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Eight Become One: the EURECA-PRO University Network

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Abstract: The United Nations Sustainable Development Goal 12 is the foundation of the European University on Responsible Consumption and Production consortium (EURECA-PRO). This article introduces the eight EURECA-PRO partner universities: Montanuniversität Leoben (Austria), Technische Universität Bergakademie Freiberg (Germany), Technical University of Crete (Greece), University of León (Spain), Silesian University of Technology (Poland), Mittweida University of Applied Sciences (Germany), University of Petroșani (Romania), and Hasselt University (Belgium). In addition, each university's role within the alliance and unique research and study programmes are outlined. The synergy created by EURECA-PRO enables the pursuit of an ambitious research agenda with five research "Lighthouse Missions" as well as the implementation of joint study programmes.

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Aus acht wird eins: Das EURECA-PRO Hochschulnetzwerk

Zusammenfassung: Das Sustainable Development Goal 12 der Vereinten Nationen stellt die Basis für den Zusammenschluss des Konsortiums der European University on Responsible Consumption And PROduction—EURECA-PRO dar. Die acht Partneruniversitäten von EURECA-PRO, die Montanuniversität Leoben (Österreich), Technische Universität Bergakademie Freiberg (Deutschland), Technical University of Crete (Griechenland), University of León (Spanien), Silesian University of Technology (Polen), Hochschule Mittweida (Deutschland), University of Petroșani (Rumänien) und die Hasselt University (Belgien) stellen sich in diesem Beitrag vor, und ihre Rolle innerhalb der Allianz wird skizziert. Im Besonderen wird auf die wis-

senschaftliche Ausrichtung der Forschung und auf das Studienangebot an den Universitäten eingegangen. Aufgrund der entstandenen Synergien durch die Vernetzung von acht Universitäten konnten sowohl eine ehrgeizige Forschungsagenda mit fünf Leuchtturm Forschungsrichtungen als auch gemeinsame Studienprogramme von EURECA-PRO verwirklicht werden.

Schlüsselwörter: Sustainable Development Goals, European University, EURECA-PRO, Montanuniversität Leoben, Technische Universität Bergakademie Freiberg, Technical University of Crete, University of León, Silesian University of Technology, Hochschule Mittweida, University of Petroșani, Hasselt University

1. Introduction

To transform our world into one protected from degradation that is home to peaceful, just, prosperous, and inclusive societies without poverty or hunger, the United Nations has developed a plan of action for people, planet, and prosperity. In a joint agenda entitled Transforming our world: the 2030 Agenda for Sustainable Development, the UN defined 17 Sustainable Development Goals (SDGs) and 169 targets within these [1]. The Montanuniversität Leoben selected SDG 12, Responsible Consumption and Production, as a central theme and sought to form a European University Alliance to pursue this goal. In autumn 2020, the European University on Responsible Consumption and Production (EURECA-PRO) was launched with the support of the European Commission under the Erasmus+ programme. The initial partner institutions of the EURECA-PRO Alliance were Montanuniversität Leoben (Austria), Technische Universität Bergakademie Freiberg (Germany), Technical University of Crete (Greece), University of León (Spain), Silesian University of Technology (Poland), Mittweida University of Applied Sciences (Germany), and University of Petroșani (Romania). The consortium expanded in spring 2022 and now includes Hasselt University (Belgium).

2. EURECA-PRO Partner Universities

In the following sections, each EURECA-PRO partner university is introduced and their role within the Alliance is outlined. In addition to the history, scientific orientation, and educational programme of each university, special attention is paid to the research and educational tasks they undertake within EURECA-PRO.

2.1 Montanuniversität Leoben

Montanuniversität Leoben (MUL, Fig. 1) was founded as a mining and metallurgy school on the 4th of November, 1840, in Vordernberg, Styria, Austria. In 1849 the school was relocated to Leoben; soon after, it became a famous mining and metallurgy expertise centre in the Alpine re-

gion of Europe. After gaining the right to award doctoral degrees, MUL became equal to a technical university in 1904. With 1364 employees and 3721 students (as of 2020) [3], it is the leading university in Europe for Advanced Resources, Smart Materials and Sustainable Processes study programmes. MUL's central mission is to support scientists and students in addressing the major societal challenges of our time—resource scarcity, climate change, energy, and the environment.

2.1.1 Education

Montanuniversität Leoben is offering two new, fully English study programmes as of autumn of 2022: Responsible Consumption & Production, initiated by EURECA-PRO, and Circular Engineering (Bachelor's and Master's levels). MUL runs 13 Bachelor's, 24 Master's and one doctoral programmes in the fields of Raw Materials and Energy, Materials, Sustainable Processing and Products and Environmental Protection and Recycling (including international programmes). Montanuniversität Leoben is home to a large international student body; students from 73 nations and all continents comprise 20% of the student population.

2.1.2 Research

The key research themes explored at MUL are energy efficiency, climate neutrality, sustainability, zero waste, and circular design. MUL's scientists develop technical and scientific methods to solve today's global problems, both in the lab and through societal applications. In the classroom, students are provided with innovative tools to tackle pressing environmental issues as they prepare for their important future role in improving our planet. In this way, MUL works actively to turn our future toward sustainability every day.

A few examples of current research projects at MUL are the environmentally friendly production of hydrogen and carbon, the traceability of resource supply chains, waste management and disposal technologies, and efficient feedstock recycling of plastics. To achieve research excellence, MUL counts on collaboration with its extensive international network of superb universities in hundreds of joint research and education projects. The Montanuniversität



Fig. 1: Main building of Montanuniversität Leoben [2]

Leoben consistently achieves top international rankings, for example 15th place in the field of Metallurgical Engineering (2nd in Europe) in the renowned “ShanghaiRanking” and 37th place in the field of Mining & Mineral Engineering [4].

2.1.3 Tasks within EURECA-PRO

Montanuniversität Leoben is not only the lead university of the European University on Responsible Consumption and Production and therefore responsible for General Management and Coordination (Work Package 1), but is also responsible for the joint Research (Work Package 3). Both the project coordinator for EURECA-PRO’s research agenda and the chairman of the Research Task Force, which consists of researchers from all partner institutions, come from MUL. Furthermore, Montanuniversität Leoben is the lead university for the EURECA-PRO research Lighthouse Mission 4—Clean Energy.

2.2 Technische Universität Bergakademie Freiberg

Technische Universität Bergakademie Freiberg (Fig. 2) was founded as a Mining Academy focused on higher education in mathematics, natural sciences, mining and metallurgy on November 21, 1765. Following the Seven Years’ War (1756–1763) and the devastation of the Electorate of Saxonia (Kurfürstentum Sachsen), two high-ranking government officers suggested to Prince Xaver, the regent of the day, that he open a “Bergakademie” to increase knowledge of the extraction and processing of raw materials. From the beginning, its quality of teaching and research has been a novel combination of theory and practice that has led to the Bergakademie’s reputation as a leading educational institution worldwide. Today it is the world’s oldest mining university still in operation.

The Technische Universität Bergakademie Freiberg’s mission is to develop efficient and innovative technologies that support a sustainable economy and industry. Its focus is on the exploration and processing of raw ma-



Fig. 2: Technische Universität Bergakademie Freiberg, Karl-Kegele-Bau [5]

terials—from extraction, storage and energy conversion through to the creation of new materials and ultimately the recycling process. The Bergakademie conducts fundamental and applied research for implementation in industry or for use within start-up firms that emerge from research activities.

2.2.1 Education

The Bergakademie consists of six faculties: (i) Mathematics, (ii) Chemistry and Physics, (iii) Geosciences, Geo-Engineering and Mining, (iiii) Engineering, (v) Materials Sciences and (vi) Economics and Business administration. Each faculty offers study programmes at Bachelor’s and Master’s levels and, for selected studies, a traditional German “Diplom”. The university’s approach includes small student working groups under excellent supervision by professors, teachers, and tutors. Many study programmes contain an obligatory internship in industry or a related organization; those without an obligatory internship strongly encourage students to take advantage of such an opportunity. There are no admission restrictions and no tuition fees at the Bergakademie.

2.2.2 Research

TU Bergakademie Freiberg is a modern research university with a strong focus on natural energy resource systems. Its research profile is centred around four areas: Geo(science), Material, Energy and Environment (GEOMATENUM all together). The Bergakademie is among the top ten research universities in Germany with respect to third-party research funding per professor.

2.2.3 Tasks within EURECA-PRO

TU Bergakademie Freiberg is responsible for EURECA-PRO Work Package 2 (Education and Studies) with the following tasks:

- Develop study programmes in responsible consumption and production at Bachelor’s and Master’s levels
- Establish a doctoral school with doctoral exchanges
- Participate in lecture series, summer schools, and similar educational events
- Contribute to and assure co-operative activities of all EURECA-PRO partner universities for Work Package 2.
- Additionally, TU Bergakademie Freiberg is the lead university for the EURECA-PRO research Lighthouse Mission 2—Environment and Water.

2.3 Technical University of Crete

The Technical University of Crete (TUC, Fig. 3) was established in 1977. Its first faculty members were appointed and students were accepted in 1984. TUC comprises five Engineering Schools, all of which offer undergraduate, post-graduate, and doctoral study programmes:



Fig. 3: Campus of the Technical University of Crete [6]

- School of Production Engineering and Management (PEM)
- School of Mineral Resources Engineering (MRE)
- School of Electrical and Computer Engineering (ECE)
- School of Chemical and Environmental Engineering (CEE)
- School of Architecture (ARC)

The Technical University of Crete is a focused and dynamic university with a clear mission: to expand knowledge for the benefit of society through research integrated with education. In total, it is home to 7500 students, 300 highly-qualified staff with international academic backgrounds, one campus, five Engineering Schools, five Engineering programmes, 14+ master's programmes, five Doctoral programmes, 70+ laboratories, one Telecommunication Systems Research Institute, one Flora and Fauna Preservation Park and high-technology infrastructure attest to TUC's educational and research excellence.

2.3.1 Education

TUC awards the following degrees:

- Engineering Diploma (5-Year Integrated Master's Degree)
- Master of Science (M.Sc.)
- Doctor of Philosophy (Ph.D.)

2.3.2 Research

The Technical University of Crete is particularly active in basic and applied research engaging staff and students in R&D, academic ethics, and collaboration. The following two quotes taken from the 2021 External Evaluation Report of the Hellenic Authority for Higher Education underline this fact:

"TUC participation in competitive research projects has been steadily increasing in number of projects, employed researchers and overall budget."

"TUC is an excellent Higher Education Establishment in both teaching and research. It is well equipped with a good campus and, with few exceptions, is well staffed. It actively maintains links with its alumni, stakeholders and the local community."

2.3.3 Tasks within EURECA-PRO

TUC leads EURECA-PRO Work Package 4 (Innovation) and has undertaken these major tasks:

- Develop a Digital Master-Platform Campus including joint administration, education, research and innovation activities and societal outreach
- Establish Credited Courses (CC) and Massive Open Online Courses (MOOC) by creating course repositories following well-known best practices
- Create a digital Innovation & Entrepreneurship platform (InnoPlat)
- Develop digital knowledge transfer mechanisms and create an administration space for policy, content, and methodology; establish personalised and codified knowledge transfer activities
- Connect existing and developing Innovation & Entrepreneurship Centres to create an Innovation Academy that serves joint innovation training hubs, spin-off companies and patent licensing procedures
- Formulate consolidated value chain innovation services and pipelines as a tool for creating spin-offs and putting innovation training course learnings into practice.

In addition, TUC is the lead university for EURECA-PRO research Lighthouse Mission 3—Sustainable Materials and Products.

2.4 University of León

Founded in 1979 as an autonomous university, the University of León (ULE, Fig. 4) is a public institution of higher education and research located in León province with two main campuses, one in the city of León itself (Vegazana) and another one in Ponferrada. It is a comprehensive university comprising nine faculties and seven schools, each offering a broad spectrum of study programmes at Bachelor's, Master's, and doctoral levels.

With 900 faculty members, 500 administration and service staff, and 13,700 students, ULE achieves excellence at the international level. It welcomes over 1000 international students each year from over 50 different countries. In addition, ULE has many international accreditations such as EAEVE (Veterinary), EURO-INF Label (Computer engineering), or the EPAS (Business studies), and it is positioned among the top worldwide universities based on the THE, Shanghai, and QS rankings.

ULE is also highly compromised with societal responsibility, being certificated, for example, as University for Fair-trade or being the first Spanish university with the label of "Blue Community."

2.4.1 Education

ULE's teaching is aligned with society's demands as shown by its wealth of academic options; ULE boasts 42 Bachelor's and double degree programmes, 38 Master's degree programmes, 17 Doctoral programmes, and 23 university-specific degrees in all branches of knowledge.

2.4.2 Research

The ULE is committed to excellence in innovation, cooperation, and knowledge transfer to society. It has 14 scientific and technological institutes, six extraordinary university chairs, and numerous research support services. Its research productivity is made possible by the work of the 101 researchers' groups that integrate 877 researchers in arts, humanities, law, social sciences, health, earth sciences, and engineering. These groups conduct more than 525 competitive research projects and have published more than 25,000 high-impact publications.



Fig. 4: Library of the University of León [7]

2.4.3 Tasks within EURECA-PRO

ULE leads Work Package 5 (Transversal European Skills, Values, and Tools). Transversal skills are defined as the knowledge, skills, and capacities that individuals must have before entering the labour market [8]. Therefore, the current education system must integrate an educational paradigm where transversal skills are a core component of each student's education.

ULE leads the creation and cross-disciplinary implementation of a Transversal Skills Portfolio into EURECA-PRO academic curricula focusing on:

- Promoting intercultural skills, language and citizen participation, and the common European identity.
- Boosting digital and STEM competencies by creating training pathways for key digital competencies and, integrating STEM disciplines into interdisciplinary academic curricula as well as strategies and policies that increase women's involvement in STEM studies.
- Identifying and improving students' training in employability skills through virtual training courses focused on soft skills and connecting the student community with the labour market needs.
- Creating a teaching-training pathway to ensure the long-life learning of EURECA-PRO academic staff by promoting active and innovative teaching methodologies as the keystone of the EURECA-PRO academic curricula.
- Supporting actions focused on the adaption of a more sustainable and healthier lifestyle in the EURECA-PRO community.
- Promoting internationalization and networking using mobility programmes.

The University of León is also the lead university for the EURECA-PRO research Lighthouse Mission 1—Responsible Material Flows.

2.5 Silesian University of Technology

The Silesian University of Technology (SUT, Fig. 5) was founded in 1945. Today it is the oldest technical university in Upper Silesia and one of the largest in Poland. It was established as a scientific and didactic base for one of the most industrialized areas in Europe. The main campus of SUT is in Gliwice and the university has additional campuses in three other Upper Silesian cities: Katowice, Zabrze, and Rybnik. The region has a long-term tradition in the raw materials industry and retains natural resources that should be used responsibly with the environment and climate in mind.

SUT operates in the heart of the Katowice Special Economic Zone, which is recognized as the best economic zone in the world. Innovative companies are highly involved in dual study programmes, project-based learning, and joint research; in this way, SUT offers a successful model for other universities. SUT consists of 13 faculties and two institutes, all of which house high-quality education and research.



Fig. 5: Silesian University of Technology, Faculty of Chemistry building in Gliwice [9]

2.5.1 Education

Over 18,000 students study at the Silesian University of Technology in Bachelor's, Master's, doctoral and other postgraduate programmes. Students may choose from over 50 fields of study including technical studies, business analytics, architecture, interior design, applied linguistics, mathematics, pre-school and early school pedagogy, sociology, management and project management.

2.5.2 Research

SUT is the only Silesian university in the prestigious group of ten Polish universities awarded the "Excellence Initiative-Research University" by the Ministry of Science and Higher Education of Poland. SUT focuses on six Priority Research Areas: Computational Oncology and Personalized Medicine, Artificial Intelligence and Data Processing, Materials of the Future, Smart Cities and Future Mobility, Process Automation and Industry 4.0, Climate and Environmental Protection and Modern Energy.

2.5.3 Tasks within EURECA-PRO

SUT leads Governance in EURECA-PRO and is responsible for legal analysis, tracking financial opportunities, performing student joint admission and enabling automatic recognition of ECTS. In addition, SUT leads Lighthouse Mission 5—Process Automation and Industry 4.0, and provides the vice chair of the Research Task Force.

SUT has established a new BSc programme in Management in Sustainable Consumption and Production within the framework of EURECA-PRO. The SUT's 7-semester BSc course on responsible consumption and production covers the application of sustainable development to managerial

activities with particular emphasis on economics and finance, design of technological sustainable production processes, circular economy, Life Cycle Assessment (LCA), IT, ICT and artificial intelligence technologies in sustainable enterprise, eco-innovation, management of innovation transfer, sustainable quality management, safety engineering, sustainable management of logistical processes, and sustainable development reporting.

2.6 Mittweida University of Applied Sciences

At the Mittweida University of Applied Sciences (HSMW, Fig. 6), education, research and contributing to society have a tradition stretching back over 150 years. In 1867 Technikum Mittweida was founded and an Electrical Engineering programme was established as early as 1884—one of the first in Germany. The institution continued by pioneering degree programmes in communication engineering in the early 20th century. In 1996 it was transformed into a University of Applied Sciences with the name Hochschule Mittweida.

HSMW, located in Saxony, Germany, is the only EURECA-PRO partner that is not a university but a higher education institution (Fachhochschule). Accordingly, its focus is on the practical application of education and on application-oriented research. At present, HSMW has approximately 6800 students, more than 100 professors and 350 staff members, who learn, teach and work in five faculties: Engineering Sciences, Applied Computer Sciences and Biosciences, Industrial Engineering, Social Sciences, and Media Sciences. Moreover, HSMW is a highly-internationalised institution with 80,000 alumni from over 40 countries; nearly a quarter of its students are international. Mittweida's small-town charm fosters personal relationships between students, teaching staff and professors and creates an atmosphere of cooperation and exchange.

2.6.1 Education

Known as innovative and application-oriented, HSMW provides more than 50 accredited study programmes in science and social studies, including part-time studies, distance learning opportunities, and dual study programmes. Teaching and research offers are characterized by a close connection between practical tasks and scientific research. In addition, students have opportunities to transfer their knowledge to industry-related projects and internships.

2.6.2 Research

HSMW focuses on four main research areas: Laser Technologies, Product and Process Development, Digitization in Business and Society, and Applied Computer Science. HSMW's high proportion of third-party funded research reflects the high value placed on cooperating with industry and society. Great importance is attached to the transfer of knowledge and technology to cooperation partners from industry and society, cooperative doctoral studies, and the transfer of scientific findings to teaching.

Fig. 6: Main building of Mit-tweida University of Applied Science [10]



2.6.3 Tasks within EURECA-PRO

Within the Alliance HSMW is responsible for Third Mission, meaning the transfer of knowledge to and improving the dialogue with society. This includes the dissemination of best practice cases, thus showing that implementing responsible consumption and production in daily life and business is possible. HSMW also develops courses on Sustainability Communication and Social Entrepreneurship and has established a platform for student exchange as part of the EURECA-PRO digital platform.

2.7 University of Petroșani

The University of Petroșani (UP, Fig. 7) has a long tradition dating back to its founding in 1864. With strong academic traditions and prestige enjoyed at home and abroad as its roots, UP offers students high-quality qualification in a variety of subjects on the Bachelor's, Master's and PhD levels. Three faculties make up the University of Petroșani:

- Faculty of Mining
- Faculty of Mechanical and Electrical Engineering
- Faculty of Sciences

The University of Petroșani is an outstanding cultural and social institution in Hunedoara County, a comprehensive higher education centre and a source of educational and scientific influence at the national level. UP's mission is to generate and transfer knowledge to society through initial and continuous student training aimed at encouraging personal development, professional insertion in the labour market and by providing scientific, technical, economic, administrative, IT, and management competences.

Three faculties with 24 undergraduate study programmes and 22 Master's studies, one doctoral school with four study fields, five research departments and four centres host 4500 students. Together with 300 staff members, the students work to achieve the University of Petroșani's mission.

2.7.1 Education

UP awards the following degrees:

- Engineering Diploma
- Economics degree
- Social Sciences degree
- Administrative Sciences degree
- Master's of Science
- Doctor of Engineering (Ph.D.)

2.7.2 Research

UP research carries out fundamental and applied studies and research in the following fields: natural resources engineering and raw materials extraction, the improvement and automatic control of machines, installations and technological processes, the evaluation of the impact of economic activities upon the environment, the rehabilitation of mining areas, the elaboration of new management, marketing, and entrepreneurial development systems, and methods for innovation and organizational competitiveness. In 2009, 2015, and 2021, UP was evaluated by the Romanian Agency for Quality Assurance in Higher Education as a "High Trust" institution.

Fig. 7: Main building University of Petroșani [11]



2.7.3 Tasks within EURECA-PRO

UP leads EURECA-PRO Work Package 8 (Sustainability and Dissemination) and has undertaken the following tasks:

- Create project identity based on a cohesive external appearance and deliver essential EURECA-PRO visual content
- Conduct the dissemination process by sharing project results worldwide through the main communication channels to increase public awareness of EURECA-PRO's mission
- Connect EURECA-PRO with stakeholders to create a cohesive and permanent dialogue focused on the benefits of knowledge exchange and the important outcomes of sustainable consumption and production
- Monitor and measure the impact of project activities through an integrated analysis of quantitative performance indicators.

2.8 Hasselt University

Hasselt University (UHasselt, Fig. 8) is a public research university situated in Belgium within a stone's throw of Brussels with campuses in Hasselt and Diepenbeek. The university was established in 1971 as the Limburg Universitair Centrum (LUC) and changed its name to Hasselt University in 2005. Today Hasselt University has more than 6700 students and 1500 staff members.

Hasselt University stands for excellence in education, top research in spearhead fields, and active commitment to innovation and entrepreneurship. As a civic university, it aims to combine academic excellence with economic and social relevance. Hasselt University is ranked amongst the top ten best institutions worldwide in U-Multirank 2022 and is ranked in the top 351–400 in the Times Higher Ed-

ucation World University Ranking, as well as 53th in the Times Higher Education Ranking of universities less than half a century old.

2.8.1 Education

Over the past decades, Hasselt University has grown towards a comprehensive university that offers attractive undergraduate, graduate and PhD programmes in seven faculties: Faculty of Business Economics, Faculty of Sciences, Faculty of Medicine and Life Sciences, Faculty of Law, Faculty of Architecture and Arts, Faculty of Engineering Technology, Faculty of Rehabilitation Sciences, and its School of Transportation Sciences, School for Educational Studies, and School for Social Sciences. Hasselt University uses innovative teaching and learning methods, with research-led courses. It offers 18 Bachelor's and 33 Master's programmes, and five English-taught programmes.

2.8.2 Research

Solid academic research is the foundation of good academic education and is an important link in the innovation chain, which has directed Hasselt University towards concentrating a large proportion of its research in four research institutes (Research Institute: Centre for Environmental Sciences (CMK), Institute for Materials Research (IMO), Data Science Institute (DSI), Biomedical Research Institute (BIOMED)) and three research centres (Transportation Research Institute (IMOB), Expertise Centre for Digital Media (EDM), Limburg Clinical Research Centre (LCRC)), next to research groups which are embedded within the faculties.

The institutes and centres aim to cover the entire research spectrum, from fundamental research via strategic basic research to the building of concrete applications. In order to respond to social and economic challenges, the university chooses to focus research on three priority areas, such as sustainable society, healthy society, and inclusive

Fig. 8: Campus Diepenbeek of Hasselt University [12]



society. Through this organisation of research in well-chosen spearhead fields, the university can achieve the scale required to participate successfully in inter-university and international networks.

2.8.3 Tasks within EURECA-PRO

Since joining EURECA-PRO in 2022, Hasselt University has been part of a common pursuit to enable students and staff to study, teach, and research in responsible consumption and production. To strengthen incoming and outgoing mobility, to bring about brain gain and to increase the employability of its graduates, Hasselt University is joining forces with its EURECA-PRO partners to set up Bachelor's, Master's and PhD programmes, summer schools, and a wide range of events. Hasselt University scientists also engages in close research collaborations on energy efficiency, efficient natural resources management, food waste reduction, efficient production and supply chains, food security, sustainable tourism, and more.

3. Achievements in Education and Research

Education and Research are the main pillars of EURECA-PRO; both are built with the United Nations Sustainable Development Goal 12 in mind. The most important research and education achievements are outlined below.

3.1 Education

Transdisciplinary Education for Sustainable Consumption and Production is embedded in all teaching and lifelong learning at EURECA-PRO, with each partner contributing to this reality.

New study programmes: Between autumn 2022 and March 2023, four Bachelor's programmes (MUL, TUBAF, SUT, HSMW) and three Master's programmes (MUL,

TUBAF, UP) focused on responsible consumption and production are scheduled to begin.

Lecture series: So far, four lecture series have been organized and carried out. TU Bergakademie Freiberg organized a lecture series on the topics 1) Responsible Consumption and Production and 2) Geosciences, Technologies for a Circular Economy, European Values and Culture. Montanuniversität Leoben, together with the International Competence Centre for Mining-Engineering Education under the auspices of UNESCO (Austrian Branch), organized a lecture series on Planetary Boundaries, and the Technical University of Crete implemented a lecture series on Innovation and Entrepreneurship.

Summer Schools: Three summer schools have already been held. TU Bergakademie Freiberg organized a summer school on the topic 1) Responsible consumption and production for higher education, the EURECA-PRO Team at Montanuniversität Leoben and the MIRO-Montanuniversität International Relations Office chose the topic 2) Responsible Material Flows, and the Technical University of Crete focused on 3) Innovation and Entrepreneurship.

Problem Based Learning (PBL): PBL is integrated in EURECA-PRO education to increase students' problem-solving skills. For this purpose, additional PBL training for lecturers and students is offered. Moreover, research results are incorporated into EURECA-PRO curricula through problem-based learning and the open access/science approach held by all alliance members ensures that all developed content is available globally and free of charge [13].

Furthermore, activities like PhD journeys, EURECA-PRO colloquia, conferences for young researchers and Open Science Events contribute both to educating students and to supporting lifelong learning.

3.2 Research

A comprehensive inventory of EURECA-PRO research projects related to SDG12 has been carried out (see the Research section of the EURECA-PRO Website [14]). In total, 488 research projects covering 805 SDG12 research topics have been identified. Through data analysis, EURECA-PRO has determined five research Lighthouse Missions that will significantly influence its research agenda in the coming years [13].

Through the implementation of the Lighthouse Missions (Responsible Material Flows, Environment and Water, Sustainable Materials and Products, Clean Energy, and Process Automation and Industry 4.0), EURECA-PRO is creating a research environment that actively develops solutions to current global challenges. Research groups have been formed and lead universities have been selected for all Lighthouse Missions. Every partner university has appointed scientists to all Lighthouse Missions research groups. The EURECA-PRO research groups submit project proposals to various national and international funding bodies, thus improving the international positioning of EURECA-PRO as a future core hub for SDG 12 topics. The second EURECA-PRO Conference in León, Spain, will use the framework of these five Lighthouse Missions to share experiences, scientific results, and recent advances related to SDG 12. The planned and partially-implemented EURECA-PRO expansion will allow for the establishment of further Lighthouses and an increasingly holistic approach to SDG 12 topics [15].

The collaborative approach of all partners ensures a European University with a common governance structure, common digital platforms forming a virtual campus, joint study programmes and SDG 12 research that responds directly to the challenges of our moment.

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