

THE IMPACT OF THE SUSTAINABILITY STRATEGY WITH EXAMPLES OF COMPLETED INVESTMENTS: PV, HEAT PUMPS, RAINWATER STORAGE, MODULAR BUILDINGS, BMS.



Provincial Specialist Complex of
Healthcare Institutions of
Lung Diseases and Tuberculosis
in Wolica near Kalisz, Poland

LOW-CARBON HEALTHCARE



“

Europe is facing a major public health crisis, with almost everyone across the continent living in areas with dangerous levels of air pollution”
[The Guardian].

“For too long, we have been waging a senseless and suicidal war on nature. The result is three interlinked environmental crises: climate disruption, biodiversity loss and pollution that threaten our viability as a species. They are caused by unsustainable production and consumption. Human well-being lies in protecting the health of the planet. It’s time to re-evaluate and reset our relationship with nature.”

António Guterres, the Secretary-General of the United Nations



The WHO leaves no illusions here – exposure to polluted air is responsible for the premature deaths of 7 million people every year! Only 0.001% of the world’s population is not exposed to PM2.5 pollution above levels that the World Health Organisation (WHO) considers safe for health. According to data from the European Environment Agency, around 45 000 people die prematurely in Poland every year due to air pollution.

The Provincial Specialist Hospital for Lung Diseases and Tuberculosis in Wolica is a pulmonology hospital. The primary activity of the hospital is the provision of services in the field of:

- (a) diagnosis and treatment of tuberculosis and lung diseases,
- b) diagnosis and treatment of patients with severe forms of asthma
- c) chemotherapy – hospitalisation with combined scope,
- (d) diagnosis and treatment of non-small-cell or small-cell lung cancer
- (e) pulmonary rehabilitation.

We implement drug programmes for the treatment of asthma, pulmonary fibrosis, non-small cell and small cell lung cancer. There is a Sleep Disorders Investigation Laboratory within the team. The hospital makes every effort to ensure that the care delivered to patients is of the highest quality, safe and effective. The hospital's certificates, including the Accreditation Certificate, the ISO Certificate and the Safe Patient Certificate, are a confirmation of its quality and expertise in carrying out its daily duties.

In 2023. Hospital was announced as the winner of the Healthcare Climate Challenge and awarded the title of Climate Champion. This first-ever elite Climate Champion award is given to one institution in each region that excels in its work. The hospital in Wolica became the European representative. As part of the challenge, the hospital also won and Gold medal in the Climate Resilience category. The hospital is situated in the middle of a beautiful pine forest, on a plot of land of more than 23 hectares. The environment is an intrinsic part of the functioning of the Wolica hospital, directly influencing its existence and further development.

Health Care Without Harm presents

2023 CLIMATE CHAMPION AWARD

**WOLICA HEALTHCARE
CENTER FOR LUNG
DISEASES AND
TUBERCULOSIS**



**Health Care Without Harm presents the following 2023
Climate Action Award to:**

WOLICA HEALTHCARE CENTER FOR LUNG DISEASES AND TUBERCULOSIS

Climate Resilience - GOLD

The hospital is situated in the middle of a beautiful pine forest, on a plot of land of more than 23 hectares. The natural environment is an integral part of the functioning of the Wolica Hospital, directly influencing its existence and further development.

Planet Earth, on the one hand, provides us with the necessary resources to carry out our healing activities and, on the other hand, is the recipient of any resulting pollution. Climate change affects everyone's health, but pulmonary patients are undoubtedly among those most susceptible. For this reason, we have adopted the principle of 'first do no harm' as the basis of our development.

Main project goals and targets sustainability work:

- reducing emissions,
- increasing self-consumption of energy produced by the hospital's own photovoltaic farm (energy storage)
- improving the energy efficiency of the hospital,
- digitisation of the hospital,
- expansion and development of the facility taking into account biodiversity and the green hospital environment,
- sustainable supply chain,
- recycling of generated waste
- re-use of rainwater and biodegradable waste



APPLICATION OF RENEWABLE RES, RECUPERATION SYSTEM AND BMS

Reducing energy consumption translates into less air pollution, but also into lower operating costs of the hospital. Own heat and energy generation sources make the hospital largely independent of the increase in the prices of these media. They contribute to reducing the risk of energy failures, which is crucial for maintaining the operational continuity of the hospital, ensuring the safety of patients and employees, as well as minimizing potential financial losses. The use of a BMS system enables constant monitoring of energy use and, therefore, analysis of how to reduce its consumption.

kWp, implemented in November 2022 on the roofs and ground of the hospital, covering an area of 968 m², is a key step towards the energy self-sufficiency of the facility. The use of 438 BB-ECO photovoltaic modules and 6 inverters with SolarEdge power optimizers allowed the creation of a high-efficiency system, adapted to the specific requirements of a medical facility. The PV installation reaches approximately 78% of the installed power, which is a very good result considering the specific location (the area is located in the middle of the forest).

In December 2023 the heat pump installation was launched. The system of 6 air heat pumps cooperates with the existing gas-fuel boiler room operating for heating installations and hot water for the existing hospital buildings. The implementation of the new task will contribute to increasing heating efficiency and thus bring measurable savings for the hospital. A hybrid combination of PV installations with heat pumps will allow for the optimal use of renewable energy sources by distributing energy using both solar and aerothermal energy. Heat pumps will be the main source of heat for the heating system of hospital buildings and domestic hot water. Replacing gas heating with renewable energy sources will make the hospital independent of the supply and prices of raw materials. The gas-oil heating boiler will remain in the building as an auxiliary heat source.

The hospital is considering installing and starting a hydrogen boiler room or heat obtained from thermal sources. The hospital is currently examining possibilities in this area and developing technical documentation.

The BMS system allows you to effectively and comprehensively manage a hospital building so as not only to reduce energy consumption and, consequently, reduce the building's operating costs, but also to significantly improve the comfort and safety of patients and medical staff. Thanks to the BMS, staff can quickly respond to failures, optimize energy consumption and ensure comfort for patients and hospital employees. Ultimately, the BMS will monitor the consumption of gas, hot and cold water, air quality and flow throughout the facility, lighting of selected zones and temperature, especially in critical rooms of the hospital. Full integration with other medical systems will ensure comprehensive monitoring and management of the hospital infrastructure. The use of heat recovery in the ventilation system of the new hospital wing allows for a significant reduction in the costs incurred in operating the building. Depending on the temperature differences between the inside of the building and the outside air, the level of heat recovery can range from 50 to even 90%. The heated air is not lost irretrievably, as, for example, when airing residential premises, but the heat from it is recovered. Thanks to recuperation, we can reduce the cost of heating the ward in the new wing of the hospital by up to 30%.

All hospital buildings have undergone thermal modernization



Shot on realme 8





Shot on realme 8









EXPANSION OF THE HOSPITAL USING MODULAR TECHNOLOGY

In investments related to the expansion of the hospital, it was decided to completely abandon traditional technology. Only modular, prefabricated solutions are allowed (innovative and still not very popular in the health care industry). Modular construction introduces significant innovations in minimizing carbon dioxide emissions. By using prefabrication in controlled factory conditions and limiting the transport of materials, it significantly reduces the carbon footprint of construction projects. Modular steel construction uses the benefits of steel, including its recyclability, to create durable, eco-friendly structures. The flexibility of the modules and the possibility of their future relocation or adaptation (reconstruction) for a new function additionally emphasizes the sustainable nature of this method.

Key ecological aspects of modular construction with steel structure:

- Material Efficiency: Steel, as a construction material, is very efficient and strong, which allows for optimization of the use of materials. Steel is also fully recyclable, reducing its overall carbon footprint.
- Production and Assembly: Modular construction allows for a controlled and efficient production process in the factory, which reduces waste and CO2 emissions. Assembly on the construction site is quick and accurate, which additionally reduces the carbon footprint and water consumption.
- Transport: Although transporting finished modules to the construction site generates emissions, it is usually less intensive than the continuous transport of materials in traditional construction.
- Low Energy Demand: Modular buildings are designed with high energy efficiency in mind, which translates into lower CO2 emissions during their use.
- Point Foundations: The use of point foundations in modular construction reduces the need to use concrete by up to 80%, which significantly reduces the carbon footprint associated with foundation work and reduces the need to use water in the production process
- Prefabrication allows the construction process to be carried out without affecting the comfort of patients and medical staff.
- Construction costs: Reducing the time has a huge impact on costs, especially in the case of external financing, and on the payback period, because it allows you to generate possible income much faster than traditionally implemented projects.

The facility strives to create an energy-saving, healthy and comfortable internal environment in hospital buildings. Modular technology allows you to minimize heat losses by eliminating thermal bridges from modular buildings. Moving the construction stage to the production hall allows the steel floor profiles to be filled with closed-cell PU foam. PU foam is also used as a floor insulating material, providing, in addition to thermal protection, also protection of the floor against moisture from the outside. The installation of the ventilated facade and window and door joinery based on the "bridgeless structural composite" is carried out in a way that eliminates thermal bridges occurring on the fastening elements, and the thermal bridges of the steel supporting structure are eliminated with properly made external insulation.





























CREATING SOLUTIONS THAT INCORPORATE NATURE

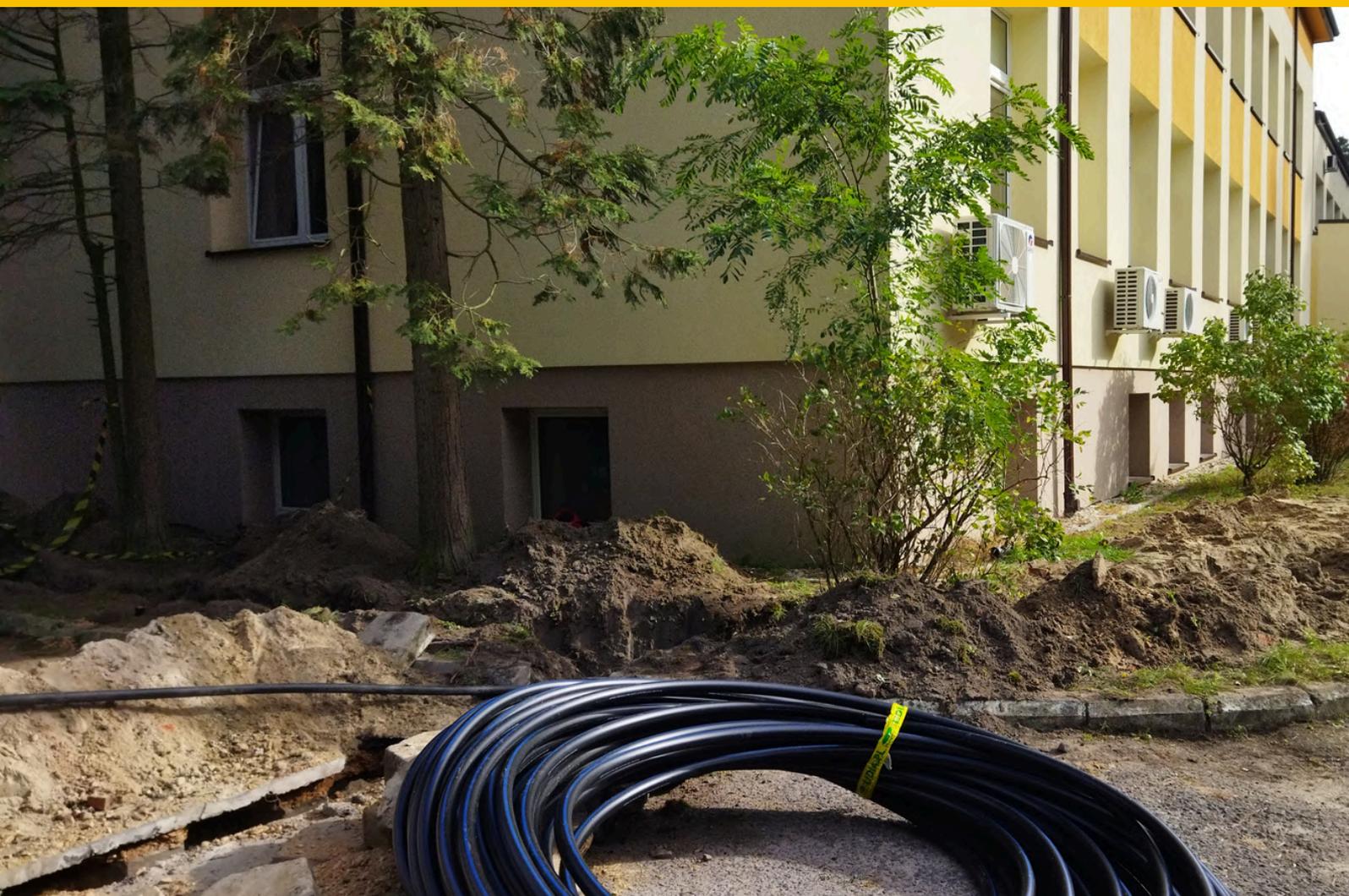
The hospital environment is an important element of hospitalization. Contact with nature, even just passive, helps reduce stress, relaxes and evokes positive emotions. Biodiversity is crucial to human health and well-being. The hospital is guided by the principles of responsible and sustainable development, which is manifested, among others, by: care for the natural environment and constant improvement of activities in this area.

The hospital is located in the middle of a beautiful pine forest, on a plot of over 23 ha. The natural environment is an inherent element of the functioning of the hospital in Wolica, directly influencing its existence and further development. As part of activities incorporating nature, a green health path was created, which is used in pulmonary rehabilitation by hospital patients. A relaxation area with benches and tables has been created on the hospital premises, where patients can naturally undergo aromatherapy. The forest area consists of 99% American pine trees, which are characterized by a high degree of saturation with essential oils. This variety has scientifically proven properties supporting the treatment of the upper respiratory tract. Currently, a gazebo and a garden are being built in the hospital space, where patients undergoing 3-week rehabilitation stays will be able to spend their time actively after exercise. In addition, patients have access to the forest area around the hospital, where they can relax on the prepared infrastructure and watch wild animals (we have pastures, nesting boxes, and periodically also apiaries). The hospital cooperates with beekeepers by providing an area for bees (availability of coniferous honeydew). The green area can be used by patients (with the consent and knowledge of medical staff) and hospital employees. In front of the administration building, the area was tidied up and a lawn space was created where, among others, sick people and visiting children can stay. In this way, we enable families to meet and at the same time minimize the risk of transmitting diseases between people from outside. In the summer, there is a fountain (closed circuit) on the hospital premises. The flower beds have been designed and planted with ornamental plants in accordance with the art of gardening. This task was performed by young people from the Agricultural Technical School in Opatówek, as part of good cooperation with the hospital.

Recreational areas are irrigated with rainwater. The rainwater storage installation consists of a total of 6 underground tanks with a capacity of 7.5 m³ each, technical infrastructure and irrigation installation. Implementation of the investment allows:

- retain up to 900 m³ of water per year in the place where it fell as rain and reuse it to irrigate approximately 2,000 m² of green areas within the hospital,
- relieve the burden on the storm sewage system operating on the hospital premises,
- counteract the effects of drought,
- increase resistance to phenomena such as downpours and flash floods,
- wisely manage rainwater.

It is important for us to maintain the balance of the ecosystem by maintaining natural forest processes such as natural tree regeneration and pest control. It is also important to monitor the level of soil and water contamination and maintain the forest. Proper forest management, care for the surroundings and creation of green spaces influence the microclimate and contribute to lowering the temperature.











RACE TO ZERO

As a member of GGHH, the hospital has the opportunity to analyze the impact of its energy efficiency efforts. This is done by using the Hippocrates Data Center, to which we have entered data since 2017. Collecting data on waste, energy and climate allows us to better understand the greenhouse gas emissions we generate from our activities.

Investments and ecological activities carried out in the hospital since 2017. until 2022 allowed us to reduce our carbon footprint by 106.58 tCO₂e (data calculated using the Hippocrates Data Center tool)

The investment was carried out in 2004. consisting in replacing the boiler room from a coal-fired one to a gas-oil one, the hospital virtually eliminated emissions of harmful gases and dust into the atmosphere. Annual coal consumption amounted to approximately 360t. and resulted in the emission of:

-5.04t. sulfur oxide,

-0.76t. Nitric oxide,

-18t. Carbon monoxide (CO)

-720 t. Carbon dioxide (CO₂) - 720 tCO₂e

-3.6t. Suspended dust

-5.4 kg Benzo (a) pyrene

In equivalent amounts, burning natural gas produces 30% to 45% less carbon dioxide than burning hard coal. Currently, emissions of sulfur dioxide (SO₂) and other particles are negligible.

In December 2023 the hospital carried out another modernization of the boiler room. A heat pump installation was installed as the second source.

In 2022 the hospital expanded its photovoltaic installation. 413 panels were added. From May 2023 the hospital has a photovoltaic installation with a total installed capacity of 199.35 kW. In the context of environmental benefits - the operation of the farm allowed for reducing the carbon footprint by 69,662.73 kg CO₂, or 69.66 tCO₂e

pro-climate strategy implemented in the hospital , we reduced the facility's carbon footprint by 896.24 tCO₂e (tons of carbon dioxide equivalent)

Analysis of data in the Hipokrates database allowed for a closer look at the facility's emission structure by source. Based on the analysis of data from 2022. it can be seen that the total value of greenhouse gas emissions (tCO₂e) is influenced mainly by 2 areas of the facility's activity: purchase of electricity (48%) - 259.76 tCO₂e, heat production in the gas boiler room and medical transport (47%) - 257.35 tCO₂e. The remaining 5% is emitted by activities mainly related to waste disposal. When taking up the Race to Zero challenge, the hospital took into account the following possibilities for reducing the above-mentioned: emission sources:

1.Expansion of the renewable energy installation, installation of an energy storage facility - covering the full energy demand from renewable energy sources

2.Installation of heat pumps (launched in 2023) - according to the energy analysis carried out, the launch of the installation will allow, within 1 year of use, to reduce CO₂ emissions by 79,706 kg of CO₂ per year, i.e. 78.71 tCO₂e. An alternative here is the planned installation and launch of a hydrogen boiler room or heat obtained from thermal springs. The hospital is currently examining possibilities in this area and developing technical documentation. Installation of one of the above. alternative heat source will reduce emissions to 0.

3.Fleet replacement - purchase of an ambulance with an electric engine and installation of our own charging stations.

Reports

Carbon Footprint

Sustainable Procurement checklist

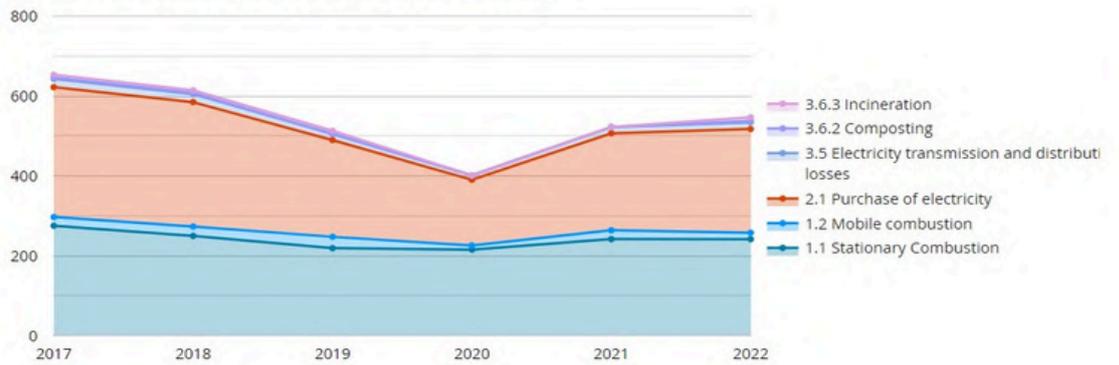
Health Care Climate Challenge

Waste | Data form

Energy | Data form

Carbon Footprint Tool Results

Total emissions per source and year (tCO2e)



Total emissions per scope (%)

Scope 3: Incineration

2%

Scope 3: Electricity transmission and distribution losses

3%

Scope 2: Purchase of electricity

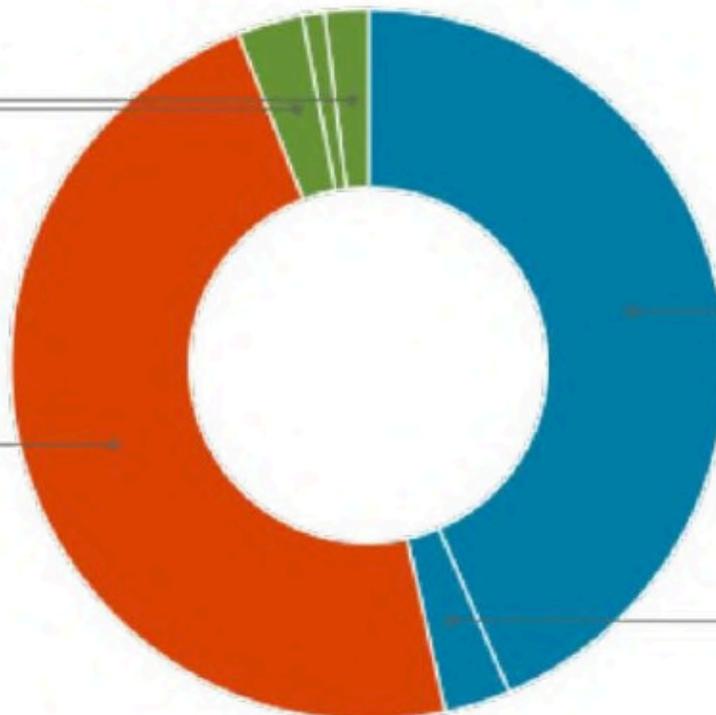
47.5%

Scope 1: Stationary combustion

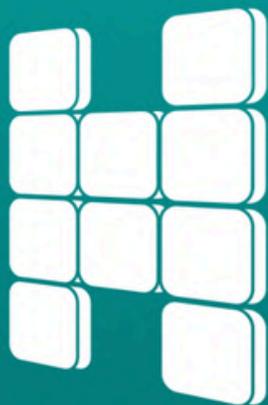
43.6%

Scope 1: Mobile combustion

3%



PROUD MEMBER OF



GLOBAL GREEN and HEALTHY HOSPITALS



A NETWORK OF
HEALTH CARE WITHOUT HARM



**WOJEWODZKI SPECJALISTYCZNY ZESPÓŁ ZAKŁADÓW OPIEKI
ZDROWOTNEJ CHOROÓB PŁUC I GRUŻLICY**



SUSTAINABLE MEDICAL EQUIPMENT

Medical infrastructure is becoming more friendly to the environment and people. In addition to ecological aspects, the sustainable development of the facility also takes into account the improvement of the quality of medical services for patients, working conditions for staff and rational financial management. Hospital digitization and cybersecurity, as well as the use of AI in diagnostic processes, also play a key role.

Precise diagnostics using high-quality equipment helps reduce treatment costs and improves the quality of medical care. Retrofitting DDL hospital in Wolica, including: with a modern computed tomography scanner, eBus, and X-ray scanner allowed for increased access to examinations. Quick access to diagnosis and subsequent treatment of patients is one of the goals of sustainable development.

We want our Hospital - through its culture of providing health services, innovation and the use of modern technologies - to consolidate its position on the Polish market of medical services and become one of the leading centers for the treatment of lung diseases in Poland. We also want it to become an effective and efficiently managed institution, ensuring that its employees acquire knowledge and skills at the highest level and shaping young medical staff and impeccable ethical attitudes.

We make every effort to ensure that diagnostics and treatment are of the highest standard, consistent with modern medical knowledge, using modern equipment, thanks to which we are able to perform perfect and painless diagnostic and therapeutic procedures. Our Hospital also undertakes activities to raise health awareness and conducts health prevention activities, thanks to which our patients are diagnosed early and thus we can treat them effectively.

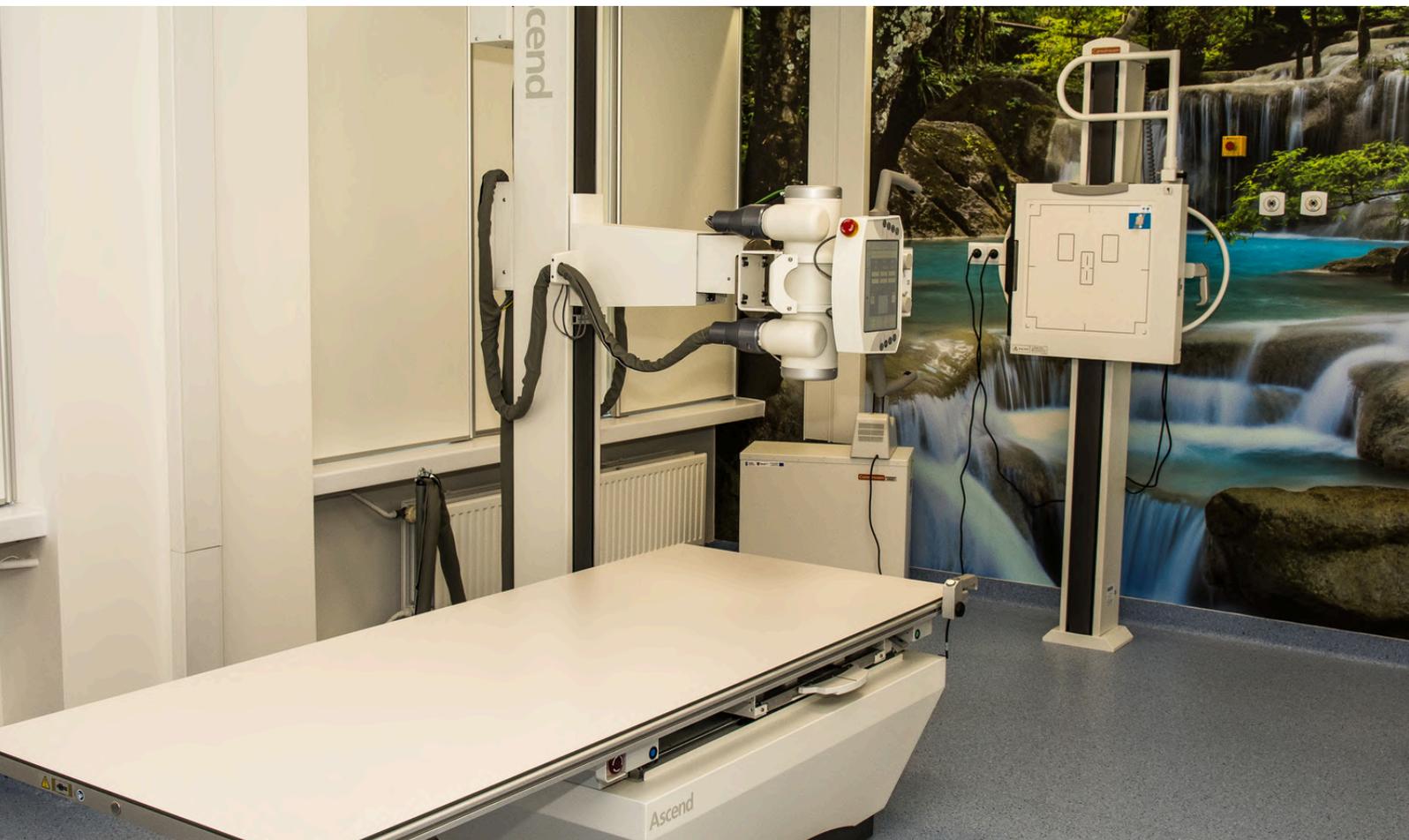












GREEN HOSPITAL

The hospital is located in the middle of a beautiful pine forest, on a plot of over 23 ha. The natural environment is an inherent element of the functioning of the hospital in Wolica, directly influencing its existence and further development. Planet Earth, on the one hand, provides us with the necessary resources to conduct medical activities, but on the other hand, it is the recipient of all the resulting pollution. Climate change affects everyone's health, but pulmonary patients are undoubtedly among the most susceptible. For this reason, we have adopted the principle of "first do no harm" as the basis for our development.

The greatest challenges in implementing the idea of Green Hospitals include: emission reduction, improvement of energy efficiency and energy storage, digitization of the hospital, expansion and development of the facility taking into account biodiversity and the green surroundings of the hospital, sustainable supply chain, recycling of generated waste. Through our activities and promotion of the idea of Green hospitals, we want to encourage people responsible for maintaining health care facilities to implement sustainable development strategies. We argue that ecological education is also health prevention. Environmental protection has become an important element of public health protection and requires the creation of tools that will allow health to be taken into account in various decisions, plans, policies and investments. The hospital also actively participates in preventive and educational activities to increase resilience to climate change. Among others joined the global network of green hospitals (Global Green and Healthy Hospitals), two editions of the International Conference on the Role of Green Hospitals in Counteracting Climate Change were organized (this year we invite you to the third edition of the conference); in cooperation with UN Global Network Poland operating at the UN and Philips Health Care , co-created the Green Hospitals report, which was presented at the 11th edition of the World Urban Forum (WUF11); an interstate agreement was signed with a hospital from Greece, the aim of which is to popularize environmentally sustainable activities that can have a positive impact on reducing the carbon footprint, limiting the amount of waste generated and rational use of resources. The hospital regularly conducts educational campaigns among patients on the proper storage of cytostatic drugs used as part of the lung cancer drug program administered orally at home and the proper segregation of waste, and periodically holds a medical picnic entitled Saturday for health. In addition, many outgoing activities were organized aimed at, among others: performing free chest X-rays for the local community. The hospital has undertaken the Race to Zero climate challenge, committing to achieving net zero carbon dioxide emissions by 2050 at the latest. and the Health challenge Care Climate Challenge



GLOBAL
GREEN and
HEALTHY
HOSPITALS

The actions taken were appreciated both in Poland and abroad. The hospital was announced in 2023. winner of the 2023 Healthcare Climate Challenge in the categories

a) Climate Champion (the first ever elite Climate Champion award is awarded to one institution in each region that stands out in its work. The hospital in Wolica became the representative of Europe)

b) Resilience to climate change - Gold medal

The Healthcare Climate Challenge is organized annually by GGHH, an international network of hospitals, healthcare facilities, healthcare systems and health organizations committed to reducing their environmental footprint and promoting public health and the environment. Global Green and Healthy Network Hospitals has over 1,900 members in over 80 countries using innovation, ingenuity and investment to transform the health sector and support a healthy, sustainable future)

In addition, the hospital's achievements include awards and distinctions, such as the title of the Best Hospital in the Greater Poland Voivodeship, 6th place in the national ranking in the "Hipokrates 2023" medical plebiscite, Polish Quality Award 2023 for exceptional standards of care combined with the implementation of green ecological solutions, the Zielony Feniks 2023 distinction for achievements in the implementation of eco-energy solutions and technologies , title of Symbol of Modern Medical Care 2023, Winner of the Green Initiatives Ranking (2023), Winner of the Polish Quality Award 2023, Winner of 6th place in the category: "Actions to protect health and the natural environment". The hospital has an Accreditation Certificate, which confirms that the Lung Diseases and Tuberculosis Hospital in Wolica, headed by Director Wysocki, meets the accreditation standards for hospital treatment in the scope of the medical facility's activities, the ISO 14001: 2015 and ISO 9001: 2015 Environmental Management System Certificate, the "Safe Hospital is a safe patient.



THE POWER OF A TEAM

The hospital structures established a Team for the implementation of Eco solutions, called the Main Team, which is an auxiliary body of the Director of the WS ZZOZ Lung Diseases and Tuberculosis Center in Wolica, and the so-called purposeful thematic teams for health care workers, for infrastructure, technology, products, water and sewage management and medical waste management, for energy, for pharmaceuticals, for international contacts and education. Each person appointed to participate in the creation of a green hospital plays an important role in building mechanisms leading to the climate neutrality of the facility.

Based on reports on actions taken by individual teams, we review the chosen path every quarter. The core team and the General Director and Directors of individual organizational units, including the Deputy Director for Technical and Operational Affairs and the Deputy Director for Medical Affairs, analyze climate-related issues of strategic importance, including action plans, risk management, available budget, and investing in climate opportunities. This gives us the opportunity to early identify critical threats and review progress in implementing initiatives undertaken, and enables risk management, including timely responses to climate-related threats.

The solution works well in our facility - we recommend it to other entities

