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## World Experience of University Sustainable Development

**Abstract**

*Introduction.* A typical practice of the world's leading countries is the transformation of higher education institutions into agents of change in society. In the XXI century, these changes are primarily focused on various aspects of sustainable development of the country and its regions. Currently, it is the universities, together with NGOs, that have the greatest impact on the achievement of the Sustainable Development Goals proclaimed by the UN for 2015. *The purpose of the research* is to analyse the global experience of sustainable development in higher education institutions (HEIs). *Methodology.* This study used the cognitive method of analysis. In order to obtain the most objective research results, the authors studied the universities included in the international Times Higher Education Impact Rankings. The study covered universities from all over the world that were included in the top 50 of the rating. The results of the analysis are systematised according to geography (the article includes several sections characterising the sustainable development of universities in Europe, the United States, Canada and Australia). *Results.* Higher education institutions are now expected to become leaders in sustainable change in the country, economy and society. The world's leading universities are demonstrating how to progressively transform their activities in line with sustainable principles. They are investing heavily in the implementation of the latest technologies for energy saving, water conservation, campus landscaping and waste recycling. Since they have access to areas where the natural complex is preserved, universities are trying to support these areas and create favourable conditions for using them as living laboratories in educational and research processes. Universities offer sustainable development and lifestyles as part of their educational activities (public lectures, expert workshops, specialised short-term online training, etc.). Universities influence the achievement of the Sustainable Development Goals through their educational and research (inventive) activities. *Conclusion.* The main directions of sustainable development in higher education institutions are 1) sustainable development of the campus (carbon neutrality, rational consumption, energy efficiency, waste recycling, optimisation of drinking water consumption, green transport, food safety for students); 2) sustainable educational programmes and courses (a sustainable component in students' bachelor and master theses); 3) sustainable research (innovative technologies against climate change, water conservation, energy saving, etc.); 4) management (internal regulatory documents on sustainable development, specialised sustainability centres to promote and support sustainable initiatives). Long-term partnership with stakeholders (entrepreneurs, local authorities and students as agents of future sustainable change) plays an important role in ensuring sustainability. The sustainable development strategy of a modern higher education institution should be based on the principles of complexity and coherence, which will not allow sustainability measures and initiatives to be fragmented and asynchronous. Areas for further research include building a theoretical and methodological framework for the development of an integrated ecosystem of sustainable development of universities.

**Keywords**

sustainable development, Sustainable Development Goals, sustainable development concept, higher education institution, sustainable initiatives, sustainable campus, sustainable curricula, sustainable research

**JEL:** I21, I23



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**DOI:** <https://doi.org/10.30525/2500-946X/2023-1-12>

## 1 Introduction

Russia's full-scale war against Ukraine has resulted in huge losses in the higher education system. The destruction and significant damage to the educational and research infrastructure, the change in the format of studies, the loss of human capital – this is not a complete list of the problems that Ukrainian universities faced during the war. However, the value and role of education is so important for the future of the country and its economy that the issue of its reconstruction and renovation cannot be put on the back burner. Today, despite the war, higher education institutions are investing considerable efforts and resources in the restoration and development of learning and research processes. The reconstruction of the national higher education system and Ukrainian universities should be comprehensive and not limited to the restoration of academic buildings and research laboratories. According to the authors, such reconstruction should be based on the principles of sustainable development. This will ensure the long-term growth of the competitiveness of Ukrainian universities through the qualitative transformation of higher education, the expansion of equal access to quality education for different categories of the population, the mitigation of the negative impact of global economic problems on the lives of citizens through the application of innovative research results, and the expansion of partnerships with various stakeholders in Ukraine and abroad. The development of an effective model for the renovation of Ukrainian universities based on the concept of sustainable development requires familiarisation with the best world experience in this area.

## 2 Methodology

This study used the cognitive method of analysis. In order to obtain the most objective research results, the authors studied the universities included in the international Times Higher Education Impact Rankings (THE Impact Rankings). The study looked at HEIs from around the world that were in the top 50 of the ranking. This made it possible to remove subjectivity from the assessment of the progress of the world's universities in terms of sustainable development.

The 2022 Impact Rankings include an assessment of 1,406 universities from 106 countries in terms of their impact on the Sustainable Development Goals (SDGs). The ranking of higher education institutions uses a set of indicators that characterise their research, management, engagement and teaching in the field of sustainability. This approach of the rating methodology is the most complex, as it includes different aspects: the effectiveness

of research processes related to the problems of sustainable development of the country; parameters of involvement of different categories of stakeholders in the activities for the implementation of the SDGs; transformation of the management of higher education institutions in terms of sustainability; modernisation of the educational process by integrating the principles of sustainability (The Times Higher Education). In addition, the indicators included in the rating methodology are used to evaluate universities in different countries in the context of all 17 SDGs.

The results of the analytical research presented in the article are systematised, in particular, the authors grouped the leading universities according to the geographical principle and in terms of the number of higher education institutions in the top 50 of the rating. This approach made it possible to identify the features of sustainable development of higher education institutions in different regions, to outline the best practices, which will be integrated into the authors' conceptual model of post-war reconstruction of higher education institutions in Ukraine in accordance with the concept of sustainable development in the next stage of their research.

The purpose of this article is to analyse the global experience of sustainable development in higher education institutions.

## 3 Results

### 3.1 Australian Higher Education Institutions

The top 50 of the Impact Rankings in 2022 included 8 higher education institutions from Australia. Actually, the leader of the rating is Western Sydney University, which in the context of the Sustainable Development Goals was ranked number 1 in the world according to SDG6, number 2 – for SDG12, number 3 – for SDG5, number 4 – for SDG10, number 5 – for SDG17, number 9 – for the SDG 14, number 10 – for SDG15 (The Times Higher Education). The University has shown significant progress in achieving the SDGs since 2017, when it signed the UN Sustainable Development Solution Network [19]. Sustainable and Resilience 2030 Decadal Strategy, which includes the following Vine Interconnected Priority Statements: Aboriginal and Torres Strait Islander knowledge Histories and Cultures; Regenerative Systems; Resilient Cities; Climate Action; Economic Transitions; Ethical Artificial Intelligence; Food security and Sustainable agriculture; Justice; Partnership were developed by this university (Sustainable Development Goals 2030). The university has adopted a systematic approach to ensuring sustainable change, which allows a sustainable component to be integrated into the educational process, research and

collaboration with stakeholders. In particular, as part of its educational activities, the university has launched the 21C project, which includes the following three streams: curriculum transformation, teaching transformation and alternative credential innovation (Sustainable Development Goals 2030). The 21C project aims to develop students' interdisciplinary skills necessary for successful employment and work in today's turbulent world. During the COVID-19 pandemic, the 21C project was adapted to meet the new challenges related to the transfer of the educational process to the online format.

As part of its research activities, Western Sydney University implements four interdisciplinary areas: education and work (SDG 4), environment and sustainability (SDGs 13, 14, 15), health and well-being (SDG 3), and urban living future and society (SDGs 11, 12) (Sustainable Development Goals 2030). In 2016, the University launched the Research Theme Programme, which aims to support researchers in collaboration with business and government, and to build new research networks to promote sustainable development. For 2022 and 2023, the programme defines the following key priority areas: equality and inclusion and zero carbon (Sustainable Development Goals 2030), which correlate with the SDGs.

Western Sydney University is committed to ensuring environmental sustainability. Within the university there is the Environmental Sustainability Unit, which deals with issues such as climate change adaptation, sustainable energy implementation, water management, waste management, biodiversity conservation, sustainable agricultural development, etc. (Sustainable Development Goals 2030). In addition, the unit supports the work of Living Labs, which are actively used for student learning and research by university academics, particularly in the areas of climate change and social responsibility.

Western Sydney University undertakes education and research projects related to sustainable development through local and global partnerships. The University collaborates with international organisations, educational institutions, businesses, local governments, NGOs, etc. Collaboration with a wide range of stakeholders allows, firstly, to ensure a high level of involvement of different population groups and representatives of different sectors of society in sustainable actions; secondly, to increase the effectiveness of information campaigns to promote the SDGs; thirdly, to increase young people's interest in sustainable education; and fourthly, to align research on sustainable development with applied needs and current requirements of business, communities and government. Based on Western Sydney University's extensive collaboration with stakeholders across a range of sectors (education, research, climate change,

etc.), it is quite reasonable that the university is included in the top five of the global assessment in terms of implementation of SDG 17.

The next Australian university to be included in the Impact Rankings 2022 is the University of Technology Sydney. The University is ranked 15th and has demonstrated the best results in achieving the SDGs: 6, 12 and 17 (The Times Higher Education). The university's management recognises that its role in the implementation of the SDGs is to conduct relevant research, promote the implementation of innovations, expand partnerships with stakeholders and collaborate with the community. It is emphasised that the University itself can inspire members of society to adopt sustainable lifestyles, sustainable governance, careful attitudes towards the environment, conscious waste management, responsible consumption, etc. Table 1 systematises some of the university's projects in the context of the SDGs.

The University of Technology Sydney has a strong team of experts in sustainable development education and research, ensuring high efficiency in the delivery of sustainable initiatives and projects. In addition, the University has several sustainable research centres: Centre for Clean Energy Technology; Centre for Green Technology; Centre for Technology in Water and Wastewater; Climate Change Cluster; Institute for Sustainable Futures, etc. It is also worth mentioning the high quality media coverage of all activities related to the achievement of the SDGs on the University's official website, which ensures their wide popularisation and increases the interest of stakeholders, young people and the public in the issues of sustainable development.

Another Australian higher education institution to be ranked in the top 10 of the impact rankings is La Trobe University. Placed 19th in the rankings, the university has demonstrated significant progress in implementing SDGs 3, 5 and 8 (The Times Higher Education). The University has set an ambitious target to become carbon neutral by 2029. The university is implementing a range of measures to improve energy efficiency, reduce greenhouse gas emissions, improve water efficiency and optimise waste management. In particular, La Trobe University will cease to use diesel fuel by 2020; it uses liquefied petroleum gas at a level of only 1% of total energy consumption; it has organised the collection and recycling of waste, its reuse, and chemical waste from laboratories is recovered or incinerated; in 2017, the university switched to 100% recycled paper; it promotes the use of sustainable transport on campus (La Trobe University). The university pays great attention to the sustainable development of its campus, namely: the installation of waste recycling containers; the use of a dehydrator to convert food waste into compost; increasing the number of fountains on campus to reduce

TABLE 1 Activities of the University of Technology Sydney to achieve the SDGs

Goal	Events, projects, initiatives
SDG1	– Scholarships to support disadvantaged students from Australia and the Asia-Pacific region; – Digital Mentoring Programme – organising interaction between international university students and people of retirement age during the COVID-19 pandemic.
SDG2	– Research to increase equity in the global marketplace; – Student initiative to provide free, nutritious, healthy and environmentally friendly meals to students four times a week (more than 4,000 meals per week)
SDG3	– Training of medical specialists, including specialist training for regional and remote indigenous communities; – An initiative to provide personal protective equipment to low-income countries during the pandemic.
SDG4	– Teacher training for schools in Australia and the Asia-Pacific region; – STEM X Schools Outreach Programme – engaging girls in STEM education
SDG5	– Research Equity Initiative and Multicultural Women's Network – promoting the employment of women in academic posts and senior positions at the University; – Women's Career Development Programme in Engineering and IT.
SDG6	– Research to improve wastewater management and develop technologies for water recycling and treatment; – Research to develop new technologies to convert wastewater treatment plants into green energy producers.
SDG7	– The transition to solar energy was declared – photovoltaic solar panels were installed on campus roofs; – Research into the use of clean energy technologies to improve energy efficiency
SDG8	– Research on safe employment; – University hosts Anti-Slavery Australia – action against forced or child labour, modern slavery
SDG9	– UTS ProtoSpace – additive manufacturing and 3D printing facility; – Biologistics Innovation Facility – biopharmaceutical manufacturing laboratory, etc.
SDG10	– Support for indigenous students; – Working with migration authorities in the fight against modern slavery
SDG11	– Pilot new smart city digital connections based on the use of Internet of Things technologies; – Granville Smart Precincts Pilot Project – applying innovative technologies to improve the quality of life, sustainability and productivity in Sydney's suburbs.
SDG12	– A plan to eliminate single-use plastic packaging has been developed, a plastic-free food court has been opened and a waste recycling system has been organised on campus; – Research into the production of bioplastics from algae
SDG13	– Climate change research; – Promoting carbon neutrality on campus, etc.
SDG14	– Pacific Reef Conservation and Management Initiative; – Coral Nurture Programme – working with the tourism industry to accelerate the recovery of the Great Barrier Reef
SDG15	– Research into the identification of flammable plant species for the control of forest fires; – Research into the resilience of some species
SDG16	– The University hosts the Australian Legal Information Institute; – AustLII – a free, open access resource for Australian legal information
SDG17	– Pacific Connect Programme Evaluation – Expanding collaboration and idea transfer between Australia and the Pacific region, particularly in the use of digital technologies to support sustainable development; – Adrift – stakeholder use of a simulated web environment to map the ocean journeys of marine microbes.

Source: compiled by the authors based on [20]

the consumption of bottled water; the use of photovoltaic panels on roofs to generate its own electricity, etc. (La Trobe University). The university has established the La Trobe Climate Network, which brings together researchers working on climate change issues and climate resilience (La Trobe University).

In 2022, RMIT University was ranked 22nd in the Impact Rankings (The Times Higher Education). The University aims to become carbon neutral by 2025; in 2021 RMIT achieved a 74% reduction in operational carbon emissions compared to 2017.

The Climate Adaptation Plan includes modifying the built environment, ensuring the energy efficiency of buildings, installing solar PV on the roofs of university buildings and purchasing renewable energy (RMIT Australia). The University is taking a comprehensive approach to solving the problem of waste recycling on campus, considering the management of different types of waste and reducing the rate of waste diversion to landfill. Among the priorities of sustainable development, KMIT also highlights the optimisation of water use, in particular it implements large-scale initiatives

to collect water on campus (rainwater reuse tanks, grey water, fire water are installed), conducts enhanced monitoring of water consumption (40 smart meters are installed), organises water extraction from the local catchment pond (it is used to irrigate garden beds on campus), installs hydration stations and drinking fountains, and so on (RMIT Australia).

The University of Tasmania is ranked 25th in the Impact Rankings and has made the most progress on SDG13 (The Times Higher Education). The university has organised the Education for Sustainability Community of Practice and is introducing training courses on sustainable development. Sustainability research is conducted by the Future Energy Research Group, the Climate Futures Research Group, the Centre for Renewable Energy and Power Systems, the Healthy Landscapes Research Group, and the Sustainability, Place and Society Research Group (University of Tasmania). For the successful implementation of activities to achieve the SDGs, the University of Tasmania establishes effective interaction with external partners (University of Tasmania).

In addition to the cases analysed above, the following universities in Australia were included in the top 50 of the rating University of Newcastle (30th), University of the Sunshine Coast (31st), Monash University (42nd) (The Times Higher Education). However, the scope of this article does not allow a detailed analysis of the sustainable development experiences of these institutions.

Summarising the Australian experience of sustainable development in higher education institutions, it can be concluded that universities, which have several campuses with picturesque natural areas, take care of the landscaping of their campuses, the conservation and maintenance of natural areas, and their use in educational and research processes (as living laboratories). The diversity of Australian universities' activities allows them to cover the fields of medicine, economics, engineering, law, education, biology, etc., within the framework of sustainable initiatives. A range of measures are being implemented on campuses to improve energy efficiency, optimise the use of potable water, establish a waste management system and reduce greenhouse gas emissions. All sustainable projects and initiatives are supported by the management of the universities. The system of institutions responsible for the planning, organisation, coordination and reporting of the universities on sustainable development and the implementation of the SDGs is developing. The vision, objectives, priorities, tasks and plans are set out in the official regulatory documents of the universities, which pushes them to achieve the key performance indicators defined in these documents. Universities publish information on the actions taken and report on their progress on

the websites and social networks of the educational institutions.

### 3.2 American Higher Education Institutions

In 2022, the following 3 American higher education institutions were in the top 50 of the Impact Rankings Arizona State University (Tempe) (2nd), Michigan State University (33rd), Penn State (main campus) (47th) (The Times Higher Education). In addition, 4 other universities in the United States were ranked in the top 100 (63 – Oklahoma State University; 96 – New Jersey Institute of Technology; 98 – University of South Florida; 98 – Virginia Polytechnic Institute and State University) (The Times Higher Education). Therefore, it's worth analysing the best sustainable development practices of some of these universities.

The best position among American higher education institutions in the rating is occupied by Arizona State University (Tempe), which is in 2nd place (The Times Higher Education). This university is home to the Global Institute of Sustainability and Innovation (Global Institute of Sustainability and Innovation), the School of Sustainability (School of Sustainability) and other structural units whose activities are focused on achieving the SDGs and ensuring the sustainable development of all university campuses. The university received the highest scores for SDGs 11, 14 and 15. Arizona State University constantly monitors and regularly updates information on research, experts, publications, courses and initiatives related to all 17 SDGs on its official website (Arizona State University. SDG Impact).

The university is also a member of organisations that bring together representatives from different sectors of the economy and society (national and local governments, the business sector, the public sector, education and science). For example, the Global Carbon Removal Partnership has demonstrated strong results in its activities, and its participants are making great efforts to improve the policy and market environment in terms of minimising carbon emissions. In addition, the University is a member of the New Carbon Economy Consortium, which develops applied innovation approaches to create a carbon neutral world. The University is an active participant in the Connective multi-stakeholder consortium, implementing the latest technological solutions to ensure the sustainable development of the Phoenix area (Arizona State University. ASU News).

Some 200 countries that are members of the Inter-Parliamentary Union use the videos from the modular gender training developed by Arizona State University in their activities. The main target group of this training is parliamentarians, government officials and agents of global change;

the main objective is to fight for the abolition of discriminatory laws against women. In addition, university staff have developed the Global SDG5 Notification Tool, which allows users to track progress on legal gender equality in 190 countries around the world (Arizona State University. ASU News).

The Decision Center for a Desert City and the Kyle Center for Water Policy provide research, education and partnerships on water management in Arizona. The university also has the Swette Center for Sustainable Food Systems, whose activities are aimed at conducting research and providing education on ensuring the integrity of agricultural systems and food safety projects (Arizona State University. ASU News). The above are just some of the sustainable development activities and initiatives undertaken by Arizona State University.

A long way behind Arizona State University, which came second in the 2022 Impact Rankings, was Michigan State University, which made it into the top 50 HEIs. Ranked 33rd, it is the second most sustainable university in the United States. Michigan State received the highest score for its efforts to achieve CSR 17 and 2 (The Times Higher Education). By leading by example, the University encourages young people to think and act sustainably and implements a range of activities in line with four pillars of success: Campus, Curriculum, Community and Culture (About Sustainability at MSU). The university has an Office of Sustainability, which is the main coordinator of events and initiatives to promote the idea of sustainable development. A smart campus and extensive infrastructure are identified as key factors in the development of academic entrepreneurship and sustainable business (energy issues, biodiversity, building standards, procurement, campus transport, etc.) (About Sustainability at MSU). The university is transforming its campus by collaborating with partners and creating an environment that encourages innovative student and staff activities. Michigan State University's sustainable facilities include: MSU Gardens, Baily Greenhouse & Student Organic Farm, Recycling Centre and Surplus Store, Red Cedar River, Leed-certified buildings, South Campus Anaerobic Digester, Student Solar Table, MSU Solar Carports. They enable both educational and research processes through live teaching laboratories, waste management centres, introduction of renewable energy use, etc. The University pays special attention to the integration of the sustainable component into the educational process, the introduction of sustainability education programmes (e.g., Environmental Studies and Sustainability; Environmental Economics and Management; Sustainable Parks, Recreation and Tourism; Agriculture, Food and Natural Resources Education,

etc.). It follows from the above that Michigan State University has a comprehensive and systematic approach to ensuring its sustainable development, covering regulatory aspects, educational and research processes, logistics and infrastructural support of university activities.

In the top 50 of THE Impact Rankings, there is another American higher education institution – Penn State (main campus). Ranked 47th in 2022, this institution received positive points for the implementation of SDGs 11, 14, 15, 17 and 2 (The Times Higher Education). Education, research, campus and collaboration with stakeholders are the main areas in which the concept of sustainable development is implemented at the University. In particular, the Bachelor's programmes such as Sustainability Leadership, Energy and Sustainability Policy, Earth and Sustainability. Research on sustainable development is conducted by the Sustainability Institute, the Institute of Energy and the Environment, the Materials Research Institute, the Insect Biodiversity Institute, the Penn State Smeal Center for the Business of Sustainability, and the Sustainable Experience Center – a 9-acre living laboratory for students and researchers located on the university's Park Campus (Penn State). A number of projects and initiatives are being implemented within the university campus, such as: landscaping the grounds and buildings; sustainable transport; recycling, composting and other waste management; ensuring energy efficiency and implementing renewable energy; and ensuring food safety (About the Sustainability Institute). The University invests significant efforts to ensure equal access of students and teachers to sustainable initiatives and activities, as the successful achievement of the Sustainable Development Goals is only possible on the basis of a high involvement of stakeholders from different sectors of society and economy.

Thus, the study of the cases of American higher education institutions in terms of their sustainable development allows us to conclude that they realise the principle of leadership by justifying the importance and benefits of sustainable development through their own example, acting as pioneers, initiators, innovators and agents of sustainable change. Universities in the United States of America take great care in landscaping their campuses, implementing the latest energy-saving technologies, preserving natural areas and using them as living laboratories for education and research. Much attention is paid to working with young people (through sustainability awareness campaigns) and the general public (through promoting the principles of sustainable development). One of the key principles of sustainable development at American universities is transparency – all information on sustainable initiatives, activities and projects is posted promptly on their official

websites, and regular reporting on their progress towards achieving the Sustainable Development Goals is also introduced. Education, research, campus and stakeholder partnerships are the focus of sustainable change agents in higher education in the United States of America.

### 3.3 Canadian Higher Education Institutions

In 2022, the Times Higher Education Impact Rankings included 10 Canadian higher education institutions. The third place in the ranking was occupied by Western University, which showed the best results in achieving SDGs 1, 2 and 9 (The Times Higher Education). The university is investing heavily in building a sustainable campus. To this end, green spaces are created, ecological landscaping of areas is carried out, greenhouses and 13 LEED buildings are maintained. The university is concerned about reducing carbon dioxide emissions, reducing energy consumption on campus, expanding the practice of using renewable energy, and creating a new vision for centralised energy use to mitigate the negative impact of climate change (Western Sustainability). In addition, Western University is committed to reducing and diverting waste: about half of all campus waste is diverted from landfills and is recycled and turned into organic streams; waste management programmes are constantly being improved; Zero Waste Stations have been introduced on campus, making it much easier to sort waste. Much attention is paid to conserving potable water and improving the efficiency of its use through real-time monitoring of water meters; maintenance of 651 backflow prevention devices;

ensuring water reuse. In addition, bottle filling stations are being installed on campus during campus renovations and new building construction (to reduce the use of single-use plastics); Landscape Services is reducing the number of water-intensive plants and turning off irrigation systems in mature landscaped areas (Western Sustainability). In addition, the University encourages the use of green transport on campus, green procurement and sustainable and healthy eating. A more detailed description of the University's contribution to the achievement of the SDGs is presented in Table 2.

The 7th place in the 2022 rating was awarded to Queen's University, which has made the most progress in achieving SDG1 (2nd in the world), SDG11 (3rd in the world) and SDG16 (2nd in the world) (The Times Higher Education). Some of the University's most significant events and projects in relation to sustainable development include the following:

- Commitment Scholars programme to provide financial support to students from under-represented groups who demonstrate a strong commitment to the principles of racial and social justice;
- The Swipe It Forward programme, which provides free food to students who have experienced food insecurity;
- Supporting the University's Snodgrass Arboretum, Elbow Lake Environmental Education Centre and ensuring broad public access to its initiatives;
- The Scholars at Risk Programme, which provides temporary research and teaching positions for

TABLE 2 Western University's activities to achieve the SDGs

Goal	Activity
SDG1	<ul style="list-style-type: none"> <li>- Research aimed at overcoming poverty in society;</li> <li>- Participation in the Homes4Women project to provide housing for homeless women;</li> <li>- Providing free legal services to low-income people (Community Legal Services of the Faculty of Law);</li> <li>- Providing financial and social support to students affected by the COVID-19 pandemic.</li> </ul>
SDG2	<ul style="list-style-type: none"> <li>- Research to develop effective circular supply chains with farmers, manufacturers and retailers;</li> <li>- Implementing the multi-strategy nutrition education research programme (FRESH);</li> <li>- Ensuring food safety for students, staff and community members (Food Support Services)</li> </ul>
SDG3	<ul style="list-style-type: none"> <li>- Research into the benefits of probiotics;</li> <li>- Participation in a global trial of innovative technologies to diagnose and treat tuberculosis in Madagascar;</li> <li>- Activities to promote physical activity and well-being among older adults (Canadian Centre for Activity and Aging);</li> <li>- Encouraging staff to participate in university wellness events;</li> <li>Implementation of the Global Health Systems Masters Programme;</li> <li>- Providing free and confidential services to students (Health and Wellness)</li> </ul>
SDG4	<ul style="list-style-type: none"> <li>- Supporting and developing the STEM skills of students with autism (STEM and Social Skills Programme);</li> <li>- Supporting the wellbeing of the community through regular public lectures; - Introducing broad support for students through various scholarships, awards, etc.</li> </ul>
SDG5	<ul style="list-style-type: none"> <li>- Interdisciplinary research on the impact of gender-based violence on health and well-being;</li> <li>- Implementing a range of programmes to promote STEM education for girls (Go Eng Girl; Go CODE Girl);</li> <li>- Support for single mothers, women experiencing violence or homelessness (Empower Club);</li> <li>- The development of the Gender, Sexuality and Women's Studies Department.</li> </ul>

(End of Table 2)

Goal	Activity
SDG6	<ul style="list-style-type: none"> <li>– Facilitating the work of the Western Water Centre, which develops solutions for water supply management and treatment;</li> <li>– Implementation of specialised undergraduate and graduate courses in water resources management, wastewater management, hydrology and groundwater modelling;</li> <li>– Applying technical solutions (water meters with real-time data transmission; low-flow taps and shower heads) to reduce water consumption.</li> </ul>
SDG7	<ul style="list-style-type: none"> <li>– Research into the efficient use of energy and the supply of energy resources in the world;</li> <li>– Annual competition to reduce the energy consumption of various University buildings (Residence Powers Down Energy Challenge);</li> <li>– Implementation of the Sunstang project to create solar cars (environmentally friendly, competitive, suitable for motor racing);</li> <li>– Introduction of bachelor courses in environmental science</li> </ul>
SDG8	<ul style="list-style-type: none"> <li>– Research by the Centre for Human Capital and Productivity;</li> <li>– Supporting initiatives and training programmes on equality and diversity in employment (Equality, Diversity and Inclusion Advisory Council);</li> <li>– Regular surveys of staff on the strengths and weaknesses of the University as a place to work.</li> </ul>
SDG9	<ul style="list-style-type: none"> <li>– Application of innovative technologies by research centres dealing with infrastructure development issues;</li> <li>– Competitions to promote innovative ideas for solving environmental problems (Western's Ideas for Sustainability and the Environment);</li> <li>– Stimulating the commercialisation of research results through licensing and the creation of new companies;</li> <li>– Supporting and organising a series of events for start-ups (Accelerator Morrissette Institute);</li> <li>– Modernisation of university buildings to reduce energy consumption.</li> </ul>
SDG10	<ul style="list-style-type: none"> <li>– Research by the Centre for Research and Social Inequality, dedicated to the study of income inequality, family dynamics, racial or ethnic segregation;</li> <li>– An information campaign to promote the study of best practices in international education, intercultural skills, traditions, etc;</li> <li>– Study of migration issues, ethnic relations, cultural diversity, conflicts, and integration of migrants</li> </ul>
SDG11	<ul style="list-style-type: none"> <li>– Conducting research on the development of sustainable cities and communities;</li> <li>– Consultation and cooperation with local authorities and policy makers;</li> <li>– Implementing a range of green transport initiatives (charging points for electric vehicles, subsidised car passes, secure bicycle parking, a network of cycle and pedestrian paths).</li> </ul>
SDG12	<ul style="list-style-type: none"> <li>– Implementation of a series of activities to raise student awareness of environmental issues on campus (EnviroWestern);</li> <li>– Introduction of undergraduate courses in chemical and biochemical engineering covering a range of aspects including water and air consumption, renewable fuel sources and carbon emission reduction.</li> </ul>
SDG13	<ul style="list-style-type: none"> <li>– Research into the development of solid-state batteries to combat climate change and reduce greenhouse gas emissions;</li> <li>– Support for three-dimensional chamber operations to investigate wind-related problems, assess energy potential and identify damage risks;</li> <li>– Launching the new Climate Change and Society programme</li> </ul>
SDG14	<ul style="list-style-type: none"> <li>– Study the landscape processes that remove mercury from the atmosphere, recycle it and export it to rivers and lakes;</li> <li>– To study the location of freshwater fish in Canada and their existence under the influence of stressors;</li> <li>– Supporting the work of the Marine Biology Society at Western student group, which aims to provide information about the current state of marine life (oil spills, plastic pollution, global warming).</li> </ul>
SDG15	<ul style="list-style-type: none"> <li>– Research into forest fires and the effects of global warming on forests;</li> <li>– Supporting the Western Wildlife Conservation Society student organisation, which engages young people in wildlife conservation;</li> <li>– Practices for maintaining environmentally friendly and beneficial plantings on campus;</li> <li>– Biology students receive credit for conducting research abroad</li> </ul>
SDG16	<ul style="list-style-type: none"> <li>– Research on reconciliation, justice, criminal responsibility and legal reconstruction;</li> <li>– Documentation of the civil war in El Salvador (Surviving Memory);</li> <li>– Working with the Canadian Red Cross on humanitarian crises;</li> <li>– Implementation of the Local Government Programme for students.</li> </ul>
SDG17	<ul style="list-style-type: none"> <li>– Conducting interdisciplinary research with researchers from Canada, the UK, New Zealand and other countries;</li> <li>– Implementing the Community Engaged Learning initiative;</li> <li>– Organising the annual international competition World's Challenge, in which students from different universities offer solutions to current environmental, economic, social problems, etc.</li> </ul>

Source: compiled by the authors based on (Western Sustainability)



scholars who find themselves in situations of military conflict, war, or other threats to their lives and health;

- Participation in the Karta Initiative to provide educational opportunities to young people from low-income families in rural areas of India;
- Black Youth in STEM programme to attract African Canadians to elementary school to study technology, engineering, science, mathematics and modelling;
- Leanpath Spark programme to measure food waste;
- The Queen's University Biological Station as Canada's leading scientific field station for environmental research;
- Ban Right Centre to support women and their associations and initiatives;
- Measures to reduce carbon gas emissions (Western Sustainability).

Research and teaching on sustainable development is carried out by the Institute for Sustainable Finance, the Institute for Energy and Environmental Policy, the Beaty Water Research Centre, the Biological Station, the Faculty of Arts and Science. The University's management pays great attention to information activities aimed at promoting the concept of sustainable development, disseminating information and reporting on implemented projects and sustainability initiatives.

The next Canadian university in THE Impact Rankings is the University of Alberta (11th place). This university has adopted a sustainability plan called "Building a Sustainable Future". This plan focuses on the following priorities: leadership, education, research, operations, infrastructure, culture, community, well-being and health. The Office of Sustainability coordinates the implementation of sustainable projects and initiatives, communicates with university leadership, and develops reports. The University of Alberta consists of 500 buildings, five campuses, farmland, forests, hospitals, etc. A number of the university's research projects use the campus as a living laboratory. It has become common practice for university researchers to give public lectures on the wide range of topics related to sustainable development. Much attention is paid to involving young people in solving sustainable development problems. In particular, in addition to training courses on sustainability, the Student Summit, Sustainability Awareness Week and the activities of student clubs (Augustana Earthwise, Le Campus Vert, North Campus, other student associations) are supported. In addition, undergraduate students at the University have the opportunity to receive the URI Undergraduate Researcher Stipend to conduct interdisciplinary sustainability research projects under the supervision of a mentor (the stipend is \$6,000 and the project duration is 4-12 months).

The Sustainability Council at the University of Alberta is involved in coordinating a range of sustainability activities, academic networking activities, experiential learning, research and teaching that ensure the integrity and coherence of processes to achieve the SDGs (University of Alberta).

The 12th place in the world in terms of sustainable development in 2022 was occupied by the University of Victoria, which showed the best results in relation to the following SDGs: 13, 12, 14, 15 (The Times Higher Education). The University widely implements a sustainable component in its academic activities, offering a number of undergraduate and graduate courses and disciplines related to sustainability. The University of Victoria's research activities place it at the forefront of the Canadian research system and contribute significantly to solving economic, social and environmental problems. The University's major research programs are implemented through Ocean Networks (coastal and Arctic marine observatories), the Pacific Institute for Climate Solutions (developing solutions to climate change and informed, effective solutions to build sound public policy), and the POLIS Water Sustainability Project (Centre for Water Policy Research and Management). In addition to the University's researchers and students, the general public is also involved in the implementation of sustainable research projects through the activities of the Institute for Studies & Innovation in Community University – Engagement, the Centre for Community Health Promotion Research, and the Centre for Co-operative and Community-Based Economy. A brief description of the main objectives defined in the Sustainability Action Plan is given in Table 3.

The 13th place in the 2022 THE Impact Rankings is occupied by the University of British Columbia, which has the best results in achieving SDGs 9, 12 and 17 (The Times Higher Education). More than 80% of the university's faculties offer students courses related to sustainable development (that's almost 780 courses); there are more than 160 research groups working on sustainable development issues; more than 100 student research projects on sustainability are being conducted; almost \$29,000 has been invested in the development of the climate change curriculum. Considerable attention is paid to the sustainable management of the campus: reducing greenhouse gas emissions; improving the energy efficiency of buildings; promoting a culture of waste management, recycling and reuse; reducing the intensity of consumption of water resources; setting up special facilities for childcare on campus; introducing the practice of using sustainable transport, and so on (The University of British Columbia).

The top 20 of THE Impact Rankings in 2022 included another Canadian university – the University

TABLE 3 Key objectives of the University of Victoria Sustainability Action Plan

Goal	Description
Administration	Integrate sustainability principles into campus development planning, operational and administrative processes, and stakeholder interaction and communication.
Buildings	Application of environmental building standards in the construction, renovation or maintenance of university buildings
Computing	Promote sustainability principles for responsible procurement, energy management and waste reduction in computing services and infrastructure maintenance.
Dining services	Providing high quality, nutritious and diverse food through local sourcing initiatives to support community health and well-being
Energy	The development of such a campus, which would be a comfortable environment to study and work in, would promote a culture of energy conservation based on innovation and stakeholder involvement in improving the efficiency of university buildings.
Engagement	Provide opportunities for students, teachers and community officials to participate in interaction programmes, events, training, etc.
Grounds	Create and support the development of a campus landscape that focuses on minimising negative environmental impacts and promoting biodiversity.
Purchasing	Advising and providing sustainable procurement and supply management services to the campus community
Transportation	Transforming the campus into the centre of a regional sustainable transport network; creating green transport options for every member of the campus community.
Waste	Making the University a Zero Waste Campus
Water	Making the University an innovator in water reduction, reuse, recovery and management

Source: compiled by the authors based on (University of Victoria)

of Guelph, which appeared in 16th place, showing the greatest progress in achieving SDGs 17, 1 and 2 (The Times Higher Education). According to the university's official website, 250 scientists are engaged in sustainability research, 123 solar photovoltaic panels have been installed on campus, 25 electric vehicle charging stations have been built on campus, the vast area of the campus is considered a LEED-certified building space, and modern environmental solutions are used in the design of the campus (University of Guelph). The university campus is used as a living laboratory in the educational process (when teaching disciplines related to sustainability) and in research on sustainability issues. In addition, the university is implementing a number of sustainable initiatives related to climate change adaptation, resource recovery, water efficiency, green building design and food safety.

Thus, the analysis of the Canadian experience of sustainable development in higher education institutions showed the need, firstly, to provide regulatory support; secondly, to develop the organisational structure in terms of forming specialised centres, units or departments; thirdly, to invest in sustainable initiatives. Canadian universities are focused on creating a holistic ecosystem that encourages students, faculty, researchers and staff to shift the paradigm towards sustainable lifestyles, generate innovative solutions to achieve the SDGs, and implement research projects on sustainable issues. While paying tribute

to sustainable development and the greening of campuses, the leadership of Canada's post-secondary institutions is not limited to these, but also encourages and supports the implementation of measures to overcome poverty, hunger, food security, well-being, healthy lifestyles, gender equality and other SDGs.

### 3.4 European Higher Education Institutions

Taking into account Ukraine's stable European integration intentions, it is valuable for Ukraine to study the leading European experiences in ensuring sustainable development. Here, the focus will be on individual cases of European universities that describe their progress in achieving the SDGs and operating on the basis of the concept of sustainable development.

The top 50 of the 2022 Times Higher Education Impact Rankings include 15 Western European HEIs, including 10 from the UK and one each from Portugal, Denmark, Italy, Sweden and Ireland (The Times Higher Education). In eighth place is Newcastle University from the UK. Among the priorities of its sustainable development, this university highlights the integration of the principles of social and economic justice in different areas. Significant efforts are being made to create a sustainable campus, where a team is working to maintain environmental sustainability and implement energy and waste management systems (Sustainable Campus). The adopted

TABLE 4 Newcastle University efforts to achieve SDGs

Goal	Key activities and initiatives
SDG 1	<ul style="list-style-type: none"> <li>– Support for the work of the North East Commission on Child Poverty (including efforts to address the cost-of-living crisis);</li> <li>– Support for the internationally recognised North East Solidarity and Learning Organisation (including initiatives to address the global refugee crisis in the North East);</li> <li>– Financial support for low-income applicants and students (in the form of bursaries, loans and grants).</li> </ul>
SDG 2	<ul style="list-style-type: none"> <li>– Projects on nutrition, food security and the future of agriculture;</li> <li>– A specialised Master's degree in "Sustainable Agriculture and Food Security", a number of Bachelor's degree programmes related to agriculture;</li> <li>– Information campaigns to raise awareness of food safety issues in the world.</li> </ul>
SDG 3	<ul style="list-style-type: none"> <li>– A strong Faculty of Medical Sciences with a long history, extensive training and research structure;</li> <li>– Research aimed at overcoming the negative effects of COVID-19;</li> <li>– Programmes to support the wellbeing of staff and students (including the Centre for Social Assistance and Support and world-class on-campus sports facilities).</li> </ul>
SDG 4	<ul style="list-style-type: none"> <li>– The development of lifelong learning;</li> <li>– Wide and free access to the resources of the university library;</li> <li>– Free public lectures;</li> <li>– Financial support for students;</li> <li>– Special support for refugees</li> </ul>
SDG 5	<ul style="list-style-type: none"> <li>– Membership of the Athena SWAN Charter, which promotes gender diversity in academic and research environments;</li> <li>– Preventing all forms of discrimination in the workplace;</li> <li>– NU Women Network, which supports women at the University;</li> <li>– Newcastle Women's Centre for Sustainable Development;</li> <li>– Gender Studies</li> </ul>
SDG 6	<ul style="list-style-type: none"> <li>– Public drinking water points on campus;</li> <li>– An environmental management system that contributes significantly to minimising water pollution and reducing water consumption in the University (including low water use planting, sustainable construction specifications for the campus that also reduce water consumption);</li> <li>– Water Research Centre, Water Engineering Group, etc.</li> </ul>
SDGs 7	<ul style="list-style-type: none"> <li>– Energy management system on campus;</li> <li>– Green building policy;</li> <li>– Energy efficiency in buildings;</li> <li>– Focus on achieving zero carbon emissions by 2030;</li> <li>– Energy Research Centre;</li> <li>– National Centre for Energy Systems Integration</li> </ul>
SDG 8	<ul style="list-style-type: none"> <li>– Ensuring appropriate levels of remuneration for staff;</li> <li>– Interaction with trade unions</li> </ul>
SDG 9	<ul style="list-style-type: none"> <li>– Modernisation of buildings based on innovations in energy efficiency;</li> <li>– Investment in renewable energy technologies, etc.</li> </ul>
SDG 10	<ul style="list-style-type: none"> <li>– University anti-discrimination policies covering aspects of student admissions, staff recruitment, student and staff support;</li> <li>– Dedicated Equality, Diversity and Inclusion team;</li> <li>– Accessibility of the campus and its buildings for people with disabilities;</li> <li>– Centres of Research Excellence (NUCoRe) focused on reducing inequality in research themes</li> </ul>
SDG 11	<ul style="list-style-type: none"> <li>– Green spaces and plants on campus;</li> <li>– Sustainable transport on campus;</li> <li>– Working with local authorities and organisations to support the sustainable development of the city;</li> <li>– Preserving the historic buildings that are part of the university, etc.</li> </ul>
SDG 12	<ul style="list-style-type: none"> <li>– Sustainable procurement policies aimed at optimising the consumption of materials and products;</li> <li>– Principles of waste reduction, reuse and recycling;</li> <li>– Control of waste disposal;</li> <li>– Respect for the principles of circular economy</li> </ul>
SDG 13	<ul style="list-style-type: none"> <li>– Climate Action Plan (2021), which sets out a series of measures to reduce carbon emissions and tackle the climate crisis;</li> <li>– The Centre for Climate and Environmental Sustainability, operating within the University's Research Experience Centre</li> </ul>
SDG 14	<ul style="list-style-type: none"> <li>– The Department of Marine Sciences, which carries out specialised research, runs free programmes and summer schools for young people, certain training courses and has launched an open distance learning course in marine sciences;</li> <li>– Research into freshwater pollution caused by mining activities</li> </ul>
SDG 15	<ul style="list-style-type: none"> <li>– Green campus, plantations that allow the preservation of natural diversity;</li> <li>– Research aimed at preserving biodiversity, monitoring changes in ecosystems, etc.</li> </ul>
SDG 16	<ul style="list-style-type: none"> <li>– Involvement of staff and student representatives in university management processes;</li> <li>– Supporting student self-government;</li> <li>– Social Justice Advisory Group to address social and environmental justice issues</li> </ul>
SDG 17	<ul style="list-style-type: none"> <li>– University professors who are actively working with the UN to achieve the SDGs;</li> <li>– Student Union, whose members are involved in implementing actions to achieve the SDGs;</li> <li>– The university is a signatory to the SDG Accord and is committed to publishing a report on the achievement of the goals.</li> </ul>

Source: compiled by the authors based on (Sustainable Development Goals)

sustainable development policy extends to educational and research processes, including all laboratories and areas of the University. In the academic year 2021/2022, the budget of the sustainable campus was approximately 930 thousand pounds (Sustainable Campus).

Newcastle University's high ranking in global sustainability indicators is explained by the large number of effective initiatives across all SDGs (Table 4).

As a strategic leader in the management of sustainability issues, Newcastle University has systematically approached the organisation of appropriate transformation processes in key areas of activity:

1) research – targeting scientific projects to solve problems related to ensuring sustainable development of the world, country and regions. In particular, specialised institutes, faculties and departments of the University have aligned their research topics with the SDGs; new structural units have been created at the University, these centres are specialised in sustainable development; they conduct doctoral research on various aspects of sustainability;

2) education – integration of sustainability principles into the educational process, development of specialised courses, bachelor's and master's programmes on sustainable development, as well as conducting thematic educational events for young people, public lectures on achieving the SDGs for a wide audience;

3) management – establishing effective interaction between the university administration and newly created structural units on sustainability, allocating adequate resources to attract talent to sustainable teams, and ensuring the successful implementation of programmes related to the achievement of the SDGs;

4) partnership – building effective and long-term cooperation of the University or its structural units with public, national, regional or international organisations whose activities are related to the SDGs; an important emphasis is placed on the broad involvement of students and employees of the University in the processes of planning and implementing sustainable programmes, as well as preventing any discrimination at any stage of cooperation; great attention is paid to increasing the interest of patrons and other stakeholders in programmes and projects for the sustainable development of the city, country, community, University.

The advantage of Newcastle University's sustainability policy is that it is based on the principles of openness and popularisation. This is reflected in the open-access nature of the University's reports, as well as the extensive coverage of sustainability events on the official website, with

regular updates. This transparency encourages young people to participate more actively in SDG implementation activities, partners to invest in sustainable initiatives, and other universities to implement proven sustainable development practices in their activities.

The ninth place in the 2022 Times Higher Education Impact Rankings was also occupied by a UK higher education institution, the University of Manchester (The Times Higher Education). In the context of the various SDGs, the role of the university in achieving them is described in Table 5.

The analysis of data from the official website of the University of Manchester (The University of Manchester) and its reports shows that this higher education institution is quite consistent and responsible in terms of promoting the implementation of the SDGs. Each of the objectives is covered by several applied projects and initiatives that aim not only to conduct research and teach sustainability principles, but also to achieve concrete practical results and/or impacts. The research component, which is reflected in research papers and their high citation index, is complemented by an educational component, which, in addition to formal education, is implemented in non-formal or informal education for a wide range of students of different ages, social status and income levels. The university's sustainable initiatives cover target groups from different countries, and their attention is focused on achieving specific, practical, quantitative and qualitative measurable results (the number of patients from socially vulnerable categories who have been helped; the amount of financial support to social entrepreneurs and start-ups; the impact on local or government policies; the number of innovative inventions and technologies that are environmentally friendly; the number and coverage of projects to help young talents and the elderly; the extent of commercialisation of research results; the updating and overcoming of environmental problems, etc.).

European universities are at the forefront of the global movement towards sustainable development of economies and societies. For example, the University of Glasgow (UK) has made significant progress in the implementation of SDG 11 'Sustainable development of cities and communities' (second in the world, according to the Impact Rankings-2022) (The Times Higher Education). This is ensured by the active participation of researchers from this university in research on urbanisation issues, in excavations within the museum collection of early medieval miscellaneous stones, the Govan Stones, as well as in the introduction of courses on sustainable urban change, housing and transport. In addition, the university is actively working with local authorities to reduce carbon emissions from housing (University of Glasgow).

TABLE 5 Activities of the University of Manchester to achieve SDGs

Goal	Key activities and initiatives
SDG 1	<ul style="list-style-type: none"> <li>– Europe's largest global development research and training institute focuses on poverty and inequality.</li> <li>– The Works Initiative, co-organised by the university, provides extensive support to the unemployed in finding work (since 2011, more than 4,000 people have received support through this initiative).</li> </ul>
SDG 2	<ul style="list-style-type: none"> <li>– A study of the food safety situation in the UK after the economic recession showed that the problem still exists, raised it in the political and information environment and allowed to develop a pilot tool to help the elderly with their diet;</li> <li>– Exploring the potential of electronics in food supply, sustainable energy production, improving precision farming, increasing productivity and reducing waste.</li> </ul>
SDG 3	<ul style="list-style-type: none"> <li>– Students from the Faculty of Dentistry provide free treatment at the University's Emergency Dental Clinic (around 2,000 patients a year, including low-income and homeless people in the community, receive treatment);</li> <li>– Research by the University's Department of Cancer Sciences has led to the development of groundbreaking therapies and drugs to combat breast cancer (curing or prolonging remission for 1.5 million women worldwide).</li> </ul>
SDG 4	<ul style="list-style-type: none"> <li>– The high quality of teaching provided by the University enables a new generation of future teachers to be trained (including training under the Teach First programme, which focuses on teacher training in disadvantaged schools);</li> <li>– The School Governors initiative encourages University staff and graduates to become school governors, thereby contributing to the modernisation of secondary education.</li> </ul>
SDG 5	<ul style="list-style-type: none"> <li>– Focus on reducing the average gender pay gap;</li> <li>– Introducing shared parental leave as part of the government's campaign to do so;</li> <li>– Membership and leadership in organisations promoting gender equality</li> </ul>
SDG 6	<ul style="list-style-type: none"> <li>– A study of the public health impact of arsenic in India has shown that it is leaching into groundwater used for human drinking and agricultural irrigation;</li> <li>– As part of the 'Once a Month' initiative, student volunteers distribute hygiene products (wipes, tampons, hand sanitiser) to vulnerable groups of women in Manchester.</li> </ul>
SDGs 7	<ul style="list-style-type: none"> <li>– UrbanChain, a university start-up, aims to tackle fuel poverty by developing a blockchain platform to reduce utility costs for vulnerable families;</li> <li>– Energy education activities that inform the general public about nuclear energy, its dangers, sustainability and waste (including thematic online simulation games for young people).</li> </ul>
SDG 8	<ul style="list-style-type: none"> <li>– Ensure adequate remuneration and social protection of employees;</li> <li>– active support for graduates in the employment process (including relevant training, competitions, etc.).</li> </ul>
SDG 9	<ul style="list-style-type: none"> <li>– The University's Innovation Centre provides high-tech companies with equipped premises and access to infrastructure, as well as specialised spaces for holding events; services for entrepreneurs are also provided by the Centre's Intellectual Property team;</li> <li>– The Social Enterprise Development Fund has provided more than £150,000 to the University's social entrepreneurs since 2014.</li> </ul>
SDG 10	<ul style="list-style-type: none"> <li>– Research by the University's Institute for Global Development has demonstrated the feasibility of direct financial support for the poorest, which the UK government has used to tackle poverty in Africa and South Asia;</li> <li>– The Equity and Merit programme supports talented young people from the world's poorest countries; since 2007, 313 young people from Ethiopia, Rwanda, Malawi, Tanzania, Zimbabwe and Uganda have received full support for Master's degrees, and will then contribute to the sustainable development of their countries (funded by the University and donors).</li> </ul>
SDG 11	<ul style="list-style-type: none"> <li>– The University's public cultural venues host a range of events for older people in the community. The activities of these institutions have contributed to Manchester being awarded the status of the UK's first Older People's City by the World Health Organisation.</li> <li>– The University's Multilingual Manchester initiative supports linguistic diversity in the city</li> </ul>
SDG 12	<ul style="list-style-type: none"> <li>– Launch of a six-week online course on cutting-edge technologies underpinning biotechnology research, an important source of renewable energy;</li> <li>– During the Bluedot Festival, held at the University Observatory, habits of sustainable waste management, sustainable use of transport, minimising carbon emissions, etc. are popularised among participants.</li> </ul>
SDG 13	<ul style="list-style-type: none"> <li>– Research in collaboration with the Tyndall Centre is developing sustainable responses to climate change (mitigation and adaptation), which will be used by local authorities to develop medium-term development programmes (e.g., to achieve zero carbon emissions).</li> </ul>
SDG 14	<ul style="list-style-type: none"> <li>– A study of UK rivers has shown that they are heavily polluted with microplastics from household and industrial sources, leading to calls for tougher regulations on waste entering urban waterways and posing a threat to ecosystems;</li> <li>– Encouraging students and staff to use reusable crockery (by introducing discounts on campuses and in university halls of residence), selling only recyclable PET bottles, etc.</li> </ul>
SDG 15	<ul style="list-style-type: none"> <li>– Manchester Museum Vivarium develops reptile and amphibian breeding programmes and provides material for blogs and shows that promote sustainable development, climate change issues and the conservation of natural ecosystems.</li> </ul>
SDG 16	<ul style="list-style-type: none"> <li>– The University's Institute of Humanitarian Assistance and Conflict Response specialises in peacebuilding, conflict resolution, security and justice, and works closely with the UN to explore the use of data collected during peacekeeping missions and to identify areas for prevention and avoidance;</li> <li>– The charity In Place of War supports artists and their organisations in conflict and war zones.</li> </ul>
SDG 17	<ul style="list-style-type: none"> <li>– The University's extensive and active collaboration with public and international organisations specialising in the implementation of the SDGs;</li> <li>– The University's Institute for Humanitarian Assistance and Conflict Response has established a specialised emergency medical care group in the UK, training specialists for difficult working conditions.</li> </ul>

Source: compiled by the authors based on (The University of Manchester)

The University of Leicester (UK), which sees sustainable development as combining the efforts of academics and management, is also interesting in this respect. This university shows the greatest progress in SDG 1 "Overcoming poverty", SDG 10 "Reducing inequality" and SDG 15 "Conserving land ecosystems". It is also the world leader in SDG 15 (The Times Higher Education). A professor at the University of Leicester has conducted a comprehensive study of the climate impacts of peatland use, the results of which will allow the negative impacts to be mitigated and the management of carbon and greenhouse gas emissions from peat to be improved (University of Leicester). In addition, the University has developed and is implementing an 'Action Plan for Biodiversity Conservation' and also offers 26 modules on topics directly related to SDG 15 (University of Leicester).

Incidentally, among the UK higher education institutions in the top 50 of the THE Impact Rankings 2022 are King's College London (24th place), the University of Edinburgh (29th), the University of Sussex (37th), Bournemouth University (42nd), the University of Esseter (42nd) and the University of East England (47th) (The Times Higher Education). In 26th place in the ranking is the University of Coimbra (Portugal), which has the best results in achieving SDG 9 "Industry, innovation and infrastructure" (4th in the world in 2022), SDG 2 "Overcoming hunger" (12) and SDG 16 "Peace, justice and strong institutions" (The Times Higher Education). In many ways, the outlined achievements of this university are the result of balanced activities to establish effective business communication with researchers (e.g., through forums, debates, thematic meetings) (SDG 9), to organise effective education and information campaigns (SDG 16), to implement the latest training programmes, modules, courses on sustainable development, as well as to conduct high-quality relevant research with wide media coverage in the research community (University of Coimbra).

In 31st place in the ranking is the University of Aalborg (Denmark), which at the same time took first place in the ranking according to SDG 4 "Quality Education" (The Times Higher Education). The latter is mainly due to the achievements of the Institute for Advanced Study in Problem Based Learning (Sustainability at Aalborg University). The university also ranks high in the achievement of SDG 17 "Partnership for Sustainable Development". Examples of university projects within the framework of SDG 17 are: inviting PhD researchers from Nairobi for temporary training (AfricaLics Visiting Fellowship Programme); international communication of scientists, students, communities and stakeholders from Greenland, the North Atlantic in the framework of Arctic research (AAU Arctic Inter-Faculty platform); building a world-class

platform for ecological growth and ecological transformation of society (together with Green Hub Denmark); active participation in the development of a pan-European ecosystem of open and inclusive stakeholder cooperation (European University Alliance), and so forth (Sustainability at Aalborg University).

The University of Bologna (Italy), which has been publishing reports on the Sustainable Development Goals since 2016, was ranked 37th in the 2022 THE Impact Rankings. The University showed the best results in achieving SDG 9 'Innovation and infrastructure', SDG 4 "Quality Education", SDG 16 "Peace, Justice and Strong Institutions" and SDG 5 "Gender Equality" (The Times Higher Education). To support initiatives within SDG 9, the university has specialised centres (Innovation. Development. Entrepreneurship. Almamater Centre), incubators, clubs (Almaclub), foundations (Foundation for Education University Oriented Professionals) (Reporting on United Nations Sustainable Development Goals). Progress in terms of SDG 4 is ensured by the high publication activity of researchers, the expansion of lifelong learning programmes, the active introduction of a sustainable component in the educational process and educational content, as well as extensive information activities to support and promote the adaptation of foreign students, the popularisation of research activities, the improvement of infrastructure available to students, and so on (Reporting on United Nations Sustainable Development Goals).

In the top 50 of the ranking (The Times Higher Education), 42nd place is occupied by another European Union higher education institution – the Royal Institute of Technology (KTH, Sweden). The Institute performs best in terms of achieving the following goals:

- SDG 17 – involvement of several national research infrastructures, cooperation with Swedish institutions in the framework of OpenLab, with NGOs and the Stockholm Environment Institute in the field of environment and sustainable development;
- SDG 12 – coordinating and participating in the MISTRA Sustainable Consumption research programme, which brings together stakeholders from education, government, business and the public sector to develop effective tools for the transition to sustainable consumption; launching the Circular Public Procurement project to promote the use of circular public procurement, the waste management project and the establishment of a unified sorting system, the introduction of master's programmes in sustainable production development and sustainable technologies;
- SDG 11 – conducting research to find new transport solutions, sustainable innovations in

the real estate and construction sector, and others (KTH. The UN Sustainable Development Goals Report 2021).

The University of Galway (Ireland) is ranked 47th in the THE Impact 2022 ranking, demonstrating significant progress towards achieving SDG 12 and SDG 17 (The Times Higher Education). It is worth noting that sustainable development has been identified as one of the four key objectives in the Galway University Strategic Plan for 2020–2025. Since 2017, the number of publications by university researchers on sustainability issues has doubled, the level of energy efficiency of premises has increased, a new policy on overcoming and adapting to the impacts of climate change (new Climate Action and Sustainability) has been launched, and courses on sustainable development of different sectors of the economy have been introduced (University of Galway Sustainability Report 2021/2022).

On the basis of the conducted analysis, it can be stated that European universities apply an integrated approach to sustainable development (i.e., they carry out sustainable activities in different areas), they focus on a wide reach of the target audience and on achieving concrete applied results of the actions taken, their research is aimed at achieving practical results. It is advisable to incorporate this experience into the activities of Ukrainian higher education institutions and thus turn them into flagships of sustainable development, both in the country as a whole and in individual regions.

#### 4 Conclusions

Analysing the experience of leading universities in terms of sustainability (according to The Times Higher Education Impact 2022 rating), it is possible to conclude that higher education institutions are playing an increasingly important role in the implementation of the SDGs. The progress of

universities in enabling sustainable development is ensured by the integration of the sustainable component in 1) teaching – the introduction of independent courses on sustainable development and the integration of the principles of sustainability (aspects of environmental friendliness, environmental impact, gender equality, justice, etc.) in all curricula, regardless of their profile and specificities; 2) research – the implementation of research projects focused on obtaining applied results that are valuable in terms of achieving the SDGs (development of new energy sources, environmentally friendly technologies, tools to overcome the consequences of climate change, etc.); 3) management – promoting the culture of sustainable development by the management of higher education institutions, organising and ensuring the implementation of campus landscaping measures, the use of energy efficient technologies, supporting energy saving initiatives and the use of renewable energy sources, the use of environmentally friendly means of transport by staff and students, and the reduction of greenhouse gas emissions; 4) stakeholder partnership – involving students and staff in recycling waste and reducing its volume, using reusable cups and bottles for drinking, switching from paper to electronic format for writing exams, essays and other tasks; 5) campus development – landscaping the university premises, increasing their energy efficiency, reducing greenhouse gas emissions, organising sustainable transport, creating conditions for rational water consumption and waste management, etc.

**Acknowledgement.** The research is carried out within the framework of the project "Sustainable University: a model of development in the post-war period", implemented with the support of the European Educational Research Association (EERA) and the Ukrainian Educational Research Association (UERA).

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Received on: 15th of April, 2023

Accepted on: 19th of May, 2023

Published on: 31th of May, 2023