials get recycled, much of the waste is disposed by landfilling or incineration.

Incineration of healthcare waste produces mainly gaseous emissions, including steam, carbon dioxide, nitrogen oxides, a range of volatile substances (e.g. metals, halogenic acids, products of incomplete combustion) and particulate matter, plus solid residues in the form of ashes.[30] All of these harmful gases contribute to air pollution, increasing the burden of disease.

EXPECTATIONS FOR THE HEALTHCARE SECTOR

In July 2016, participants attending the World Health Organization (WHO)'s Second Global Conference on Health and Climate proposed key actions for the implementation of the Paris Agreement to reduce health risks linked to climate change (please see the Climate Policy chapter for more information about the Paris Agreement). This conference set a health action agenda for the implementation of the Paris Agreement, and included specific recommendations for the healthcare sector, arguing that health systems can *"lead by example, advancing models of low-carbon health care that improve access to health care services, reduce occupational and environmental health risks and save energy costs."*[30] Similarly, the 2015 Lancet Commission on Health and Climate argued that by moving toward low-carbon health systems, healthcare can mitigate its own climate impact, become more resilient to the impacts of climate change, and lead by example.[31]

Mitigation

As the sector that exists to promote and maintain human health and well-being, the health sector has the challenge, opportunity, and moral obligation to lead by example and act on climate change by reducing its own carbon footprint. The health sector not only provides healthcare, it is also a major employer, landowner, purchaser of goods, and a provider of energy-consuming services, such as 24-hour hospital care and transportation. Across all of their activities, health systems have the opportunity to adopt and engage in sustainable practices that are beneficial to the environment, reduce health risks, and save money. To honour its commitment to the Hippocratic Oath – First, do no harm – the health sector should take on the responsibility of moving away from fossil fuels, so that its practices and services, the products it consumes, and the buildings it operates, do not harm human health and the environment.

Resilience

Healthcare infrastructure and services need to become increasingly resilient to all possible climate-related conditions, such as extremes of heat, cold, droughts, and storms. There are many different measures that must be implemented in order to become more resilient. Vaccination programmes and the monitoring of sanitation, waste, and water are necessary to build resilience to infectious diseases and strengthen environmental health services. The healthcare sector must strengthen early warning and disaster response systems and build climate resilient infrastructure. Health systems must also be prepared to support a greater influx of patients. It is vital that health professionals receive the necessary training to act as a protective force in emergency situations.

Leadership

Health systems must play a strong leadership role in advocating for health, in order to encourage and engage the support of different sectors and members of the government, industry, and civil society in the implementation of effective adaptation and mitigation policies. This influence can take many forms. For example, health systems and professionals, in their role as health stewards, can provide evidence-based information for the establishment of norms and standards for the transition from fossil fuels to clean, renewable energy, and the green and ethical procurement of goods and services that can be legally enforced, locally, nationally, and internationally.

Health professionals have expertise, resources, and knowledge; they are often sought out for a reliable opinion regarding the health effects of climate change. Therefore, their participation in advocacy activities adds immense value to the fight for adaptive and preventive action at both policy and community level. From providing public education inside health clinics, to participating in educational programmes on topics such as personal hygiene and nutritional advice, to publicising the health risks of climate change for political leverage, health professionals have great capacity to spread knowledge and awareness across communities, and to influence the political momentum of climate change policies.

It is under these three pillars – mitigation, resilience, and leadership – that we have developed case studies from European hospitals (including one from Morocco) that are addressing climate change. While there is still much work to be done to significantly reduce the health sector's climate impacts, many lessons can be learned from the following case studies, which provide a wide and diverse set of strategies to reduce healthcare's climate footprint.

CASE STUDIES:
WHAT EUROPEAN HOSPITALS ARE DOING TO TACKLE CLIMATE CHANGE

Klinikum Neukölln, Berlin

- FRANCE -

ASSISTANCE PUBLIQUE - HÔPITAUX DE PARIS

ABOUT

Assistance Publique - Hôpitaux de Paris (APHP) is the largest hospital group in Europe, delivering medical care, research, and education across the region of Paris at its 39 hospitals. APHP has more than 22,000 beds, including 350 in intensive care facilities. On a yearly basis, APHP medical teams offer advanced treatments in all medical disciplines to 7 million patients – including 5 million medical consultations and 1.5 million hospitalisations (roughly 10% of all hospitalisations in France). With 95,000 health professionals, including doctors, researchers, paramedics, administrative staff and workers, the APHP is the largest employer in the Paris region.

ASSISTANCE PUBLIQUE HÔPITAUX DE PARIS

LEADERSHIP

Given the size of their network, APHP understands the influence it can have in swaying public health and climate change policies across the Paris region and is constantly working towards the implementation of them. From setting up research projects on energy management with the City of Paris, to developing new techniques on renewable energy consumption, APHP seeks to create awareness about sustainable development and climate change issues among health professionals and concerned government stakeholders.

In partnership with the Centre Hospitalier Universitaire de Bordeaux and Centre Hospitalier Universitaire de Rennes, APHP initiated the Mobility Day of University Hospitals in France, aimed at gathering professionals working on sustainable development in the healthcare sector to exchange and promote innovative sustainable mobility practices. This has become an important day for strengthening the health sector's collaboration with the City of Paris. At the event, hospitals and other public services, such as the city postal service, present their programmes of active mobility to inspire sustainable travel across the city. The second annual conference took place on 23rd September 2016 in Paris.

At the European level, APHP participates in the European research project STREAMER,[32] which aims to curb energy consumption and GHG emissions of new and renovated health facilities by 50% within 10 years. Using building information modelling technologies, the project sets out to develop innovative designs for sustainable buildings. Currently, the pilot project is developing models for the Georges Pompidou Hospital in Paris.

APHP is playing a key leadership role in promoting environmental policies within the Parisian health sector. In light of the increasing awareness of the impact of climate change on human health, APHP acknowledges its responsibility to develop initiatives that reduce GHG emissions across all of its activities (including those emanating from its supply chain) in order to protect the health of its patients. Through increasing its efforts to address climate change, APHP creates momentum through its relationship with the French Federation of Hospitals to influence national policies that will pave the way for a more sustainable healthcare sector in France.

To this end, APHP is developing more sustainable policies for many of its polluting activities. In waste management, it is working towards more systematic sorting of 18 different kinds of waste, and seeking to reduce packaging. APHP has also established a working group composed of medical professionals to raise awareness and find ways to minimise carbon emissions from the procurement of pharmaceuticals. APHP expects to implement sustainable development policies across its many activities, and to develop solid programmes and strategies for the reduction of GHG emissions in years to come.

Transportation

APHP seeks to facilitate the use of alternative means of transport for its employees in order to optimise intra-hospital travel and to reduce its carbon footprint. It has put in place a travel and commuting plan in each hospital of the APHP network. The aim is to promote environmentally-friendly means of transportation, and to replace each vehicle with an electric or hybrid option. APHP also encourages employees to reduce the use of personal vehicles through the use of *Velib* (a network of shared bicycles)[33] and *Autolib* (an electric car-sharing programme),[34] and has also put in place a carpooling system for all its employees.

Building

As part of its efforts to reduce its carbon emissions in its hospitals, APHP has also partnered with the French Environment and Energy Management Agency (Agence de l'Environnement et de la Maîtrise de l'Énergie, ADEME). It is working to implement the High Quality Environmental standard (a standard for green buildings in France), and reduce its energy consumption by 20% by 2019, compared to its 2013 levels. ADEME provides financial assistance for projects, work review services, and recommendations for specialised consulting organisations.

Institut E3M: Institute of Endocrinology, Metabolic Diseases, and Internal Medicine, Paris, France

CENTRE HOSPITALIER DE NIORT

ABOUT

Centre Hospitalier de Niort is the largest public health facility in the Deux-Sèvres region in Western France.[35] The hospital is made up of one general hospital and a psychiatric unit, has 1,295 beds, and employs more than 3,300 health professionals.

MITIGATION

The hospital emits 44,165 tonnes of CO_2e per year from its collective activities. In order to reduce carbon emissions, the hospital has implemented policies in line with the United Nation's Agenda 21, which is a non-binding, comprehensive plan for sustainable development.

Centre Hospitalier de Niort was the first public health institution in the region of Poitou-Charentes to launch such a sustainable development approach in 2010. To this end, three committees were established: a steering committee to develop a sustainable development strategy and action plans, a partnership committee, and a technical committee to monitor the carbon footprint. Moreover, every employee was invited to participate in working groups to develop strategies for implementation of the sustainable development policies for the hospital.

The hospital set a goal to reduce CO_2 emissions by 15% by 2020. In 2014, Centre Hospitalier de Niort replaced its gas heater with a new system fuelled by wood. This change helped Niort to exceed its target, having reduced emissions by 25% compared to 2010 levels (see Table 2). As a result, the target was reviewed in 2010 and 2014, and it will be reviewed again in 2018.

Transportation

Implementing effective travel policies is a key objective for Niort Hospital. A 20% reduction target in emissions from transportation has been set. In parallel to working to meet this target, the hospital seeks to solve parking problems that the staff encounter. In March 2013, the hospital launched its travel and parking plan, aimed at reducing unnecessary travel and solo car journeys. It has also sought to promote environmentally-friendly means of transportation, such as carpooling, and by gradually replacing hospital vehicles with electric or hybrid options.

Waste management

Overall, the hospital produces about 1,325 tonnes of waste per year (see Table 1). The hospital separates oils, paper, cardboard, green waste, toxic waste from laboratories, common industrial waste, scrap metal, computer waste, batteries, neon bulbs, wood, and rubber. The current waste policies encourage the sorting of waste in order to minimise the quantities of materials going to landfill or incineration, and instead re-use or recycle them as much as possible.

To encourage recycling, Centre Hospitalier de Niort has developed an awareness campaign for personnel in order to educate them about sorting waste. Educating the workforce is challenging, but is the most important element to achieve effective implementation of waste management separation systems. The hospital has started auditing their various departments, and has established treatment systems with external waste collectors for specific materials, such as cardboard and plastic for recycling. There are over 30 sorting streams to promote the recycling of more waste and to help find ways of processing specific materials. Vegetable waste is treated in industrial composting units that belong to the city of Niort.

TABLE 1: ANNUAL WASTE PRODUCTION

Type of waste	Amount (in tonnes)
Healthcare waste	229
Household waste	750
Paper & cardboard	120
Vegetable waste	99

Positive energy buildings

A significant contribution to the sustainable development programme at the Centre Hospitalier de Niort was the decision to commission a positive energy building. Positive energy buildings generate their own energy for consumption but also create surplus energy that can be used for other purposes (such as running electric vehicles or providing power to the grid). Construction of such a building began in February 2014, and was completed in October 2015.

Located 30km from Niort, in the city of Parthenay, this building was built to reduce the amount of patients travelling to Niort for consultations. The building is a day hospital and houses consultation offices, care facilities, and activity rooms for patients.

With the first positive energy building in the Poitou-Charentes region, the hospital succeeds in producing an amount of renewable energy greater than the energy consumption of the building. In 2013, the planned hospital building won an award in a project launched by the region and Agence de l'Environnement et de la Maîtrise de l'Energie, ADEME, in the National Research and Experimentation Programme on Energy in Buildings.

How is this achieved?

Environmental concerns were considered during the project design in order to incorporate them into the construction of the building. The hospital was built to maximise natural light and to reduce primary energy consumption. The facade is covered by wood certified for solar protection. Safe linoleum materials were used, as well as paints without any volatile organic compounds. A new boiler installed in September 2014 is fuelled with wooden pellets and generates 3.1 MW of power. There is double-flux ventilation throughout the entire building, which helps heat and cool the building more quickly.

In 2015, the hospital also installed 228 m^2 of photovoltaic panels on its rooftop, producing 39,500 kWh annually and offsetting the building's energy consumption. These panels produce surplus electricity that is then sold to the general electricity grid. The total energy consumption of the building is 53,046 kWh, across a surface area of 1,596 m^2 (33 kWh/m2).

TABLE 2: CO2 EMISSIONS OF GENERAL HOSPITAL FOR SELECTED YEARS

Year	Fuel	Emissions tCO_2	% Reduction
2010	Gas	5,475	
2014	Gas/wood	4,204	-23%
2015	Wood	577	-89%

The positive energy building at Centre Hospitalier de Niort, Parthenay

BUND FÜR UMWELT UND NATURSCHUTZ DEUTSCHLAND – THE BUND "ENERGY SAVING HOSPITAL" LABEL

LEADERSHIP

The "Energy Saving Hospital" label[36] was established in 2001 by BUND (Bund für Umwelt und Naturschutz Berlin e.V., also known as Friends of the Earth Berlin), a German NGO active in environmental policy. It is awarded to German hospitals that have achieved outstanding results and engagement in the fields of energy saving and climate protection.

Bund für Umwelt und Naturschutz Deutschland

BUND

FRIENDS OF THE EARTH GERMANY

The label is initially granted for five years to hospitals that:

a. implement an **energy management plan** (including designating an energy officer, providing for collection and validation of data and costs, regular inspection of facilities and equipment, and implementing a list of recommendations) and:

b. demonstrate compliance with at least two of the following criteria:

- → Reduction of CO_2 emissions by more than 25% in the last five years,
  or
- → Continuous reduction of energy consumption compared to the specifications of the VDI-guideline 3807,[37]
  or
- → Long term optimisation of energy consumption in new buildings.

After the initial five years, the label can only be extended after an external audit identifies continuous improvements and compliance with the criteria, and the adoption of a further minimum target of 5% reduction in energy consumption over the following five years.

Today, 45 German hospitals have received the BUND label. Overall, 65,000 tonnes of CO_2 emissions per year have been saved. This translates into the reduction of 22,000 MWh electricity per year, and 140,000 MWh of heat per year. Through the implementation of BUND label criteria, a single hospital could save at least €100,000. One hospital in Berlin saved up to €2.1 million per year in energy costs by implementing BUND's energy saving solutions. **More than €20 million per year has been saved by all 45 hospitals bearing the BUND label.** Participating hospitals can also take advantage of a growing network where they can exchange views and experience, and learn from other success stories to further improve their hospital's energy efficiency.

Top image: 2013 BUND Label ceremony for Franziskus Clinic, Berlin & Havelhöhe Clinic, Berlin

Bottom image: Clinic Mühlacker, Germany

The "Energy Saving Hospital" Label - Case studies

EVANGELISCHE ELISABETH KLINIK in Berlin is one of six hospitals that belong to the hospital group Paul Gerhardt Diakonie. It is a small hospital with 150 beds, and receives 21,400 patients each year. Based on 2014 data, this hospital consumes about 5,600 MWh energy, and emits around 1,800 tonnes of CO_2 each year.

Through the implementation of energy efficiency policies for electricity, heat, and water consumption, Elisabeth Klinik has achieved a significant reduction in energy use. In 2016, the hospital paid €250,000 less in energy costs than in 2010.

Reduced CO_2 emissions:

- **2000 to 2004:**
  CO_2 reduction of approximately 30% (c. 615 tonnes per year)
- **2004 to 2009:**
  CO_2 reduction of approximately 8.2% (c. 141 tonnes per year)
- **2009 to 2015:**
  CO_2 reduction of approximately 7.3% (c. 142 tonnes per year)

While the hospital made significant reductions in the first award period between 2000-2004, it becomes much more of a challenge to achieve further CO_2 reductions in the second and third award periods on top of savings already achieved.

LWL LIPPSTADT is a hospital of the Regional authority of Westphalia Lippe. The hospital has 862 beds and cares for 2,370 psychiatric patients per year. Based on data from 2015, the hospital consumes 23,470 MWh energy and emits 5,140 tonnes of CO_2 each year.

Through the implementation of energy efficiency policies for electricity, heat, and water consumption, Lippstadt hospital has made significant reductions in their energy use.

Reduced CO_2 emissions:

- **2000 to 2005:**
  CO_2 reduction of approximately 40% (c. 7,400 tonnes per year)
- **2005 to 2010:**
  CO_2 reduction of approximately 10.9% (c. 872 tonnes per year)
- **2010 to 2015:**
  CO_2 reduction of approximately 14.6% (c. 929 tonnes per year)

Between 2010 and 2015, it has saved a total of €170,000 though energy saving strategies.

BUND'S KLIK PROJECT - "DEVELOPING CLIMATE MANAGERS IN HOSPITALS"

LEADERSHIP

Following on from the success of the label project, BUND also led a project to help hospitals to develop climate strategies. The initiative is called KLIK[38] (Klimamanager für Kliniken) and exists to develop and train employees in hospitals to be climate managers. Funded by the National Climate Protection Initiative (Nationale Klimaschutzinitiative), the KLIK project began in 2014, and ran until the end of 2016. The focus of the project was to increase energy efficiency in hospitals through low and no-cost measures.

Germany has 3,183 hospitals, which collectively consume 12.5 million MWh of heating and 3.9 million MWh of electricity, accounting for a total spending of approximately €1.7 billion each year. Numerous opportunities exist to save energy – and costs – given the diversity of energy use in healthcare settings. While saving money is an obvious incentive, hospitals also have the opportunity to be leaders in energy efficiency in the public sector. This is what KLIK set out to do: mobilise climate managers across the German health sector to guide their institutions towards more efficient and energy saving systems.

The specific goals of the KLIK project were to:

- maximise the energy saving potential of hospitals;
- train and qualify 50 climate managers in the German health sector;
- establish an internal network of climate leaders in every participating hospital;
- publish an online guidebook for hospitals;
- create a database with examples of best practice; and
- reduce CO_2 emissions by approximately 30,000 tonnes, mostly through non- and low-investment measures. This meant reducing energy costs by approximately 6% to 10% per clinic.

Of the 51 hospitals that participated in the KLIK project, 34 were public, 14 were charities, and 3 three were private hospitals.

The success of the energy saving solutions of the KLIK project was very much determined by the commitment of the climate managers, and successful implementation was reliant on strong leadership. For this reason, climate managers needed to fulfil some important criteria, such as being anchored in internal hospital structures. This could be an administrative role, or a technical or quality management position, but the leader required an affinity for climate protection issues, and also the authority to make decisions, changing some rules or procedures if necessary.

Of the hospital participants in the KLIK project, 21 climate managers were technical leaders, 19 were technical qualified employees, three were administration managers, and three held other positions.

Within three years, all participating hospitals reduced their CO_2 emissions by approximately 34,500 tonnes collectively. At the same time, energy costs decreased by €9 million. Measures were carried out in a number of areas such as: ventilation, cooling, heating, lighting, and consumer behaviour. The greatest reduction of CO_2 emissions were achieved in ventilation – approximately 3,000 tonnes per year.

An online guidebook with tips and results is available on the KLIK website (in German).[39] From 2017, other (German) hospitals will be able to join the network[40] which will continue to host seminars and workshops.

KLIMAMANAGER FÜR KLINIKEN

Solar panels on the exterior of Clinic Mühlacker, Germany

VIVANTES KLINIKUM NEUKÖLLN

ABOUT

Klinikum Neukölln is one of the nine hospitals that make up the Vivantes hospital network. Located in central Berlin, it is an acute hospital with multiple specialist centres, covering traumatology, lung cancer and thorax conditions, gastroenterology, and neurology, amongst others. The clinic has 1,288 hospital beds, and cares for 125,000 patients each year. With a large workforce of 400 doctors and 750 nurses, Neukölln also has the largest emergency department in Berlin, with 77,000 cases per year. In order to provide for this wide scope of specialised and emergency care, the hospital has a high energy demand. Klinikum Neukölln has taken it upon itself to become a leader in energy efficiency.

Vivantes

MITIGATION

Energy efficiency

In 2003, energy saving goals were set in accordance with the BUND label for *"Energy Saving Hospitals" (see pages 20-21)*. In the past, energy conservation was primarily achieved by the replacement of energy-inefficient facilities and devices. Today, Klinikum Neukölln is also attempting to improve energy conservation through construction projects. The hospital is currently working on a reconstruction strategy where a key objective is the integration of energy-efficient technologies in a long-term strategy to reduce GHG emissions.

In 2003, when Klinikum Neukölln began its energy saving efforts, the hospital consumed 103,092 MWh of energy, and produced 31,227 t CO_2 emissions. In 2015, after 12 years of implementing energy efficiency solutions, the hospital consumed 52,057 MWh of energy and produced 17,927 t CO_2 - a 43% reduction in emissions.

Low investment measures

Klinikum Neukölln has implemented a variety of different low investment measures to improve energy efficiency, many of which are simple measures to guide behaviour change towards more conscious energy use. For example, by attaching thermostatic valves to radiators, the hospital is able to better monitor and control the temperature levels of the building. These valves have locking devices which allow radiators to be set to a specific level, which is very important when an increase in temperature of 1°C means a 15% increase in heating costs. At first, hospital staff were unhappy with lower temperatures in the buildings and this resulted in valves being disassembled. However, through capacity building and awareness raising, the new system was soon accepted by all.

The hospital also replaced all permanent lighting with more efficient fluorescent tubes. Klinikum Neukölln has approximately 10,000 lights throughout its buildings, creating great opportunity for easy energy saving. The costs of this measure were paid off in only eight months.

Another strategy was to optimise lighting by automatically cutting off lights after three minutes in areas with low transit, such as staircases, and throughout the hospital during sleeping hours. Along with signs on light switches to educate patients and staff to turn off unnecessary lights, these ideas have proven to be valuable methods of conserving energy.

Another energy-saving approach came from merely adjusting the air conditioning units during low-transit hours, and shutting them down in the operating suites at night. Neukölln uses residual heat from sludge and blowdown water from boilers for heating, while also making the most of residual heat by using recovery systems in midsummer to power air conditioning.

In order to save energy through reduced water consumption, the clinic installed 200 waterless urinals for staff and visitors (not for patients). Additionally, the replacement of older water circulation pumps with highly efficient pumps has been a significant contributor to the clinic's increased water and energy efficiency.

Maintenance is crucial to maximise efficiency, and Neukölln carries out daily checks and maintenance of equipment consuming electrical energy. For example, it is critical to check that fans are running at full load, and to make sure that ventilation systems are clean in order to reduce power consumption.

High investment measures

Higher investments can contribute to much greater energy savings. In 2010, the Klinikum Neukölln modernised its refrigeration equipment, replacing the old steam-heated absorption refrigeration system with three new screw compressors powered by electricity. This replacement required an investment of approximately €4 to €5 million, but this new system has helped Neukölln reduce the costs of gas supply by €400,000 per year, and reduce annual power consumption by approximately 2 million kWh.

The whole Vivantes network has switched to green electricity. At Klinikum Neukölln, a photovoltaic system was installed on the roof. The system achieves an output of 50.54 kilowatts peak (kWp). It produces 45.5 MWh of electricity and saves 30 tonnes of CO_2 per year. Excess electricity generated is fed into the public electricity network to be used for the energy demand of Berlin. Through all of these policies and improvements, Klinikum Neukölln has become "the energy saving hospital" of the Vivantes network. Considering the development of energy markets and the value of energy resources, there has been a saving in the hospital's energy demand of approximately 2% to 3% per year.

Since 2003, Klinikum Neukölln has prevented over 100,000 tonnes of CO_2e emissions, saved 400,000 MWh of energy, and approximately €23 million in energy costs. In 2014, Neukölln consumed 60% less energy than in their baseline year of 2003.

RESILIENCE

Klinikum Neukölln has implemented particular infrastructure projects to support healthcare in the case of emergency situations. The main parts of the hospital are equipped with autonomous electricity, water, and heating supply systems. The emergency generators are able to supply the hospital with electricity for up to five days. The boilers for central heating are normally fuelled by city gas, but in emergency situations, they can be fuelled by oil reserves kept at the hospital.

To cope with extreme heat events, the hospital built its air conditioning unit with a higher capacity than is typical. This system has sufficient reserves to cool the hospital buildings, including medical functional areas and intensive care units, in periods of extreme heat. The technical system is manufactured for outdoor temperatures up to 40°C.

Taking into account possible situations of water scarcity or contamination, Klinikum Neukölln has its own water tower and deep well to provide a safe supply of water.

Aerial view of Klinikum Neukölln

Solar panels at Klinikum Neukölln

CENTRE HOSPITALIER UNIVERSITAIRE MOHAMMED VI, MARRAKESH

ABOUT

The Centre Hospitalier Universitaire (CHU) Mohammed VI of Marrakesh is a public institution including five hospital buildings, with a joint patient capacity of 1,548 beds. Currently, it employs around 2,500 health professionals who provide care to 4.5 million citizens each year. In 2016, the hospital conducted 200,000 outpatient consultations, had 172,000 emergency visits, and admitted 48,000 patients for day-care treatment.

Centre Hospitalier Universitaire
Mohammed VI
Marrakech

- MOROCCO -

MITIGATION

In 2014, CHU Mohammed VI began integrating sustainability into its policies, and in 2016, a Sustainable Development Committee was created. The Committee seeks to adopt an integrated, participatory, and responsible approach to sustainability, and to promote a culture of innovation throughout the hospital's policies. In 2014, CHU Mohammed VI was awarded by the Quebec Council of Accreditation with the "Milieu Novateur" certification ("Innovative Environment"), which recognises the cultural shift.

The Sustainable Development policy sets social, environmental, and economic objectives, which include:

- reducing greenhouse gas emissions and improving the energy efficiency of buildings;
- promoting products and processes that are more respectful of the environment;
- promoting source reduction, reuse, sorting, recycling, recovery, and safe disposal of waste;
- supporting the implementation of renewable energy projects;
- applying a responsible purchasing policy that aims to make suppliers aware of Corporate Social Responsibility;
- continuing to improve awareness and communications aimed at reducing consumption and improving energy efficiency;
- developing a sustainable economic development strategy; and
- ensuring the integration of ecodesign principles in new investment projects.

Training programmes are an integral part of the strategy, and the hospital works to raise awareness by developing videos and other communication materials such as flyers and posters, which educate the staff and patients about sustainability.

Energy efficiency & renewable energy

In total, the hospital consumes 9,813 MWh of energy each year. Emissions from energy use in the hospital buildings total 29,478 tonnes CO_2e. CHU Marrakesh has committed to reducing its carbon footprint from energy consumption by 2% each year, compared to 2015 emissions. This will be achieved through the implementation of an energy efficiency policy that will provide staff training and capacity building, reduce energy and water consumption, and improve indoor and outdoor lighting systems.

CHU Mohammed VI has been investing efforts into reducing its reliance on fossil fuels, by increasing its use of renewable sources of energy. This has been a challenging task, as it requires the involvement of several authorities for financial and technical assistance. However, considerable progress has been made.

Renewable energy alternatives have been fitted to hospital buildings. More than 70% of all buildings are equipped with solar collectors that provide solar energy to power the buildings. Renewable sources currently generate about 80 kWp, with a goal to install sources that will provide 200 kWp more by the end of 2016. This project is costing approximately 4 million Dirhams (€372,900). CHU Mohammed VI seeks to expand renewable energy targets through increased investment and more clean technology.

The hospital has taken careful consideration of Marrakesh's environment during the construction of the solar plant located on the rooftop of the hospital. As strong winds were a threat to the new installation, the panels were built on a solid metal foundation, constructed to avoid damage. High temperatures have also also posed some challenges; during summer months temperatures can reach 50^{0}C, which resulted in wires being corroded (see image below). Such challenges have meant finding new ways to adapt the transition to sustainable development while meeting the demands of the local environment.

The hospital has also invested in outdoor solar lighting for its parking facilities. This has been done by installing a solar photovoltaic system, which provides 90% of the energy for the outdoor lighting. Solar photovoltaic systems also provide energy for pumping and irrigation processes.

Solar panel plant on the rooftop of the hospital building

Wires on the solar panel plant corroded due to extreme heat

Water conservation

To reduce water consumption, new water-efficient low-flow plumbing fixtures have been installed. While the older toilets used between 20 to 25 litres of water each flush, this new system uses only six litres per flush.

Procurement

Through changes in the procurement of medical devices, technical installations, construction materials and supplies, CHU Mohammed VI has reduced its carbon emissions by 15%.

The hospital is working towards ensuring that only what will be used is purchased, particularly for products that increase the carbon footprint. One initiative that has resulted in great reductions in resource use is the implementation of the Hospital Information System, which keeps track of the resource consumption of the hospital. This online tool has been developed internally to track energy consumption, costs, products, and GHG emissions. Its objective is to track progress, resulting in more sustainable management of all hospital activities. The hospital is also transitioning to paperless offices.

Although there have been some notable improvements in the hospitals' purchasing practices, a major challenge remains around the need to improve the Moroccan legislative framework regarding public procurement. For example, currently the state does not allow purchasing of local products, which limits the potential for the development of a sustainable procurement market in Morocco.

Waste management

CHU Mohammed VI produces approximately 260 tonnes of waste each year. It has adopted procurement policies that promote source reduction, recycling, and the recovery of paper and wood products. Treatment of potentially infectious or hazardous medical waste is conducted on-site for all hospitals, using a new treatment system based on microwave technology.

LEADERSHIP

The hospital has undertaken various initiatives as part of its efforts to raise awareness about climate change. It has organised training, seminars, and conferences on various topics including environmental management, energy management, energy efficiency, and waste management.

On the 30th and 31st of October 2014, CHU Mohammed VI held its first annual symposium on sustainable development in the health sector. Sponsored by the Moroccan Ministry of Health and Ministry of the Environment, the event brought together 120 participants from the hospital and scientific community to discuss environmentally responsible healthcare in Morocco and abroad. The hospital is also the first Moroccan member of the international Global Green and Healthy Hospitals network.[41]

In December 2015, CHU Mohammed VI participated in the Conference on Climate Change and Healthcare at the European Hospital Georges Pompidou in Paris, held in parallel with the Paris UN climate change meeting (COP21). CHU then went on to host the Climate and Health Care Conference in parallel to COP22 in Marrakesh in 2016. The event brought together health sector leaders from Morocco, Europe, and beyond to share strategies for the health sector to mitigate its own climate impacts, develop low carbon models of care, and use their voice, both individually and collectively, to advocate for policies to address climate change and public health.

Climate and Health Care Conference participants at CHU Mohammed VI, December 2016

REGION SKÅNE

ABOUT

Region Skåne is the self-governing authority (an elected body) of Skåne, the southern-most county of Sweden. Region Skåne's responsibilities include health and medical services, regional development, environment, public transport, culture, and cross-border and inter-regional cooperation. Region Skåne has eight hospitals, and a number of primary healthcare units and other health facilities. The region is one of Sweden's largest employers with 33,000 employees, of which close to 80% work for the healthcare sector to provide care for 1.3 million citizens each year.

MITIGATION

Renewable energy

In 2009, Region Skåne adopted a fossil fuel-free strategy with the ambition of eliminating the use of fossil fuels by 2020 in all buildings and transportation managed by the Region *(see Table 3)*. This goes far beyond the national climate ambition.

TABLE 3: REGION SKÅNE'S INTERIM TARGETS FOR RENEWABLE ENERGY

Year	Goal
2012	• 60% of heating to be provided by renewable sources • 50% of all transportation to use renewable fuels
2016	• 80% of heating to be provided by renewable sources • 75% of all transportation to use renewable fuels
2020	• 100% of heating to be provided renewable sources • 100% of all transportation to use renewable fuels

Sweden's country-wide target is that all transportation is fossil fuel-free by 2030, whereas Region Skåne aims to become fossil fuel-free by 2020 in both transportation and buildings.

In 2010, Region Skåne's environmental programme was launched in order to strengthen and develop Skåne's internal environmental work. The programme addresses all of the Region's administrative areas, as well as other activities financed by it.

In 2016, Region Skåne's health sector was 86% fossil fuel-free, and well on its way to reaching its target.

The great majority of Region Skåne's hospitals are heated through district heating from local suppliers. Letters of intent have been signed with all eight of the major suppliers of district heating and cooling. These letters stipulate that Region Skåne shall, in close collaboration with the suppliers, find sustainable energy solutions to reach its 2020 goals in terms of heating, cooling, and transportation.

Region Skåne has built a wind turbine park, having undertaken Sweden´s biggest public wind power contracting process to date. The investment cost was €25 million for six wind turbines. These produce 40% of the electricity required by the region's hospitals.

In September 2016, Region Skåne built the largest passive house[42] in Sweden measuring 12,700 m². A passive house is a smart and very energy efficient building that requires special construction techniques in comparison to a conventional building. This passive house is the site of Region Skåne's Forensic Psychiatric Centre; all of its energy is provided from local sources of renewable energy, such as wind turbines, solar cells, solar panels, and geothermal energy. The building produces surplus energy which is used for computers and printers inside the building.

Procurement

Region Skåne purchases vast quantities of goods; many of the products are disposable materials that generate large amounts of waste. The region seeks to make better and sustainable use of resources, to ease the burden on natural resources and reduce greenhouse gas emissions.

EACH YEAR, REGION SKÅNE PURCHASES:

48
million pairs of gloves

32
million paper towels

15
million napkins

6
million aprons

7
million syringes

1.7
million mouth protection masks

300
tonnes of disinfectant, cleaning materials, and dishwashing detergent

350
tonnes of copying paper

The region is increasingly using products made from biomaterials - which consist of raw materials from renewable sources - to replace some plastic materials. For example, as the result of innovative procurement, a supplier has developed more climate-friendly aprons using 91% renewable materials. This product is expected to be launched in 2017.

Trelleborg Passive House

Another strategy for reducing the material's climate footprint is the prevention of unnecessary waste. While reducing single-use items in the health sector is a sensitive issue due to hygiene requirements, there are still strategies that can be applied to reduce the unnecessary wastage of such items. For example, 48 million disposable plastic examination gloves are bought annually by Region Skåne. In one study, the tight packaging of the gloves caused 6% of gloves to fall onto the floor when being opened. These had to be discarded, unused. Region Skåne demanded smarter and higher standards of packaging from their supplier in order to reduce the unnecessary waste.

Region Skåne has also procured a plastic syringe that weighs less compared to the one used previously, which reduces waste and climate impact. If this could be applied throughout to other medical devices, the carbon footprint of these materials would be greatly reduced.

Additionally, the region has developed an online platform called "Products, Environment & Climate" that tracks the climate footprint of products used. The platform was created by the region for internal use and maps the carbon footprint of all of the products used by hospitals in the region in order to identify those with the highest climate impact. All hospitals and individual wards have access so that they can track their own activity. The platform is used to keep an inventory of products and their materials (for example whether they are made of plastic or rubber, etc.) and how much the products weigh. The information inserted into the database is then used to calculate the climate impact of the product. The platform is updated every 24 hours. The health sector uses this tool to decide which products should be replaced with greener alternatives, or which activities can be improved to become less energy-intensive.

These are only some of the steps that Region Skåne has taken to reduce the carbon footprint of its consumables along the entire supply chain.

Apron made from renewable and biodegradable materials

Through more sustainable purchasing practices, Region Skåne wants to prioritise products and materials that are resource-saving and made from renewable materials. The sound implementation of more sustainable purchasing decisions requires a dialogue with the staff using the products, in order to identify areas for improvement. Moreover, Region Skåne's strategy for reducing the carbon footprint of the proucts it purchases is one of active engagement in dialogue with the suppliers in order to demand products with more efficient designs and materials, and which have a lower climate impact.

LEADERSHIP

The LEAN Programme

Region Skåne is inspired by a programme called LEAN,[43] which helps departments find smarter work methods that benefit patients, staff, the environment, and the economy. These working methods promote improvements in all areas of care giving, and guarantee that hospital activities are highly efficient. By tracking a patient's experience during hospital visits, stays, and treatments, the programme seeks to improve the experience through capacity building and environmentally sustainable approaches. The progressive programme's ambition is to lead Skåne's healthcare sector towards a holistic, sustainable, and constantly improving system of care.

Mapping CO_2 emissions

In 2001, Region Skåne was one of the first organisations to study and map the climate footprint of their entire organisation. Ever since, Region Skåne has been finding new and innovative ways to map and reduce its carbon footprint throughout all sectors and activities.

The region is working towards being a forerunner in climate and environmental issues. For example, all the hospitals are working with the environmental management system ISO14001 (the international framework for environmental management systems), towards a common certification by 2018.

Influencing the community and the supply chain

Region Skåne is playing a major leadership role in connecting health and environment throughout the county of Skåne. By setting high standards for environmental objectives for all administrations, this region-wide approach to sustainability creates momentum and a broad incentive for other sectors to follow suit in reducing their carbon footprint.

The region's health sector has also demonstrated the power that hospitals have to influence their supply chain. By demanding more efficient and sustainable products, such as the aprons made with renewable materials, the supply chain is incentivised to explore alternative innovations for greener products.

Region Skåne's ambition and holistic approach to minimising the health sector's environmental footprint demonstrates a clear and inspiring understanding of the relationship between a healthy environment and people's health and wellbeing.

OPERATION TLC (BARTS HEALTH NHS TRUST)

ABOUT

Operation TLC is an award-winning behaviour change programme developed by Barts Health National Health Service (NHS) Trust, together with a behavioural change charity, Global Action Plan. The programme seeks to train hospital staff, providing education and knowledge to help adoption of best practices in areas which save energy and money, while creating a healing environment for patients.

Operation TLC
Creating Healing Environments

ENERGY EFFICIENCY

In 2012, Operation TLC was brought to life by the sustainability team of Bart's Health NHS Trust. The pilot project intended to address avoidable energy-wasting behaviour at the six hospital sites of the Trust, such as leaving lights on in unattended rooms, or high energy-consuming machinery being left on after use. The project sought to find ways to inspire the staff to take control of their environments and be energy efficiency stewards.

The first step of the project was to identify the specific actions that staff could universally adopt in order to tackle the issues that they had identified. These actions focused on three categories: lighting, temperature, and equipment control. Examples of interventions included:

- closing doors and windows to help control heating, which resulted in improved levels of comfort and privacy;
- dimming or turning off unnecessary lighting, and switching off unused equipment - both during day and night. This helped reduce noise, heat, and bright light, which in turn helped patients rest;
- opening blinds so that patients benefited from daylight, rather than relying on artificial light. This helped them follow a more natural sleep cycle.

Four barriers were identified that prevented nurses from taking action:

- Familiarity with the buildings. Staff were often unfamiliar with the layout of the building and with control systems, so they were unaware of how to make the most efficient use of the facilities.
- Lack of expectation. The staff did not know that intervention was expected of them, or that they were even allowed to adjust lighting and control systems.
- Habit and memory. Some staff would simply forget.
- Maintenance and facilities. Sometimes equipment would be broken and would take a long time to fix.

Developing solutions to these challenges empowered staff with the knowledge, confidence, and authority to take control of their building. In turn, by focusing on ways to save energy, the staff began to notice that patient satisfaction was also improving.

Other methods to improve patient comfort were also developed. For example; patients in shared rooms would be constantly disturbed by bright lights every time a nurse came to visit a neighbouring patient. The Trust implemented "Quiet Times" on their wards, which gave patients the opportunity to rest in a dark room for an hour after lunch without disturbances from nurses, visitors, or other patients. Nurses noticed that improving patient's resting conditions also significantly improved the quality of interaction with them. Patients could be more comfortable, get more rest, and this ultimately improved patient and staff relationships, as well as resulting in the saving of energy and money. There are many more examples of simple, low-cost energy efficiency strategies, such as this one, on the Operation TLC website.[44]

Barts Health saved £49,000 (€57,445) in the first year by simply turning off equipment that could be safely switched off during non-working hours, and by placing reminder stickers close to the light switches. Thanks to the Operation TLC programme, in two years the Trust reported one-third less sleeping disruptions and 38% fewer patient requests to change room temperatures, which saved 1,900 tonnes of CO_2 and £428,000 (€501,764).

"It is about taking simple actions that help to give patients and staff a little extra Tender Loving Care."
- Operation TLC[44]

Turn off equipment
Lights out
Control temperatures

Hospital staff pledging their commitment to improving energy efficiency

SUSSEX COMMUNITY NHS FOUNDATION TRUST

ABOUT

Sussex Community NHS Foundation Trust (SCFT) is an NHS healthcare provider based in the South East of the United Kingdom. The Trust employs nearly 5,000 staff and treats approximately 9,000 patients each day. The Trust delivers care from nine community hospitals and 65 health centres across nearly 1,000 square miles (2,600km^2). It has around 400 patient beds, though over 90% of the Trust's clinical activity takes place in patients' homes. The NHS has the largest carbon footprint of the public sector in the UK, and to this, the SCFT contributes 6,400 tonnes CO_2e annually.

- UNITED KINGDOM -

Sussex Community NHS
NHS Foundation Trust

MITIGATION

CARE WITHOUT CARBON

In order to reduce carbon emissions, the Trust has implemented a programme called Care Without Carbon (CWC), which has been created by the NHS for the NHS. CWC is an action plan that provides a simple framework for delivering sustainable healthcare. The programme strategy works to cut carbon, save money, and support staff and patient well-being.

The SCFT aims to reduce its total CO_2 emissions by 34% by the year 2020 compared to 2010 levels, and expects to save £4.75 million (€5.57 million) through the implementation of the CWC strategy. These targets were set as a means to comply with the UK's Climate Change Act, which sets legally-binding carbon reduction targets of 34% by 2020, 57% by 2030, and 80% by 2050, all compared to 1990 levels. The Trust has a long-term objective of becoming a carbon-neutral health care provider.

The CWC programme has driven significant reduction of carbon emissions across the Trust's healthcare activities. Between 2010 and 2016, the Trust reduced its absolute carbon footprint by 1,623 tonnes CO_2e, a 21% reduction in six years.

Energy & water

Sussex Community NHS Foundation Trust, in total, consumes 32,471 MWh of energy. The Trust's buildings emit 4,725 tonnes CO_2e through energy use, making up 74.5% of the Trust's total emissions. Since the implementation of the CWC model, SCTF has reduced its carbon footprint from buildings by 20.6%. This has been achieved through the implementation of a range of energy efficiency measures including boiler replacement, renewable energy technology, improvements to the building management control system, and intelligent lighting controls. With the implementation of all of these improvements across all SCTF buildings, the Trust raised its energy efficiency (measured in kg CO_2e/m^2 floor space) by 28%, and improved its water efficiency (m^3 used/m^2) by 55%.

Transportation

As a community services provider, 90% of the Trust's activities take place in patients' homes. The Trust provides care to 9,000 patients every day over an area of 1,000 square miles (2,600km^2). Therefore, the efficiency of the transportation system is of utmost importance for this Trust, in reducing both emissions and costs.

Implementing sustainable travel policies is a key strategy that addresses all the pillars of sustainability. With clean and efficient transportation systems, the Trust saves money, reduces its carbon footprint, and improves health by reducing pollution and supporting healthy and active travel. Travel is a great example of how simple policies can produce economic, environmental, and health benefits simultaneously.

The Trust's Travel Bureau has been working towards the reduction of CO_2 emissions by supporting staff to reduce their business mileage. Business mileage includes staff journeys to provide care outside the hospitals, as well as to attend meetings and training events.

To reduce unnecessary travel and solo car journeys, the Bureau also provides season tickets for staff who travel to work on public transportation and encourages the use of low-emission alternatives such as car-pooling.

The travel policies have lead to an average drop of 17% in business miles per year, compared to 2010.[45] In 2015, the Trust achieved its lowest carbon emissions for business mileage, reaching a 25% reduction[46] compared to 2010.

Waste management

In total, the Trust produces 685 tonnes of waste per year, accounting for 92 tonnes CO_2e, or 1.5% of the Trust's total measured carbon footprint.

A key aspect of the CWC programme is sustainable waste management, and it is also a category where the SCFT has done impressive work. With an ambitious target of zero domestic waste to landfill, the Trust has reached its goal and is effectively zero-waste to landfill of non-healthcare general waste materials, with a high rate of recycling for most of its municipal waste.

Currently, the Trust landfills the lowest possible amount of healthcare waste, also known in the UK as "offensive" waste. This is waste that is not considered hazardous, but is nonetheless unpleasant and difficult to dispose of, such as nappies, protective clothing, and other hygiene-related waste. This is an element of the current waste management policy that the Trust seeks to improve in the near future, aiming to eliminate all waste to landfill through creative and sustainable strategies.

The Trust categorises waste management as an element of procurement, following the logic that the less materials that are bought, the less materials will need to be disposed of. SCTF began recording the carbon footprint of its waste in 2016, yet does not currently track the carbon footprint of the vast amount of goods the Trust procures. SCTF is currently developing a methodology to measure emissions from procurement and they expect to begin reporting on these emissions in 2017. The Trust seeks to work directly with individual suppliers within their Trust in order to demand the reporting of their supply chain's carbon activities and to work in collaboration with them to meet the reduction targets.

RESILIENCE

SCFT is developing a Climate Change Adaptation Strategy to prepare for the impacts of extreme weather conditions, as part of its comprehensive CWC programme. The Trust is equipped to deal with damage to infrastructure from extreme weather events via business continuity planning, and has developed plans for heat waves and cold weather. The Trust is also working with local authorities to identify the climate change risks at a local level in order to prepare an adaptation plan that will not only be useful today, but also in the long-term.

SCFT staff and vehicle

As a community healthcare provider, the SCTF must have a very reliable transportation system that is able to adapt to different climatic events that might affect the region. To guarantee this reliability of care under all circumstances, the Trust operates a small number of 4-wheel drive vehicles and has provided extensive driver training to its team of courier drivers. On a day-to-day basis, these drivers are responsible for delivering packages and medicines, and posting items to its bases throughout the county. However, under emergency situations, these employees become emergency 4x4 drivers to transport nurses and doctors to crucial locations.

SUSTAINABLE DEVELOPMENT UNIT

ABOUT

The Sustainable Development Unit (SDU) in England was established in April 2008. It is a national unit created in order to develop and promote sustainable development policies for the health and care sector in England (across the NHS, public health, and social care system). Considering the three pillars of sustainability – environmental, social, and economic – the SDU develops tools, strategies, policies, and research, in order to empower the health and social care system to fulfil its potential as a leading sustainable and low carbon organisation.

- UNITED KINGDOM -

Sustainable Development Unit

The healthcare sector in England

The NHS in England employs 1.3 million people, establishing it as one of the top five largest employers in the world. The NHS alone provides care to 54.3 million citizens each year, and cares for over one million patients every 36 hours. The health sector as a whole represents 40% of the English public sector's GHG emissions.[47]

The scope and size of the health and care sector creates an enormous opportunity to use improvements in its operations and its purchasing power to make sustainable choices that will benefit the economy, the environment, and the health of the greater population. These wider benefits are precisely the objectives of the Sustainable Development Unit.

MITIGATION

Carbon Reduction Strategy

Developed in 2009, the Carbon Reduction Strategy was created for the NHS to meet the binding targets set out by the UK's Climate Change Act. The Act calls for a 34% reduction in CO_2e emissions by 2020, and an 80% reduction by 2050, as compared with 1990 levels. The SDU applies these targets to the entire NHS in England and across all types of GHG emissions and is committed to meeting these high standards. The Strategy considers key areas of action such as energy and carbon management, procurement and food, travel, water, waste, designing the built environment, organisational and workforce development, partnership and networks, governance, and finance.

In 2015, the NHS in England achieved an 11% reduction in CO_2e, compared to 2007 levels. The public health and care sector as a whole achieved a 13% reduction. This exceeded the target of 10%, and is especially notable given that healthcare activities increased by 18% during this period. The emission reductions were achieved through a 16% reduction in procurement activities, a 4% reduction in energy emissions, and a 5% reduction in emissions from transportation.

Sustainable Development Strategy for the health and social care system

In 2014, the Sustainable Development Strategy (SDS) was launched to guide the transition towards a sustainable healthcare system by 2020. While the Carbon Reduction Strategy's focus is to reduce carbon emissions, the implementation of the SDS seeks to extend the reach of sustainable practices beyond carbon emissions, and towards the protection of all natural resources and the resilience of communities to the impacts of climate change, with the ultimate goal of promoting and constructing healthy lifestyles and environments.

LEADERSHIP

The SDU has developed a number of policies, tools, strategies, and expert bodies to guide the NHS and the public health and social care sector towards meeting its sustainable development and climate targets. These policies have played a key role in reducing the carbon footprint of the healthcare sector in England. In 2012, the carbon footprint of the NHS and the public health and care sector was 32 $MtCO_2e$; by 2015 this had been reduced to 26.6 $MtCO_2e$. Other tools developed to help NHS organisations include the use of Marginal Abatement Cost curves and a Good Corporate Citizen assessment tool *(see below)*.

Marginal Abatement Cost Curves

Marginal Abatement Cost (MAC) curves are used to identify which carbon reduction measures provide the greatest cost-saving opportunities. This tool condenses complicated data into a graph that illustrates the cost-benefits of carbon-saving measures, and can demonstrate solutions that actually save more money than they cost to implement. A MAC curve analysis shows that the NHS has the potential to save at least £180 million (€211 million) each year by reducing carbon emissions. A MAC curve can be elaborated for any NHS Trust to help them make the right investment decisions that will help them achieve their climate targets.[54]

Good Corporate Citizen

Among these sustainability plans and methodologies is the Good Corporate Citizen (GCC) self-assessment model that allows NHS organisations to analyse their practices in a number of areas and to be able to assess the level of sustainability. 70% of NHS providers have Sustainable Development Management Plans in place, and in 2015, 19% used the GCC assessment model. Through these assessments, the SDU empowers hospitals to be able to monitor and improve their efforts to become sustainable healthcare providers.[55]

The environmental footprint of pharmaceuticals and medical devices

The NHS in England spends £20 billion (€23.5 billion) every year on goods and services, and over £8 billion (€9.4 billion) each year on prescription medicines for primary care alone.[48] Considering the high costs and intensive carbon footprint of the procurement of goods and services, developing tools for sustainable procurement, thereby reducing the footprint, is essential.

In 2012, the procurement of goods and services made up 57% of the GHG emissions of the NHS, public health, and social care in England (18.8 $MtCO_2e$). Of these emissions,16% were due to the procurement of pharmaceuticals and 9% to medical devices. In 2015, these emissions had fallen to 15.2 $MtCO_2e$. Of these emissions, 11% was due to the procurement of pharmaceuticals and 10% of medical devices.[49] This decrease in the pharmaceutical component of the emissions was achieved following an SDU initiative in partnership with a number of pharmaceutical and medical devices companies, and development of careful GHG accounting methodologies *(see box on page 40)*.

NHS operating theatre

DEVELOPMENT OF GHG ACCOUNTING METHODOLOGIES: THE COALITION FOR SUSTAINABLE PHARMACEUTICALS AND MEDICAL DEVICES

In 2012, the SDU created a coalition with a number of pharmaceutical and medical devices companies – the Coalition for Sustainable Pharmaceuticals and Medical Devices (CSPM). The aim of the group is to collaborate on the development of sustainable tools and guidelines relating to pharmaceuticals and medical devices. Members of CSPM worked together to developed the *"Greenhouse Gas Accounting Sector Guidance for Pharmaceutical Products and Medical Devices".*[50] This guidance document presents accounting and reporting standards for measuring GHG emissions of a product's entire lifecycle, including extraction of raw materials, manufacturing, transportation, storage, use, and disposal.

The methodology addresses both attributable and non-attributable processes. Attributable processes are defined as *"services, material and energy flows that become the product, make the product and carry the product through its life cycle".* Examples of these processes may include manufacture of chemical feedstocks and solvents, energy used during processing, and disposal of waste. Non-attributable processes are *"services, materials and energy flows that are not directly connected to the studied product because they do not become part of the product, make the product, or directly carry the product through its life cycle".* Examples of these processes may include the use of chemicals during cleaning, sterilisation, or in protective gear used by operators.

The guidance document builds on the requirements already defined by the Greenhouse Gas Protocol, which provides a standardised methodology to help organisations to quantify and report the GHG emissions associated with a specific product.[51] The CSPM is intended to be used in parallel to this standard. The document is relevant for all pharmaceutical products and medical devices as defined by the NHS, and is useful for all actors in the pharmaceuticals and medical devices value chain, in any region of the world. It is a free tool, available to all people in all sectors.

The guidance document provides a comprehensive strategy that is made up of modules specific to different processes, as well as to different stages of the value chain. The wide scope of the guidance makes it a complicated task to summarise the technicalities of the methodology in this report. However, the CSPM has extensively documented these procedures, and all relevant documents can be found on the SDU website.[52]

In addition, the CSPM has developed guidance for the carbon footprinting of key patient pathway components such as an emergency room attendance, a bed day, an operating room procedure, and a GP consultation. These are also available on SDU website.[53]

CLIMATE POLICY

The following chapter sets out to illustrate the recent developments of the European climate and energy package. It is important to become familiar with the political landscape within which the European healthcare sector is operating, in order to understand the expectations that lie ahead. As we have thoroughly described in this report, the healthcare sector has the moral obligation and the opportunity to be a pioneer in tackling climate change. By understanding the recent and upcoming developments of the relevant legislative instruments, the healthcare sector can become empowered to not only comply with the regulations, but to also go beyond the general norm.

INTRODUCTION

The EU ratified the Paris Agreement on 5th October, 2016, and in doing so, it committed to maintaining its role as a global leader in the fight against climate change. The EU and its Member States committed to a binding target of at least 40% domestic reduction of greenhouse gas (GHG) emissions by 2030 compared to 1990, to be fulfilled collectively between all EU Member States.

Now, the EU must focus on delivery, namely finalising a strong policy and legal framework that ensures that all Member States and economic sectors of society, including the healthcare sector, are onboard.

In order to comply with its Paris Agreement commitments, the EU will need to deliver 95% emissions reductions by 2050 below 1990 levels.[56] This will require complete decarbonisation of the energy sector (including power, heating, and cooling) and a 94% reduction in emissions in the transport sector.[57] In addition, close to 60% of EU's emission cuts must come from energy savings (i.e. improvements in energy efficiency).[58] As the healthcare sector accounts for a substantial amount of emissions, it also has a significant role to play in reaching reduction targets.

Below, we look at the Paris Agreement and what it means for the EU, as well as the healthcare sector. We can then assess how the EU has been preparing to implement this Agreement, and whether or not these actions will place it in a sufficient position to fully implement its commitments. We conclude with recommendations for how the EU must go further, in order to achieve necessary emissions reductions under the Paris Agreement.

OVERVIEW OF THE PARIS AGREEMENT – ESSENTIAL ELEMENTS

The Paris Agreement, which was adopted at the end of 2015 by 195 countries and entered into force on 4th November 2016, is a legally binding global climate treaty. The Agreement sets a long-term goal to limit global warming to well below a 2ºC increase, with the aim to limit the increase to 1.5ºC. Among other things, it also aims to address adaptation to the effects of climate change, and to direct finance towards investment that is consistent with long-term climate change goals.

For the first time ever, the Paris Agreement commits all nations to undertake efforts to combat climate change domestically. All countries that become a Party to the Paris Agreement are required to pledge how much they intend to contribute towards reducing GHG emissions (through the submission of a "nationally determined contribution") and to strengthen these efforts over time. Parties are also required to be more transparent around how they implement their pledges.

The Agreement also emphasises the action and ownership that is needed by cities and local/regional authorities. This emphasis uniquely positions the healthcare sector to contribute to the EU's implementation of its commitments under the Paris Agreement.

It is important to note that the pledges submitted by countries in the run up to the Paris Agreement are not sufficient to limit global warming to well below 2ºC. The Paris Agreement acknowledges this, and sets out a process that should encourage countries to progressively increase ambition over time, in order to meet this long-term objective. In 2018, there will be a global stock take, after which every five years there will be a review, the purpose of which is to lead to a "ratcheting up" of ambition by the Parties.

TABLE 4: THE COMMISSION'S PROPOSED 2030 CLIMATE AND ENERGY LEGISLATIVE FRAMEWORK

INSTRUMENT	DESCRIPTION OF EXISTING INSTRUMENT	PROPOSALS INCLUDED FOR 2030
CLIMATE-RELATED LEGISLATION		
Revised Emissions Trading Scheme (ETS) Directive	Sets a cap on the total amount of GHG emissions that can be emitted by industrial installations that are covered by the Directive. Within the cap, regulated entities can receive or buy emissions allowances that they can trade with each other, as well as buy international emissions credits. Each year, regulated entities must surrender a certain number of allowances to cover their emissions.	→ By 2030, emissions in the ETS sectors must be reduced by 43% compared to 2005 → More ambitious annual linear reduction → Market stability reserve to cancel excess allowance and raise the carbon price
New Effort Sharing Regulation (ESR)	Previously called the Effort Sharing Decision, this regulation covers economy-wide GHG emissions (e.g. transport, buildings, waste, agriculture) not covered by the ETS Directive. The ESR establishes individual national GHG emissions targets, expressed as percentage changes from 2005 levels, which are distributed based on national GDP per capita. Member States are responsible for defining and implementing national policies and measures to meet their targets.	→ By 2030, non-ETS emissions must be reduced by 30% compared to 2005 → More ambitious national targets → Review mechanism to ensure Paris objectives are achieved, including potential to increase ambition → New flexibilities including limited one-time use of ETS allowances to meet national targets and access to credits from the land use sector
New Land use and land use change and forestry (LULUCF) Regulation	Lays down accounting rules for how Member States calculate emissions caused and saved (removed) by different land use activities. It would prohibit national emissions from exceeding emissions removed over a ten-year accounting period.	→ Included in the EU's 2030 GHG target → Accounting rules for each category → Possibility to transfer removals between Member States → Compliance checks by the Commission
ENERGY EFFICIENCY-RELATED LEGISLATION		
Recast Energy Efficiency Directive (EED)	Establishes binding measures to help the EU meet its 20% energy savings target by 2020. Member States must establish plans for how they intend to meet national targets, which include measures and policies designed to encourage energy savings from industry and consumers, as well as long-term national building renovation strategies. It also provides special provisions encouraging the public sector to take a leading role in building renovations, as well as purchasing of energy efficient buildings, products, and services.	→ Binding measures to help the EU meet its binding 2030 energy efficiency target of 30% → Raises target from 27% (as stated in the Council's 2014 Conclusions) to 30%, plus making it binding → Stronger rules for energy utilities to reach energy savings of 1.5% of annual sales to final consumers → Planning and reporting streamlined into the Governance Regulation
Recast Energy Performance of Buildings Directive (EPBD)	Supplements the Energy Efficiency Directive and is designed to reduce energy consumption from buildings. Requires Member States to establish a system of energy performance certificates for buildings, inspection schemes for heating and cooling systems, set minimum energy performance requirements for new buildings, and develop national measures to finance energy efficiency improvements. It also requires all new buildings to be "nearly zero-energy buildings" by 31st December 2020 (public buildings by 31st December 2018).	→ New requirements for new and renovated residential and non-residential buildings to include charging infrastructure for electric vehicles → Remove assessments of high-efficiency alternatives and regular inspections of heating and cooling systems → Provisions on building renovations in the EED to be moved to the EPBD
Eco-design Workplan	Sets a plan for updating the ecodesign and energy labelling legislative framework between 2016 and 2019, which includes the Ecodesign Directive and the Energy Labelling Directive. It also includes proposed implementing measures for air heating and cooling products.	

INSTRUMENT	DESCRIPTION OF EXISTING INSTRUMENT	PROPOSALS INCLUDED FOR 2030
RENEWABLE ENERGY-RELATED LEGISLATION		
Recast Renewable Energy Directive	Sets rules for the EU to achieve its 20% renewable energy target by 2020. It requires Member States to meet individual targets and to ensure that at least 20% of transport fuels come from renewable sources by 2020. It aims to establish investor certainty for renewable energy by providing a framework for Member States to provide support and to reduce administrative burdens for new installations.	→ Replace national binding targets with EU-binding target of at least 27% → Requirement to pledge national contributions to 2030 EU target → General principles for national renewables support schemes → Enhanced requirements to simplify administrative and other procedures → Rules for self-consumption and community participation → A revised framework for biofuels → Planning and reporting streamlined into the Governance Regulation
ENERGY MARKET DESIGN LEGISLATION		
Recast Electricity Directive	Lays down general rules and principles for the functioning of the internal energy market for electricity. Covers consumer rights, non-discrimination, what activities different market actors can and cannot perform, and national energy regulators.	→ Stronger orientation towards decarbonisation and system flexibility → Reinforces rights for consumers, including to participate in demand response, self-generation and self-consumption of electricity → Allows local energy communities to engage in generation, distribution, aggregation, storage, supply or energy efficiency services → New roles/responsibilities for distribution system operators
Recast Electricity Regulation	Sets rules and principles for trading on electricity markets, conditions for cross-border exchanges in electricity, and rules for developing cross-border infrastructure. Establishes the European Network for Transmission System Operators for electricity (ENTSO-E).	→ Sets new rules for balancing and priority dispatch → Provides a legal framework for assessing system adequacy and designing capacity mechanisms → Establishes regional operational centres and a new EU level body for distribution system operators
Recast ACER Regulation	Establishes the Agency for the Cooperation of Energy Regulators (ACER), which brings national energy regulators together to work on cross-border and EU issues. Sets out its tasks and responsibilities.	→ Provides ACER with stronger powers on cross-border and regional energy market oversight, and in development of Network Codes
New Regulation on Risk Preparedness in Electricity Sector	Establishes common rules on crisis prevention and management of electricity crisis situations.	→ Requires countries to develop a risk-preparedness plan → Establishes rules on cooperating with other countries in crisis situations
HORIZONTAL LEGISLATION		
New Regulation on the Governance of the Energy Union (the Governance Regulation)	Streamlines planning and reporting obligations across all areas of climate and energy legislation, covering the 5 dimensions of the Energy Union. Requires Member States to make pledges for what they will contribute in order to meet the 2030 climate and energy targets. Ensures transparency on how Member States and the EU are implementing the 2030 climate and energy targets, including the development, monitoring and update of national climate and energy plans (NECPs). The NECPs should also have a view to 2050.	→ Requirements to develop and report on NECPs → Measures to ensure national pledges allow for overall achievement of 2030 EU targets → Requirement to develop 2050 plan linking to Paris objectives → Monitoring and assessment by the Commission → Processes to enhance ambition over time
TRANSPORT		
Low Emission Mobility Strategy & Strategy towards Cooperative Intelligent Transport Systems	Provides the Commission's plans for enhancing the regulatory framework for low carbon transport, including changes to the Alternative Fuels Infrastructure Directive and the Regulation on setting emissions performance standards for cars and vans, a review of the Clean Vehicles Directive, and actions through the Energy Market Design. The latter strategy plans how to coordinate efforts in deploying digital and information technologies across the EU to ensure interoperability and a level playing field between different countries, including development of services, and ensuring data privacy and security.	

THE EU'S 2030 CLIMATE AND ENERGY FRAMEWORK – HOW DOES IT CONTRIBUTE?

In its preparations for implementing the Paris Agreement, the EU has embarked on two key initiatives. The first is an update of its policy and legal framework to cover the period 2021-2030. The second, and perhaps more ambitious initiative, is the creation of a more forward-looking strategy to achieve an "Energy Union with a Forward-looking Climate Change Policy".[59]

As it stands, these initiatives will not be enough to ensure the EU meets its long-term climate objectives. However, as initial steps, they lay a foundation that can be built upon over time.

An Energy Union with a forward-looking climate change policy

In February 2015, the European Commission released its "Framework Strategy" for an Energy Union. It aims to create a sustainable, low-carbon, and climate-friendly economy designed to take Europe into the future, which includes a "fundamental transformation" of Europe's energy system. It aims to achieve this by bringing different energy objectives[60] together to make them more coherent, supported by a strong governance system. The Commission has also set out to redesign the EU's energy market so that renewable energy plays a key role, and is supported by the energy efficiency first principle.

Moving towards a climate and energy framework for 2030 and beyond

The Commission has published most of the proposals that will make up the EU's contribution towards achieving its commitments under the Paris Agreement. A majority of these proposals constitute significant revisions of existing legislation. Shown in the table above, this consists of the Commission's clean energy package ("Clean Energy for All Europeans"),[61] released on 30th November 2016, containing three mainly climate-focused pieces of legislation, and several other strategies. Over the next two to three years, these proposals will make their way through the European Parliament and the Council for adoption.

AN ENERGY UNION ON – OR OFF – TRACK?

Despite the Commission's recent proposals, the EU still has a long way to go if it wants to effectively contribute to limiting global warming to well below 2ºC, with the aim to limit the increase to 1.5ºC. There are several areas where the EU must either go further than its current ambition, or change direction to avoid damaging measures that will make the energy transition harder to achieve.

Ambition on GHG emissions reductions – a tide to lift all ships?

The EU's climate ambition was decided prior to the Paris Agreement. Furthermore, the Paris Agreement envisions "ratcheting up ambition" over time. While the Commission proposed links between the EU's climate and energy framework and the Paris Agreement, these will need to be strengthened, so that the EU can reconcile its ambition with its international climate commitments.

A number of proposed loopholes could also allow Member States to avoid reducing GHG emissions at home, which would limit opportunities for the healthcare sector. These include:

- **A 2021 starting level** – Actual emissions between 2016 and 2018 have been proposed as the starting point for the linear path that each Member State must follow to meet their 2030 targets. This would benefit Member States that are behind in meeting their 2020 GHG emissions targets.
- **Offsets from land-use activities** – Subject to certain restrictions and accounting rules, Member States could use certain types of land-use activities to offset their overall GHG emissions. This could result in an increase in emissions of up to 280 million tonnes.[62]
- **Eligibility to use Emissions Trading Scheme (ETS) permits under the Effort Sharing Regulation (ESR)** – Certain Member States would be allowed to make a one-off transfer of surplus ETS allowances into the ESR, resulting in an overall increase in emissions of up to 100 million tonnes.[59]
- **2021 bonus for lower-income Member States** – Lower income Member States would be allowed to start with a (one-time) larger emissions budget for the year 2021.
- **A project-based mechanism** – Richer Member States could buy offsets from specific mitigation projects undertaken in lower-income Member States. If designed properly, this could actually result in additional emissions reductions, while also contributing to economic development.

Putting efficiency first

In its legislative proposals, the Commission proposed a binding EU target of becoming 30% more energy efficient by 2030, which goes beyond the European Council's agreement in October 2014. The Commission also proposed a number of measures that will contribute to energy savings, such as:

- The continuation of national renovation strategies with a link to 2050;
- The continuation of requirements for energy companies to save 1.5% energy per year;
- New measures to leverage investment in energy performance improvements;
- Stronger links between the installation of renewable energy sources in buildings and the achievement of energy savings targets;
- Requirements that ensure consumers (including hospitals) can participate in, and economically benefit from, demand response (i.e. a change in consumption patterns by the customer in response to incentives from providers to better match demand with supply, and reduce energy use at off-peak times and when system reliability is threatened); and
- Requirements for new and renovated residential and non-residential buildings to include infrastructure to enable electric vehicle charging, with links to public procurement.

Taken together, these proposals could amount to significant opportunities for the healthcare sector to reduce its carbon footprint through reduced and smarter energy use.

Energy market design – maintaining leadership in renewables or sticking with coal?

Under the newly proposed legislation, hospitals would have enhanced opportunities to become active consumers through new rules on self-production, storage, and consumption of energy from renewable sources. They would also have the ability to cooperate with other local actors through setting up energy communities; providing services for and feeding locally-produced renewable energy into the public grid, thus ensuring renewable energy sources are integrated safely and efficiently. All of this would contribute towards a better functioning market for renewables.

However, new rules on capacity mechanisms could allow Member States to keep dirty and inflexible coal alive for the next 10 to 15 years. This would continue to distort energy markets and contribute to an oversupply of energy in the market, undermining the business case for the healthcare sector to become active in the energy market. It would also significantly undermine efforts to decarbonise the EU's energy supply by 2050.

Governance to ensure delivery of 2030 – and 2050 – objectives?

As part of its effort to make climate and energy policies more coherent, reduce administrative burden, and promote flexibility, the European Commission has attempted to streamline and simplify planning and reporting requirements across the entire climate and energy legislative framework. However, the Commission has also rolled back nationally binding targets for Member States on renewables.

In its Governance Regulation, the Commission has failed to propose credible measures to ensure national pledges enable the EU to meet its 2030 targets. This is contributing to policy uncertainty that will undermine confidence in national investment, including from the healthcare sector, in energy efficiency and renewables. The proposals also establish weak links between measures intended to meet 2030 targets and planning to meet 2050 objectives. This creates a risk that even if the 2030 targets are achieved, it will not be enough to keep the EU on pace to meet its overall Paris objectives.

POLICY RECOMMENDATIONS MOVING FORWARD

In order for the EU to maintain its role as a global leader in the fight against climate change and to comply with its international climate obligations, HCWH Europe make the following recommendations for the upcoming legislative negotiations on the 2030 climate and energy package.

More ambitious effort-sharing to help drive EU GHG emissions reductions

Using the first stock-take under the United Nations Framework Convention on Climate Change (UNFCCC) in 2018, overall EU and national ambition for economy-wide emissions reductions under the proposed Effort Sharing Regulation (ESR) should be strengthened, so that it is more in line with achieving the EU-wide target that would limit warming to well below 2ºC. Furthermore, the ESR should include a strong "ratchet-and-review" clause that can guarantee higher ambition over time, in line with the latest scientific information. Loopholes for using flexibilities, including from the ETS and LULUCF should be closed, or otherwise limited to the extent possible, in order to encourage real emissions reductions on the ground.

A stronger Emissions Trading Scheme (ETS) that does not undermine other important climate and energy policies

Ambitious reform of the ETS is needed to cancel allowances that are depressing the price of carbon in the market, in order for the ETS to be capable of reflecting the true price of carbon and driving investment certainty into alternative clean technologies. In the meantime, the ETS must not be allowed to undermine other much-needed policies that drive energy efficiency and renewables.

The new market design must be oriented towards a more flexible renewables-based energy system that empowers consumers and gets rid of dirty, inflexible fossil fuels

EU legislation on a new market design needs to ensure that renewables can be integrated into the heart of the EU's internal energy market, and that the system overall can become more efficient and flexible. Furthermore, legislation needs to ensure that all consumers are empowered to participate in the energy market through self-production, storage, demand response, and energy efficiency. Rules around the adoption of capacity mechanisms[63] by Member States need to ensure that they are not used to support and lock in dirty fossil fuels.

Legislation should promote electrification of transport

Market design legislation needs to help facilitate a more robust market for electric vehicles, including through market coupling by incentivising smart charging of batteries, and incentivise and support the development of appropriate infrastructure, such as electric vehicle charging stations, ensuring that energy used to charge electric vehicles is from renewable sources.

Energy Union governance should ensure delivery of the 2030 climate energy targets consistent with the Paris Agreement objectives

The Governance Regulation[64] needs to provide a clear process to ensure that, from the outset, national contributions place the EU on a trajectory to deliver the 2030 targets for GHG emissions reductions, renewables, and energy efficiency. If implementation gaps are identified, there should be sufficient corrective mechanisms to ensure the EU does not get off track. The Regulation should also contain review mechanisms to ensure that the EU's climate and energy policy can evolve over time, consistent with the latest scientific data and information under the Paris Agreement.

Opportunities to use public procurement to achieve 2030 and long-term climate and energy targets should be fully exploited

The 2030 climate and energy legislative framework needs to better support public procurement of renewable electricity, heating and cooling (particularly through self-production and cooperation with communities), and the electrification of transport (with electricity generated from renewable sources). There is a need to better communicate the value of production for storage and self-consumption and the role it can play in helping to improve energy performance in buildings, particularly from the public sector

RECOMMENDATIONS FOR THE HEALTHCARE SECTOR

Based on lessons learned from the case studies presented in this report, this section provides recommendations for hospitals and health systems to reduce GHG emissions across all of healthcare's polluting activities. HCWH Europe encourages hospitals around the world to learn from each other in order to enhance knowledge and expertise in implementing climate change mitigation practices, and to further advance healthcare's mission to protect human health and well-being.

BUILDINGS & ENERGY

Becoming more energy efficient and reducing energy use are possibly the biggest "easy wins" for hospitals, as they also guarantee financial savings. As we have illustrated through the case studies presented in this report, the first steps in saving energy can be quite an easy endeavour for hospitals. Low investment measures, such as staff training, switching to high efficiency light bulbs, and turning off lights in unattended areas, can save a great deal of energy and money, while reducing GHG emissions.

Further measures, such as replacing current energy systems with more efficient ones or using renewable energy sources, will yield much greater savings in the long-run. Considering the inevitable and continuously increasing ambition of European energy policies, and the health sector's role in contributing to the EU's compliance with the Paris Agreement, hospitals should plan ahead by improving the current infrastructure to become energy efficient and renewable energy institutions.

TRANSPORTATION

Considering a hospital's high dependency on transport services, replacing old vehicles with new and more efficient ones, and moving to technologies such as electric or hybrid cars, is an obvious alternative that can prevent immense amounts of GHG emissions. It is important to ensure that the energy for electric vehicles is produced using renewable sources, such as solar, wind, hydroelectric, and geothermal heat. However, other less costly alternatives exist, such as by encouraging active travel (e.g. walking, cycling), carpooling, and the use of public transportation amongst staff. Health systems can find creative ways to incentivise the workforce to adopt these modes of transport.

Hospitals and health systems should also be advocates of active travel to promote health in their communities. They can work with their municipalities to establish city rental bicycle services with stations on the hospital grounds for staff and visitors.

By adopting more environmentally friendly transportation plans, health systems can reduce healthcare's contribution to air pollution, climate change, and the burden of disease.

WASTE MANAGEMENT

Strategies for sustainable waste management include recycling, composting of food waste, and waste reduction through the conscientious use of materials. Reusing materials also contributes to the reduced demand for virgin resources, which directly reduces emissions from resource extraction. Health systems can reduce their carbon footprint by promoting zero waste policies, reducing the volume and toxicity of waste produced by the healthcare sector, and implementing safe and sustainable disposal options as alternatives to landfilling and incineration.

FOOD

Simple steps for reducing GHG emissions from food consumption include preventing food waste and promoting dietary change. Reducing food waste reduces the production of unnecessary food, and dietary change generally entails a reduction in the consumption of carbon intensive food products, such as meat and dairy. Other activities to mitigate emissions from food include purchasing food produced through sustainable and organic farming, and reducing travel miles by purchasing locally produced food.

PROCUREMENT

Health systems should hold themselves accountable for the environmental footprint of their supply chain. Hospitals that are working towards green procurement affirm that a close relationship and active communication with their suppliers about issues and concerns with current products is crucial, in order to provide motivation for greener and better products to enter the market. Tracking a product's environmental footprint throughout its life cycle is an important strategy to transition to the procurement of greener products. Many tools and databases already exist to measure healthcare products' climate footprint. Measuring usability and satisfaction with the product is also important in order to identify inefficiencies that can be improved.

By implementing sustainable procurement strategies, such as applying green and social criteria to tendering processes, hospitals can reduce their environmental footprint, contribute to the mitigation of climate change, and become more socially responsible.

JOIN THE GLOBAL GREEN AND HEALTHY HOSPITALS NETWORK!

Whether hospitals are already working to reduce their climate footprint or not, it is never too late to look for new initiatives or to just get started. This report sets out to demonstrate that there are many different solutions and alternatives to all of healthcare's most environmentally-damaging activities. If your institution is interested in enhancing your work on climate, we invite you to join Health Care Without Harm's network: Global Green and Healthy Hospitals (GGHH). www.greenhospitals.net

GGHH is an international network of hospitals, healthcare facilities, health systems, and health organisations dedicated to reducing their environmental footprint and promoting public and environmental health. To commit your institution into reducing its climate footprint, you can join the 2020 Health Care Climate Challenge.

The 2020 Health Care Climate Challenge is a GGHH initiative to mobilise healthcare institutions around the globe to protect public health from climate change. It is comprised of three main pillars:

The 2020 Challenge invites hospitals, health systems, and health organisations to pledge to take real action on climate change.

Join the Challenge today at: www.greenhospitals.net/about-challenge/

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Health Care Without Harm (HCWH) Europe is the European arm of a global not for profit NGO whose mission is to transform healthcare worldwide so that it reduces its environmental footprint, becomes a community anchor for sustainability and a leader in the global movement for environmental health and justice. HCWH's vision is that healthcare mobilises its ethical, economical, and political influence to create an ecologically sustainable, equitable, and healthy world.

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