

SELF-EVALUATION REPORT FOR MODULE 3

THE NAME OF THE UNIT BEING EVALUATED:

University Centre for Energy Efficient Buildings

FORD: 2 - Engineering and technology

SOCIAL CONTRIBUTION OF THE EVALUATED UNIT

3.1 Introductory information about the unit under evaluation

The evaluated unit will describe its mission and vision and provide a general self-reflection of the societal contribution of R&D&I, along with its long-term goals in the fields it develops. The distribution of research activities by type of research will also be commented on.¹ The evaluated unit will describe its organizational structure and size (staffing, number of students, number of study programmes implemented, etc.) based on the data provided in annex tables 3.1.1 to 3.1.6.

Maximum 1000 words.

This is a non-rated indicator that serves as an introduction to the evaluated unit, providing context for data in indicators 3.2-3.7.

Self-assessment:

Mission and vision

We are a center of top-tier interdisciplinary research dedicated to developing technologies and solutions that contribute to sustainable development in the construction industry. We bring innovations for a sustainable future, focusing on buildings, cities, energy, and the environment.

Societal contribution of our research

We bridge the gap between science and the entire supply chain in construction and energy, collaborating with professional associations, local governments, central state administration, and the non-profit sector.

We conduct research and development of specific products or independent verification of their technical properties for businesses. We also develop our own proprietary solutions, which we offer for licensing. We assist architects and developers in implementing new technologies and energy-efficient, environmentally friendly solutions in their projects. We provide cities and municipalities with expert advice on energy planning and urban development, acting as an independent consultant in the adoption of new technologies and defining requirements for new construction. For central state administration, we offer expertise in drafting strategic documents, legislation, standards, and grant programs. Additionally, we provide specialized courses and professional training in construction and energy.

¹ Basic, applied, contract, artistic research (see Definition of Terms in Methodology HEI2025+).

Long-term goals in research

Our long-term objective is to continuously enhance the societal impact and economic value of research in our key focus areas, particularly:

- **Buildings and Energy** – Increasing the share of renewable energy sources, improving energy storage and sharing systems, ensuring energy flexibility, enhancing building resilience, and strengthening cybersecurity.
- **Sustainable Construction and Circular Economy in Building** – Developing materials and construction solutions that reduce environmental impact while maintaining high building quality.
- **Healthy and Comfortable Environments** – Innovating solutions to ensure a healthy indoor microclimate, high-quality lighting, and integrating telemedicine services into buildings.
- **Urban Innovations** – Decarbonizing urban energy systems, developing energy communities, and increasing climate adaptation and resilience in cities.
- **Digitalization in Construction** – Advancing digitalization and the use of AI in planning and designing new buildings, manufacturing construction materials and prefabricated structures, and managing buildings and energy networks.

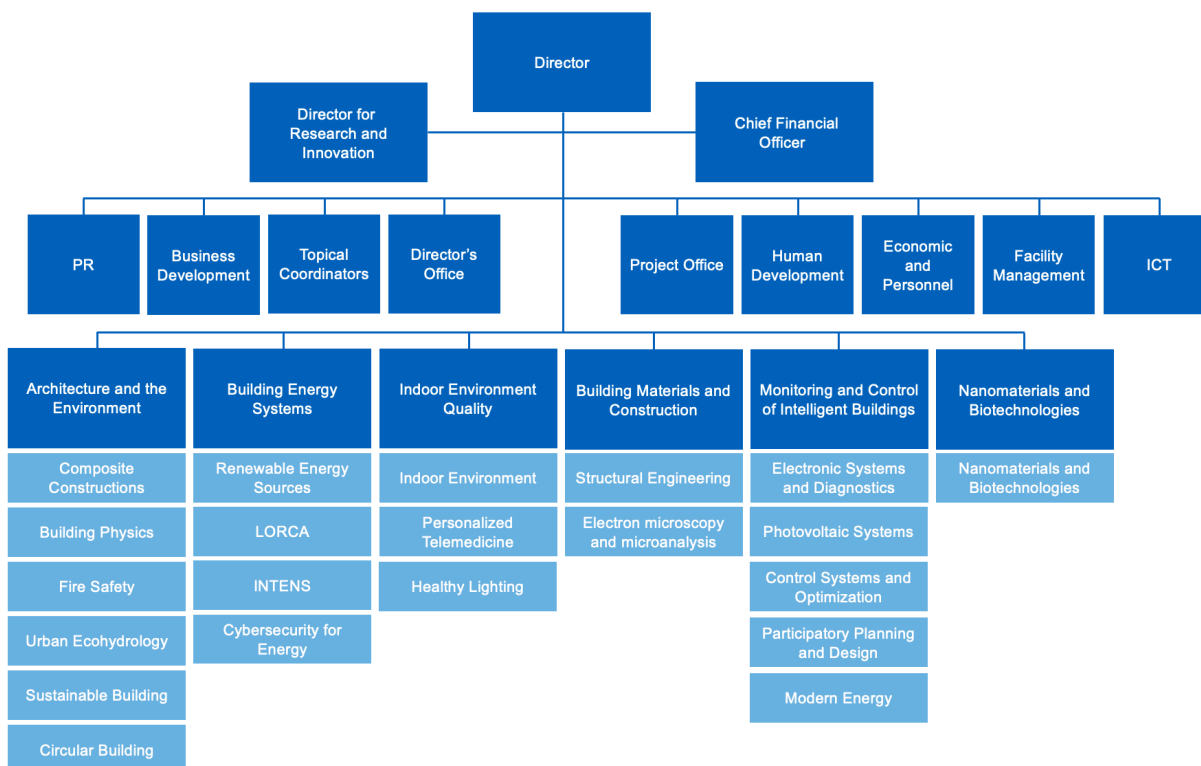
Distribution of the research activities by the type of research

At UCEEB, applied research predominates. Out of the total number of 185 ongoing projects in the monitored period, 19 were predominantly fundamental research projects, which accounts for slightly over 10 % of the total.

Contract research accounts for approximately 15% of the center's budget on average.

Organizational structure

UCEEB consists of six research departments, divided into 21 research teams, supported by an administrative unit. A detailed organizational breakdown is presented in the following diagram.



Personnel Composition

UCEEB is characterized by a high number of employees shared with other university faculties. The following tables provide statistics on core employees who have their primary contract with UCEEB. Many of these employees also have joint appointments with faculties where they are involved in teaching. Most shared appointments are with the Faculty of Civil Engineering, Faculty of Mechanical Engineering, Faculty of Electrical Engineering, and Faculty of Biomedical Engineering. Employees whose primary affiliation is with other university departments are listed under those departments for statistical consistency.

Since UCEEB is not directly involved in teaching, it does not have academic positions such as professor, associate professor, assistant professor, or lecturer. Instead, it employs only research staff, technicians, and administrative personnel.

Number of students and study programs

UCEEB does not participate in traditional teaching and, therefore, does not have enrolled students. However, every year dozens of students from various faculties conduct the research and experimental components of their final theses at UCEEB, spanning all levels of study, from bachelor's to doctoral programs.

As part of our collaboration with industry, local governments, and state administration, we organize professional education courses and seminars. These include training sessions for authorized professionals in the certification of sustainable buildings (SBToolCZ), courses on recycling and circular construction, training in the design and implementation of photovoltaic systems, and more. The number of courses and graduates is detailed in the tables.

Table 3.1.1 - Staffing per FTE²

Academic/ Professional position	Total / Of which women					
	2019	2020	2021	2022	2023	Total
Professor	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
Associate Professor	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
Assistant Professor	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
Assistant	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
R&D Personnel ³	7.0 / 0.6	7.2 / 0.6	7.2 / 0.6	6.2 / 0.6	6.2 / 0.6	33.8 / 3.0
Researchers in other categories ⁴	92.9 / 23.7	87.8 / 24.3	81.5 / 20.0	89.8 / 24.0	90.9 / 25.0	442.8 / 117.0
Technical and economic staff ⁵	30.8 / 18.9	35.8 / 22.3	34.1 / 22.2	26.1 / 15.6	24.1 / 13.6	150.8 / 92.5

² The average number of hours worked is calculated as the ratio of the total number of hours actually worked during the reference period, from 1 January to 31 December, by all staff (including agreement on work activity, excluding agreement on work performance) to the total annual working time pool per full-time employee. The full-time status of the worker in the evaluated unit is always reported. If an employee holds more than one type of full-time job within the evaluated unit, the total sum of the two shall be reported.

³ The category "R&D Personnel" includes technical and professional personnel who are not directly involved in R&D&I but are indispensable for the research activity (e.g. operators of research facilities).

⁴ The category "Researchers in other categories" includes all other staff who cannot be classified under any of the above categories (e.g. independent researcher/scientist).

⁵ Who participates in the management and support of R&D&I in the institution.

Scientific, research and development staff involved in teaching activities	4.0 / 2.0	4.0 / 2.0	4.5 / 2.0	4.5 / 2.0	4.5 / 2.0	21.5 / 10.0
Early career researchers ⁶	77.2 / 20.5	68.7 / 19.9	63.4 / 14.4	65.2 / 16.4	60.2 / 16.3	334.7 / 87.4
Total ⁷	130.6 / 43.1	130.8 / 47.2	122.8 / 42.8	122.1 / 40.2	121.2 / 39.2	627.4 / 212.5

Note: The categories professor, associate professor, assistant professor, assistant, other scientific, R&D personnel, researchers in other categories and technical and economic staff are mutually exclusive, i.e. one staff member is reported under one category only. Scientific, research and development staff involved in teaching activities, as well as early career researchers are reported collectively for all the above-mentioned categories.

3.1.2 Age structure of R&D&I personnel of the evaluated unit and their structure by job title and gender in the year 2019 (numbers of physical employees and personnel)⁸

Academic/ professional position	Under 29 years		30-39 years old		40-49 years old		50-59 years old		60-69 years old		70 years and older	
	Total	Women	Total	Women	Total	Women	Total	Women	Total	Women	Total	Women
Professor	0	0	0	0	0	0	0	0	0	0	0	0
Associate Professor	0	0	0	0	0	0	0	0	0	0	0	0
Assistant Professor	0	0	0	0	0	0	0	0	0	0	0	0
Assistant	0	0	0	0	0	0	0	0	0	0	0	0
R&D Personnel ⁹	0	0	4	1	3	0	1	0	2	0	0	0
Researchers in other categories ¹⁰	38	13	60	20	13	2	3	0	5	0	1	0
Technical and economic staff ¹¹	0	0	0	0	0	0	0	0	1	0	0	0
Scientific, research and development staff involved in teaching activities	0	0	3	1	1	1	0	0	0	0	0	0
Early career researcher ¹²	38	13	60	20	0	0	0	0	0	0	0	0
Total ¹³	38	13	64	21	16	2	4	0	8	0	1	0

Note: The categories professor, associate professor, assistant professor, assistant, other scientific, R&D Personnel, Researchers in other categories and Technical and economic staff are mutually exclusive, i.e. one staff member is reported in only one

⁶ See Definition of Terms in Methodology HEI2025+.

⁷ Total is the sum of the categories: professor, associate professor, assistant professor, assistant, R&I personnel, researchers in other categories and technical and economic staff.

⁸ The total number of employees/workers as of 31st December of the calendar year in question is to be entered, irrespective of the level of time worked, but only in an employment relationship (including agreement on work activity, excluding agreement on work performance). Other types of contractual relationships under the Civil Code that involve purchase of services are not included.

⁹ The category "R&D Personnel" includes technical and professional personnel who are not directly involved in R&D&I but are indispensable for the research activity (e.g. operators of research facilities).

¹⁰ The category "Researchers in other categories" includes all other staff who cannot be classified under any of the above categories (e.g. independent researcher/scientist).

¹¹ Who participates in the management and support of R&D&I in the institution.

¹² See Definition of Terms in Methodology HEI2025+.

¹³ Total is the sum of the categories: professor, associate professor, assistant professor, assistant, R&I Personnel, Researchers in other categories and technical and economic staff.

category. The categories of scientific, research and development staff involved in teaching activities and early career researchers are reported collectively for all the above-mentioned categories.

3.1.3 Age structure of R&D&I personnel of the evaluated unit and their structure by job title and gender in the year 2023 (numbers of physical employees and personnel)¹⁴

Academic/ professional position	Under 29 years		30-39 years old		40-49 years old		50-59 years old		60-69 years old		70 years and older	
	Total	Women	Total	Women	Total	Women	Total	Women	Total	Women	Total	Women
Professor	0	0	0	0	0	0	0	0	0	0	0	0
Associate Professor	0	0	0	0	0	0	0	0	0	0	0	0
Assistant Professor	0	0	0	0	0	0	0	0	0	0	0	0
Assistant	0	0	0	0	0	0	0	0	0	0	0	0
R&D Personnel ¹⁵	0	0	4	1	3	0	2	0	0	0	0	0
Researchers in other categories ¹⁶	19	5	53	18	28	10	4	0	5	0	0	0
Technical and economic staff ¹⁷	0	0	0	0	0	0	0	0	0	0	0	0
Scientific, research and development staff involved in teaching activities	0	0	1	0	4	2	0	0	0	0	0	0
Early career researcher ¹⁸	19	5	53	18	0	0	0	0	0	0	0	0
Total ¹⁹	19	5	57	19	31	10	6	0	5	0	0	0

Note: The categories professor, associate professor, assistant professor, assistant, other scientific, R&D personnel, researchers in other categories and technical and economic staff are mutually exclusive, i.e. one staff member is reported under one category only. Scientific, research and development staff involved in teaching activities, as well as early career researchers are reported collectively for all the above-mentioned categories.

Table 3.1.4 – Students

Type of study	2019		2020		2021		2022		2023		Total	
	Total	Women	Total	Women	Total	Women	Total	Women	Total	Women	Total	Women
Undergraduate	-	-	-	-	-	-	-	-	-	-	-	-

¹⁴ The total number of employees/workers as at 31.12. of the calendar year in question is to be entered, irrespective of the level of time worked, but only in an employment relationship (including agreement on work activity, excluding agreement on work performance). Other types of contractual relationships under the Civil Code that involve purchase of services are not included.

¹⁵ The category "R&D Personnel" includes technical and professional personnel who are not directly involved in R&D&I but are indispensable for the research activity (e.g. operators of research facilities).

¹⁶ The category "Researchers in other categories" includes all other staff who cannot be classified under any of the above categories (e.g. independent researcher/scientist).

¹⁷ Who participates in the management and support of R&D&I in the institution.

¹⁸ See Definition of Terms in Methodology HEI2025+.

¹⁹ Total is the sum of the categories: professor, associate professor, assistant professor, assistant, R&I personnel, researchers in other categories and technical and economic staff.

Master's ²⁰	-	-	-	-	-	-	-	-	-	-	-	-
Doctoral	-	-	-	-	-	-	-	-	-	-	-	-
Lifelong Learning Courses	-	-	-	-	-	-	88	2	483	7	571	9
Total	-	-	-	-	-	-	88	2	483	7	571	9

Table 3.1.5 - Study programmes in Czech/English

Type of study programme	Total ²¹ / Of which professional study programmes											
	2019		2020		2021		2022		2023		Total	
Undergraduate	-	-	-	-	-	-	-	-	-	-	-	-
Master's	-	-	-	-	-	-	-	-	-	-	-	-
Doctoral	-	-	-	-	-	-	-	-	-	-	-	-
Lifelong Learning courses	-	-	-	-	-	-	2/0	0/0	3/0	0/0	3/0	0/0
Total	-	-	-	-	-	-	2/0	0/0	3/0	0/0	3/0	0/0

Note: For each SP type, enter the number of SPs in Czech language in the first cell and insert the number of SPs in English language after the slash in the same cell (e.g. 15/3), enter the number of professional SPs in Czech language in the second cell and insert the number of professional SPs in English language after the slash. Follow a similar procedure in the last column of the table (Total).

3.1.6 – R&D&I capacities

R&D&I field	FORD	FORD share [%]	Predominant type of research	Total share of industry group [%]
1. Natural Sciences	1.1 Mathematics	-	Zvolte položku.	2.23 %
	1.2 Computer and information sciences	0.88 %	Applied Research	
	1.3 Physical sciences	-	Zvolte položku.	
	1.4 Chemical sciences	-	Zvolte položku.	
	1.5 Earth and related environmental sciences	1.35 %	Balanced basic and applied research	
	1.6 Biological sciences	-	Zvolte položku.	
	1.7 Other natural sciences	-	Zvolte položku.	
2. Engineering and Technology	2.1 Civil engineering	47.26 %	Applied Research	92.01 %
	2.2 Electrical engineering, Electronic engineering, Information engineering	7.44 %	Applied Research	
	2.3 Mechanical engineering	4.86 %	Applied Research	
	2.4 Chemical engineering	-	Zvolte položku.	
	2.5 Materials engineering	6.35 %	Balanced basic and applied research	

²⁰ All master's degree students are listed, regardless of the length of their programme of study.

²¹ The total number of study programmes for which admissions have been announced in a given academic year.

	2.6 Medical engineering	0.62 %	Applied Research	
	2.7 Environmental engineering	23.88 %	Applied Research	
	2.8 Environmental biotechnology	-	Zvolte položku.	
	2.9 Industrial biotechnology	-	Zvolte položku.	
	2.10 Nanotechnology	1.53 %	Balanced basic and applied research	
	2.11 Other engineering and technologies	0.06 %	Applied Research	
3. Medical and Health Sciences	3.1 Basic medicine	-	Zvolte položku.	4.00 %
	3.2 Clinical medicine	0.09 %	Applied Research	
	3.3 Health sciences	3.80 %	Balanced basic and applied research	
	3.4 Medical biotechnology	0.11 %	Applied Research	
	3.5 Other medical sciences	-	Zvolte položku.	
4. Agricultural and veterinary sciences	4.1 Agriculture, Forestry, and Fisheries	-	Zvolte položku.	-
	4.2 Animal and Dairy science	-	Zvolte položku.	
	4.3 Veterinary science	-	Zvolte položku.	
	4.4 Other agricultural sciences	-	Zvolte položku.	
5. Social Sciences	5.1 Psychology and cognitive sciences	-	Zvolte položku.	0.35 %
	5.2 Economics and Business	-	Zvolte položku.	
	5.3 Education	-	Zvolte položku.	
	5.4 Sociology	-	Zvolte položku.	
	5.5 Law	-	Zvolte položku.	
	5.6 Political science	-	Zvolte položku.	
	5.7 Social and economic geography	0.35 %	Applied Research	
	5.8 Media and communications	-	Zvolte položku.	
	5.9 Other social sciences	-	Zvolte položku.	
6. Humanities and the Arts	6.1 History and Archaeology	-	Zvolte položku.	1.41 %
	6.2 Languages and Literature	-	Zvolte položku.	
	6.3 Philosophy, Ethics and Religion	-	Zvolte položku.	
	6.4 Arts (arts, history of arts, performing arts, music)	1.41 %	Balanced basic and applied research	
	6.5 Other Humanities and the Arts	-	Zvolte položku.	
Total		100 %	-	100 %

RECOGNITION BY THE RESEARCH COMMUNITY

3.2 Recognition by the research community

The evaluated unit will briefly comment on its position in the research community. It shall consider individual and other prestigious R&D&I awards, participation of its academic staff in the editorial boards of international scientific journals, elected membership in professional societies, major invited lectures given by the evaluated unit's academic staff abroad or by foreign scientists and other relevant guests at the evaluated unit. Additionally, it will address the involvement of staff in the evaluation of national or European project/programme calls over the period of 2019–2023 based on the data provided in annex tables 3.2.1 to 3.2.5 (max. 10 most relevant items). If necessary, the evaluated unit shall list any additional services to the scientific community that it considers relevant.

Maximum 1000 words.

Self-assessment:

Position in the research community

UCEEB holds a strong position in the international research community, particularly in sustainable buildings, energy efficiency, and environmental technologies. It is recognized for its interdisciplinary research and applied solutions in smart buildings, renewable energy systems, and automation in construction. Its research contributes to the development of innovative technologies in building automation, energy storage, and green infrastructure, with applications for both urban and industrial environments.

The center collaborates closely with Czech and international companies to apply research findings in real-world construction and energy projects. UCEEB also supports government and EU agencies by providing research-based recommendations on decarbonization, green infrastructure, and climate adaptation policies.

Researchers at UCEEB publish in high-impact journals and participate in global academic networks, enhancing the center's influence in the fields of civil engineering, energy systems, and IoT-based building management.

International collaboration

UCEEB is actively involved various joint research projects in EU-funded programs such as Horizon Europe, Interreg, and other international research initiatives that focus on sustainable construction and innovative energy systems. In the reported period, UCEEB participated in 29 international projects (H2020 and HE: 13, Interreg: 5, other funding schemes: 11). In the number we count projects with international partners and/or funded by foreign funding agency.

In 9 of them UCEEB was in the role of coordinator

The center develops its academic partnerships and collaborates with universities and research institutions worldwide to exchange knowledge, share resources, and co-author scientific publications on energy efficiency, circular economy, and digitalization in construction.

Our researchers have been active in various international research networks such as COST (CA21103; CA20139; CA23104), IEA (IEA EBC Annex 57, 72, 82 and 89; IEA Energy Storage Tasks 36 and 44; and IEA Heat Pump Annex 58), EERA (EERA JP Smart Cities) and in various professional associations (ASHRAE, ASME, DLA, iISBE, EGU, fib, InterPore, IWG5, KCORC, SFPE, SLTBR).

UCEEB hosts and participates in international conferences, workshops, and expert panels, fostering global dialogue and innovation in the field of sustainable and intelligent buildings. The largest international event organized by UCEEB in collaboration with the Faculty of Civil Engineering is the

international conference series Central Europe towards Sustainable Building. In 2019 it hosted 240 delegates from 43 countries and in 2022 during COVID there were 150 participants from 28 countries.

Even though UCEEB does not participate in the regular study programs, it accepts foreign students for fellowships.

Prestigious awards

The UCEEB's recognitions included several types of prestigious awards: prizes for outstanding outputs of our projects (products and their practical applications), awards recognizing the contributions of our scientists to the scientific and/or professional community, awards for the excellent execution of our projects, and individual awards for outstanding presentations of research results. The top 10 examples are presented in the table 3.2.1 below.

The most prestigious recognition is the set of awards for the S.A.W.E.R., which is a unique technology for extracting water from extremely dry desert air. It was part of the Czech EXPO pavilion in Dubai and it won the Best Innovation Award and several other international and national awards. More importantly, this technology has been further developed into and is in the final stage of negotiation for licensing. The second highly appreciated output of our research with multiple awards was the energy plus retrofitting project of a secondary school in Prague. In this project, a novel low-carbon curtain wall system *envilop* developed at our research centre, has been applied. The project also used a certification scheme SBToolCZ that we developed in collaboration with the Faculty of Civil Engineering, and we participated in the energy concept of this successful project.

Involvement in evaluation of national and international research project calls

Besides the participation in the research projects, our researchers also contribute to the evaluation of project proposals. At the national level, they are involved in the evaluation at the Grant Agency of the Czech Republic (fundamental research) and Technology Agency of the Czech Republic (applied research), at CzechInvest (funding for innovative start-up companies).

Our researchers also participate in the project evaluation for the European Commission (details cannot be disclosed due to signed NDAs).

Table 3.2.1 - Prestigious R&D&I awards granted during the evaluation period

Name, surname and title(s) of the evaluated unit's staff member	Name of the award	Awarding institution
S.A.W.E.R. – Technology for extracting water from dry desert air	1) UAE Innovates Award 2022 – Best Innovation 2) World Expo Awards – Honorable Mention for the Best Use of Technology 3) ESG Award, category Innovation, technology, and energy 2022 4) Green Hero for Tomáš Matuška	1) Center for Governmental Innovation of Mohammed bin Rashid Al Maktoum, i.e. the ruler of Dubai and prime minister of the United Arab Emirates 2) EXHIBITOR Magazine of EXPO Dubai 3) Social Responsibility Association 4) Komerční banka
Energy plus retrofitting project of COPTH Českobrodská in Prague	1) Urban Planning Award 2022 2) European Solar Prize 2023 in the category Solar Architecture 3) two honourable mentions at Stavba roku 2022 (Building of the Year 2022) 4) Czech Adaptterra Award for the category Built Environment	1) EUROSOLAR 2) The European Association for Renewable Energy 3) Nadace pro rozvoj architektury a stavitelství (Foundation for the Development of Architecture and Construction)

	5) Wood Design & Building Award 6) BIG SEE Architecture Award 2024	4) Nadace Partnerství (Partnership Foundation) 5) Canadian Wood Council 6) BIG SEE
Biodynamic circadian LED floor lamp Sunflow developed in our research project	LIT Lighting Design Awards 2023	LIT Design Awards
Municipality of Mikolajice for the smart and ecological municipality energy system incorporating a pellet cogeneration unit WAVE developed and produced at UCEEB	Smart Cities 2022 Award	Smart City Innovations Institute
Prof. Ing. Petr Hájek, CSc.	Medal of Merit 2020	Fédération Internationale du Béton
Ing. Jakub Maščuch, Ph.D.	1) Innovators 20 (2021) 2) Silver Medal of Prof. Vladimír List	1) Hospodářské noviny 2) Czech Union of Employers in the Energy Sector
doc. Ing. Petr Kuklík, CSc.	Čestná uznání Vladimíra Lista (Vladimír List Honorable Mention) for long-term significant contribution to the development of technical standardization in the field of wooden structures	ČAS – Czech Standardization Agency
doc. Ing. Tomáš Matuška, Ph.D.	REHVA Professional Award in Science 2023	REHVA
Ing. Nikola Pokorný	Werner von Siemens Award – Best Thesis 2021	Siemens Česká republika
Project RESINDUSTRY	Top 10 projects of Interreg Europe	Interreg Europe

Note: Provide up to 10 examples.

Table 3.2.2 Participation of academic staff of the evaluated unit in editorial boards of international scientific journals during the evaluation period

Name, surname and title(s) of the evaluated unit's staff member	Name of scientific journal, ISSN
prof. Ing. Karel Kabele, CSc., FEng.	Energy and Built Environment, ISSN: 2666-1233 Energy and Buildings, ISSN: 0378-7788
Doc. Ing. Antonín Lupíšek, Ph.D.	ZeroBuild Journal, ISSN: 2980-0048
Prof. Ing. Petr Hájek, CSc.	ZeroBuild Journal, ISSN: 2980-0048
Prof. Ing. Jan Tywoniak CSc.	ZeroBuild Journal, ISSN: 2980-0048
Doc. Ing. Tomáš Matuška, Ph.D.	Journal of Heating, Ventilation, Sanitation, ISSN: 1210-1389
Ing. Pavel Kopecký, Ph.D.	Journal of Heating, Ventilation, Sanitation, ISSN: 1210-1389
prof. Ing. Karel Kabele, CSc.	Journal of Heating, Ventilation, Sanitation, ISSN: 1210-1389
doc. Ing. Vladimír Zmrhal, Ph.D.	Journal of Heating, Ventilation, Sanitation, ISSN: 1210-1389
Ing. Sofiane Kichou, Ph.D.	Energies, ISSN: 1996-1073, guest editor Frontiers in Energy Research, ISSN: 1664-8714, guest editor
Doc. Ing. Antonín Lupíšek, Ph.D.	Energies, ISSN: 1996-1073, guest editor

Note: Please provide up to 10 examples of academic staff participation in editorial boards of international scientific journals (e.g. editor, editorial board member, etc.).

Table 3.2.3 The most important invited lectures delivered by the academic staff of the evaluated unit at foreign institutions during the evaluation period

Name, surname and title(s) of the evaluated unit's staff member	Invited lecture title	Name of host institution, or name of conference or event	Year
Prof. Ing. Petr Hájek, CSc.	Concrete Structures for Sustainable and Resilient Built Environment	KCI – Korean Concrete Institute	2023
Ing. arch. Lenka Maierová, Ph.D.	The time for the light and the time for the darkness	ETH Zürich	2023
Ing. Jan Včelák, Ph.D.	Integrated Optic Fibre Sensors for Structural Health Monitoring	Empa – Swiss Federal Laboratories for Materials Science and Technology	2023
Ing. Jan Špale	The Energy Challenge of 21st Century: Large Scale Medium Duration Energy Storage	Purdue University – Herrick Laboratories	2023
Doc. Ing. Antonín Lupíšek, Ph.D.	Adapting Systems and Components to the Next Generation Needs	University of Bologna, NEXT BUILT	2022
Ing. Marek Petreje, doc. Ing. Michal Sněhota, Ph.D.	Hybrid Green Roof Amended with Recycled Material	Grenoble Institute of Technology	2022
Ing. Jan Včelák, Ph.D.	Novel Heating and Cooling Technology as a Flexible Load for Optimized PV Utilization in buildings	Gebze Technical University	2022
Prof. Ing. Petr Hájek, CSc.	Advanced Concrete Structures for Sustainable Built Environment	Manipal University Jaipur, India	2022
Prof. Ing. Petr Hájek, CSc.	Textile Reinforced Silicate Composites – Challenge and Opportunity	Slovak Academy of Science	2021
Prof. Ing. Petr Hájek, CSc.	Concrete Structures for Sustainable and Resilient Built Environment	SSCS 2019 Strategies for Sustainable Concrete Structures, Lecco, Italy	2019

Note: Provide up to 10 examples.

Table 3.2.4 - The most important lectures by foreign scientists and other guests relevant to R&D&I at the evaluated unit during the evaluation period

Name, surname and title(s) of the lecturer	Lecturer's employer at the time of the lecture	Invited lecture title	Year
Dr. Rolf Frischknecht	ETH Zürich	The Buried Giant: Construction Materials Shape the Environmental Footprint of Buildings	2022
Prof. Wolfgang Streicher	University of Innsbruck	A Fossil Free Future - Scenarios for Austria - Implications for Europe	2022
Miles Kenneth Oglethorpe	The International Committee for the Conservation of the Industrial Heritage,	Making Our Industrial Heritage Work for the Future, in The Context of Climate Change	2022
Prof. Karsten Voss	University of Wuppertal	Solar Decathlon Europe 21/22 – Experiences and Findings	2022
Prof. Harald S. Müller	Karlsruhe Institute of Technology	A New Generation of Sustainable Structural	2019

		Concretes – Design Approach and Material Properties	
Prof. Martin Teperspur and Doris Österreicher	The University of Natural Resources and Life Sciences, Vienna	Large Scale Urban Developments in Austria – Challenges and Opportunities Based on Two Case Study Examples	2019
Prof. Thomas Lützkendorf	Karlsruhe Institute of Technology	Sustainability in Building Construction – a Multilevel Approach	2019
Richard Lorch	International Journal Building Research & Information	Buildings and Climate Change: Accelerating Transformation	2019

Note: Provide up to 10 examples.

Table 3.2.5 - Involvement in the evaluation of national/European research project/programme calls relevant to the R&D&I area at the unit during the evaluation period

Name, surname and title(s) of the evaluated unit's staff member	Name of the Research project/programme call	Name of the contracting authority/guarantor of the project/programme call	Year
prof. Ing. Petr Hájek, CSc.	GA ČR panel 105	Grant Agency of the Czech Republic	2021-2025
Doc. Ing. Antonín Lupíšek, Ph.D.	Prostředí pro život	Technology Agency of the Czech Republic	2022-2023
Ing. Jan Špale	Theta	Technology Agency of the Czech Republic	2022-2023
Ing. Václav Novotný, Ph.D.	Theta	Technology Agency of the Czech Republic	2022-2023
Doc. Ing. Antonín Lupíšek, Ph.D.	Ecotech	CzechInvest	2023
prof. Ing. Jan Tywoniak, CSc.	Trend	Technology Agency of the Czech Republic	2019-2023
doc. Ing. Petr Kuklík, CSc.	INTER-EXCELLENCE	Ministry of Education, Youth and Sports	2019-2023
doc. Ing. Tereza Pavlů, Ph.D.	Trend, Epsilon, Zéta	Technology Agency of the Czech Republic	2019-2023
Ing. Jan Včelák, Ph.D.	Inovace	CzechInvest	2022-2023
prof. Ing. Petr Hájek, CSc.	Expert Committee for the Evaluation of Technical Documentation of New School Construction Projects	Ministry of Education, Youth and Sports	2022-2023

Note: Provide up to 10 examples.

RESEARCH PROJECTS

3.3 Research projects

The evaluated unit shall list at most 10 (considered most significant by the evaluated unit) research projects/activities (regardless of whether they are supported by public funds or based on contract research²²) that it has implemented or participated in during the period of 2019–2023²³. This should be done from the full list in annex tables (Table 3.3.1-3.3.2)²⁴, regarding particularly the results achieved or the application potential of the projects. The unit should also describe how the research projects contributed to the mission and purpose of the evaluated unit. If the evaluated unit has been a participant in listed project, it shall indicate which other entities were involved and describe its contribution to the project. The interdisciplinary aspects of the projects will also be commented on, along with any collaboration with other units of the evaluated HEI.

Maximum 300 words per project.

Self-assessment: The following text presents the 10 featured projects. A complete database of our research projects is available at <https://www.uceeb.cz/en/portfolio-en/>.

University Centre for Energy Efficient Buildings – Sustainability Phase, 2016-2020 (LO1605)

Funding agency: Ministry of Education, Youth and Sports

Programme / Call: National Programme for Sustainability I / Národní program udržitelnosti 5 (SMSM2016LO5)

Participants: CTU UCEEB

Budget total: 18.2 mil. EUR

Justification of selection:

This project represented the largest initiative undertaken during the reporting period and played a critical role in the successful establishment and early development of the UCEEB. As a foundational project, it enabled the Centre to consolidate its research capacities and build a stable institutional framework for long-term interdisciplinary collaboration. The project laid the groundwork for a wide range of subsequent research activities across multiple scientific domains, including building energy systems, sustainable materials, indoor environmental quality, and smart technologies for the built environment. It acted as a catalyst for further national and international research projects, fostering the development of new partnerships and enhancing UCEEB's visibility within the European research landscape.

One of the most significant outcomes of the project was its contribution to high-quality scientific output. It resulted in the publication of numerous peer-reviewed articles in prestigious international journals, several of which have since become highly cited. Notable examples include articles published in *Energy and Buildings* (DOI: 10.1016/j.enbuild.2018.01.033, 108 citations), *Materials* (DOI: 10.3390/ma12121923, 59 citations), *Renewable Energy* (DOI: 10.1016/j.renene.2020.03.090, 49 citations; and DOI: 10.1016/j.renene.2018.08.113, 40 citations), *Sustainability* (DOI: 10.3390/su12156151, 42 citations), and *Urban Planning* (DOI: 10.17645/up.v6i1.3545, 40 citations). In total, the project generated 405 results, including 188 peer-reviewed scientific articles, 142 conference proceedings papers, 24 functional samples, 14 utility models, and 4 patents. These outputs reflect not only the project's scientific excellence but also its strong orientation toward

²² For the definition of contract research for the purposes of evaluation in the HE segments, see Article 2.2.1 of the Community Framework for State Aid for Research, Development and Innovation 2014/C 198/01.

²³ Regardless of whether the projects are completed or still ongoing, provided that at least part of the project was implemented during the evaluation period.

²⁴ The evaluated unit shall only fill tables that are relevant to it.

applied research and innovation. By translating research findings into practical solutions and intellectual property, the project significantly contributed to UCEEB's mission of bridging academia and industry and advancing sustainable technologies for the built environment.

Centre for Advanced Materials and Efficient Buildings, 2018-2021 (TN01000056)

Funding agency: Technology Agency of the Czech Republic

Programme / Call: National Centres of Competence 1: Support programme for applied research, experimental development and innovation / NCK 1 (STA02018TN010)

Participants: CTU UCEEB, Brno University of Technology, Technical University of Liberec, Mendel University in Brno, AERS s.r.o., AGROP NOVA a.s., AZS 98, s.r.o., FENIX Trading, s. r. o., GEOTest, a.s., HOCHTIEF CZ a. s., INFRAM a.s., KNAUF INSULATION, spol. s r.o., KNAUF Praha, spol. s r. o., KOMA MODULAR s.r.o., KRONOSPAN OSB, spol. s r.o., Kloboucká lesní s.r.o., Město Třešť, PREFA KOMPOZITY, a.s., REGULUS spol. s r.o., RD Rýmařov s. r. o., SEDUM TOP SOLUTION s.r.o., SUBTECH, s.r.o., Siemens, s.r.o., Skanska a.s., TKP geo s.r.o., Teco a.s., VDT Technology a.s., WAFE s.r.o., Wienerberger s.r.o., cadconsulting, spol. s r.o., di5 architekti inženýři s.r.o.

Budget total / CTU: 7.8 mil. EUR / 2.9 mil. EUR

Justification of selection:

The project, led by the University Centre for Energy Efficient Buildings (UCEEB), was implemented as part of the National Competence Centres programme, which supported applied research, experimental development, and innovation in the Czech Republic. This initiative brought together four leading academic institutions and twenty-nine industrial partners, creating a unique interdisciplinary platform focused on enhancing material and energy efficiency within the construction sector—an area that lies at the very core of UCEEB's mission.

By fostering close collaboration between academia and industry, the project significantly advanced the development and practical application of sustainable construction solutions. Key areas of research included the design and testing of innovative construction materials with improved performance and durability, circular construction, the development of technologies to enhance energy efficiency in buildings, and the optimization of integrated water management systems. Special emphasis was also placed on the implementation of Building Information Modeling (BIM) to streamline planning, design, and efficient operation of buildings.

The project produced a total of 168 measurable results, including 27 peer-reviewed scientific articles, 38 functional samples, one working prototype, and 18 software tools. These outputs exemplify the project's strong focus on practical outcomes and technology transfer. Many of the solutions developed are already being used by participating companies, demonstrating the project's tangible contribution to innovation in the construction industry and its long-term societal impact.

S.A.W.E.R, 2018-2020

Customer: KGK EXPO

Participants: CTU-UCEEB

Budget total: 1.49 mil. EUR

Justification of selection:

The Solar Air Water Earth Resource (S.A.W.E.R.) project, developed by UCEEB in collaboration with the Faculty of Mechanical Engineering, is an innovative system designed to extract water from arid desert air using solar energy. This technology was prominently featured in the Czech Republic's pavilion at

EXPO 2020 in Dubai, demonstrating its potential to transform desert environments into fertile landscapes.

The concept of S.A.W.E.R. originated from the idea of harnessing solar energy to produce water in desert conditions. The system operates in two stages: first, it uses a desiccant material to adsorb water vapor from the air; second, it heats this material to release the absorbed moisture, which is then condensed to produce water. This method allows the system to produce up to 200 liters of water per day, significantly surpassing traditional condensation techniques that yield about 10 liters per day. Prior to its installation at EXPO, a mobile version of the S.A.W.E.R. system was successfully tested in the Sweihan desert near Abu Dhabi.

For EXPO 2020, the system was integrated into the Czech pavilion to showcase its capabilities. It not only extracted water from the desert air but also enriched it with nutrients to irrigate a garden surrounding the pavilion, effectively turning the arid environment into a green oasis. The pavilion's design emphasized the synergy between technology and nature, with the S.A.W.E.R. system serving as the technological core.

The S.A.W.E.R. system garnered significant attention and acclaim during EXPO 2020. Besides other awards and recognitions, it received the "Best Innovation that Creates Opportunity" award at the UAE Innovates awards, highlighting its potential to address water scarcity in desert regions. The success at the EXPO has opened avenues for further collaborations and applications in other arid areas, demonstrating the global relevance and impact of this Czech innovation.

RESINDUSTRY – Policies for Renewable Energy Sources in industry, 2019-2022 (PGI06158)

Funding agency: Interreg Europe

Programme / Call: Interreg / Interreg Europe

Participants: CTU-UCEEB (lead partner), LAB University of Applied Sciences (until 2019 LAMK Lahti University of Applied Sciences Ltd), Consortium Extremadura Energy Agency (until 2022 Association Extremadura Energy Agency – AGENEX), Tartu Regional Energy Agency – TREA, Marshal Office of Świętokrzyskie Region, Vorarlberg University of Applied Sciences, Ministry for Gozo

Budget total / CTU: 1.6 mil. EUR / 0.22 mil. EUR

Justification of selection:

The RESINDUSTRY project coordinated by UCEEB was recognized as one of the top 10 most successful projects within the Interreg Europe programme. Its primary aim was to boost the energy independence and sustainability of the European industrial sector by increasing the use of renewable energy sources (RES) and reducing reliance on fossil fuels.

RESINDUSTRY sought to enhance the competitiveness of European industries by lowering energy costs through greater RES integration. A significant focus was also placed on improving policy instruments—particularly regional Operational Programmes—so that they better support investments into renewable energy technologies for industrial use. This was achieved by working closely with stakeholders and public authorities across seven partner regions in Europe.

Throughout the project, RESINDUSTRY delivered impactful outcomes. Seven regional action plans were developed, influencing over €8 million in structural funds and €2.5 million in additional financing. The project organized 83 policy learning events, which facilitated knowledge exchange and the sharing of best practices between policymakers, industry representatives, and energy experts. Additionally, it supported capacity-building for 90 professionals and produced regional assessments and policy reports that mapped the potential of renewable energy technologies in various industrial contexts.

The project demonstrated how interdisciplinary collaboration, strategic planning, and evidence-based policy support can accelerate the deployment of renewable energy solutions in one of the most energy-intensive sectors—industry. Furthermore, it positioned UCEEB as a key player not only in technological development, but also in international cooperation and policy advocacy for sustainable energy systems.

SPARCS – Sustainable energy Positive & zero cARbon Communities, 2019-2024 (GA 864242)

Funding agency: European Commission

Programme / Call: H2020 / H2020-LC-SC3-2019-ES-SCC

Participants: Teknologian Tutkimuskeskus VTT OY (coordinator), CTU-UCEEB, Espoon Kaupunki, Stadt Leipzig, Município Da Maia, Reykjavíkurborg, Statutarni Mesto Kladno, *Dimos Kifissia*, *Lviv City Council*, *KONE Oyj*, *SIEMENS Osakeyhtiö*, *PLUGIT Finland OY*, *Kiinteistö Oy Lippulaiva*, *Suomen Rakennusinsinöörien Liitto RiL Ry*, *Adven Oy*, *Fraunhofer Gesellschaft Zur Förderung Der Angewandten Forschung EV*, *Bable GmbH*, *WSL Wohnen & Service Leipzig GmbH*, *Stadtwerke Leipzig GmbH*, *Cenero Energy GmbH*, *Seecon Ingenieure GmbH*, *Universitaet Leipzig*, *Sociedade Portuguesa de Inovacao Consultadoria Empresarial*, *E Fomento da Inovacao SA*, *CNET Centre for New Energy Technologies SA*, *Orkuveita Reykjavíkur SF*, *Suite5 Data Intelligence Solutions Limited*, *Vernt Monoprosopi Anonymi Etairia Aeiforon Proionton Kai Ypiresion*, *National Ecological Centre of Ukraine*, *Lviv Municipal Enterprise Lvivavtodor*, *Civiesco srl*, *Gopa Com.*, *Motor Oil (Hellas) Diilistiria Korinthou A.E.*, *Municipal Institution City Institute*

Budget total / CTU: 23.8 mil. EUR / 0.4 mil. EUR

Justification of selection:

The SPARCS project supported the transition of cities toward carbon neutrality by developing smart, sustainable and energy-positive urban districts. UCEEB has played an active role in this project, representing the Czech Republic through its collaboration with the city of Kladno.

Kladno, traditionally an industrial hub, is undergoing a significant transformation to become a more sustainable and resilient city. In cooperation with UCEEB, the municipality focused on increasing the share of renewable energy, implementing smart energy management, and improving the overall energy performance of urban infrastructure. A central element of this cooperation was the preparation of a Positive Energy District (PED) in the Sletišťe district. The goal is to create a part of the city that generates more energy than it consumes, powered entirely by local renewable sources and supported by energy-efficient buildings, mobility solutions and smart technologies.

The innovative work in Kladno under the SPARCS project was also featured in the Czech Television documentary *Green is the New Black*. The film captures the city's efforts to move from its coal-heavy industrial past toward a cleaner, smarter future. It presents Kladno as a testbed for sustainable solutions and highlights the role of UCEEB researchers in shaping this transition. The documentary has helped raise public awareness of climate challenges and showcased the real-world impact of research institutions on local development.

Through its role in SPARCS, UCEEB has contributed significantly to promoting practical applications of its research in sustainable energy and urban transformation. The project supports UCEEB's mission by advancing innovation in energy-positive districts, influencing municipal planning and policies, and engaging citizens and stakeholders in the co-creation of smart energy solutions. It demonstrates how applied research and cross-sectoral collaboration can drive systemic change toward climate-neutral cities and communities.

MORE-CONENCT – Development and advanced prefabrication of innovative, multifunctional building envelope elements for MODular RETrofitting and CONNECTIONS, 2014-2019 (GA 633477)

Funding agency: European Commission

Programme / Call: H2020 / H2020-EE-2014-1-PPP

Participants: Huygen Installatie Adviseurs (Coordinator), CTU-UCEEB, Stichting ZUYD Hogeschool, BJW BV, Timmerfabriek WEBO BV, Rigas Tehniska Universitate, Latvian Wood Construction Cluster, Zemgales Tehnologiskais Centrs, Tallinna Tehnikaülikool, MATEK AS, Ref Ehitustood Ou, Universidade Do Minho, DARKGLOBE, CENERGIA Energy Consultants APS, Innogie APS, Invela, RD Rymarov sro, ECONCEPT AG, Gaiurb - Urbanismo E Habitacao EM

Budget total / CTU: 5.6 mil. EUR / 0.3 mil. EUR

Justification of selection:

The MORE-CONNECT project was a European initiative focused on accelerating the deep renovation of existing buildings using prefabricated, multifunctional facade elements. The goal was to create scalable, cost-effective renovation solutions that achieve nearly Zero-Energy Building (nZEB) standards with minimal disruption for occupants.

A key innovation of the project was the development of modular facade panels that integrate insulation, ventilation, energy systems, and smart technologies. These panels were designed for mass production, but with flexibility for customization based on local climate, building typology, and user preferences. MORE-CONNECT also promoted the creation of automated production lines and one-stop-shop services to simplify and streamline the renovation process.

UCEEB's contribution to the project was significant. In collaboration with the Czech largest producer of prefab timber housing RD Rýmařov, UCEEB developed and demonstrated a complex prefabricated renovation system for a deep energy refurbishment of Czech multifamily residential buildings. It enables fast installation of façade elements and reducing renovation time to just a few days.

MORE-CONNECT contributed directly to UCEEB's mission by promoting energy efficiency, advancing building technology innovation, and strengthening ties between research and industry. The project demonstrated how modular prefabrication can transform the renovation sector, offering practical solutions to help meet Europe's climate and energy goals.

Combined heat and power (CHP) ORC unit with thermal output of 120 kW in containerized configuration, 2018-2020 (TK01020061)

Funding agency: Technology Agency of the Czech Republic

Programme / Call: Programme for funding of applied research, experimental development, and innovation THETA / THETA 1 (STA02018TK010)

Participants: CTU-UCEEB (lead partner), BHC Jílové s.r.o., Ing. Miroslav Šamata

Budget total / CTU: 402 kEUR / 167 kEUR

Justification of selection:

The project was carried out under the leadership of UCEEB developed a compact, efficient energy system based on Organic Rankine Cycle (ORC) technology, tailored for biomass fuel sources.

The result is a containerized unit capable of producing both heat and electricity from biomass, particularly wood chips. With a thermal output of 120 kW, the unit is designed for small-scale industrial, agricultural, and municipal applications where there is stable heat demand and access to local biomass. The containerized format ensures high mobility, easy deployment, and integration into existing infrastructure, making it suitable for facilities such as woodworking plants, hotels, farms, or district heating systems in rural areas.

The unit combines a biomass combustion system with an ORC module that efficiently converts thermal energy into electrical power. This cogeneration approach significantly increases energy utilization compared to separate systems. The compact, modular design minimizes installation time and cost while offering a sustainable and decentralized energy solution. There are already running three units in various locations in Czechia.

The project represents a step forward in the practical use of ORC technology and supports UCEEB's mission to advance innovative, sustainable energy systems that can be implemented in real-world conditions. By utilizing renewable biomass, the system reduces greenhouse gas emissions and promotes local energy independence. It also contributes to circular economy principles by turning wood waste into useful energy.

PLURAL – Plug-and-Use Renovation with Adaptable Lightweight Systems, 2020-2024 (GA 958218)

Funding agency: European Commission

Programme / Call: H2020 / H2020-NMBP-ST-IND-2020-singlestage

Participants: Ethnicon Metsovion Polytechnion (Coordinator), CTU-UCEEB, Proigmenes Erevnitikes & Diahiristikos Efarmoges, Dimos Varis - Voulas – Vouliagmenis, FENIX TNT sro, Obec Kasava, Bergamo Technologie SPZOO, DAIKIN Airconditioning Hellas SA, Netcompany-Intrasoft SA, OST - Ostschweizer Fachhochschule, Institut de Tecnologia de la Construcció de Catalunya, Pich-Aguilera Arquitectos SL, Fundació Institut de Recerca de L'energia de Catalunya, Agència De L'habitatge de Catalunya, ZRS Architekten Gesellschaft Vonarchitekten MBH, Recuair S.R.O., Denvelops Textiles SL, RD Rymarov sro

Budget total / CTU: 9.66 mil. EUR / 0.55 mil. EUR

Justification of selection:

The PLURAL project was a European research initiative focused on developing innovative, modular, and lightweight facade solutions for energy-efficient building renovation. The goal was to accelerate the decarbonization of the building stock by providing prefabricated “plug-and-use” elements that are adaptable, scalable, and easy to install with minimal disruption to occupants.

These developed prefabricated panels integrate a range of technologies, including insulation, ventilation, heating and cooling systems, as well as smart sensors. Designed for different climate zones and building typologies, they enable deep renovation of residential buildings to nearly zero-energy standards in a cost-effective and time-efficient manner.

The UCEEB played a key role in the successful demonstration installation in the village of Kašava in the Czech Republic and for the design and testing of the HVAC systems for other demos as well as for the implementation of smart monitoring technologies. Its expertise ensured the successful integration of these advanced components into the renovation process and provided valuable insights into the system's long-term performance.

PLURAL contributes directly to UCEEB's mission of advancing sustainable and energy-efficient building technologies. The project enabled UCEEB to translate cutting-edge research into practical applications, support innovation in the construction sector, and promote data-driven renovation methods that are both scalable and future-ready.

RENCO – Recycled Environmental Concrete for Building Construction, 2016-2020 (FV10397)

Funding agency: Ministry of Industry and Trade of the Czech Republic

Programme / Call: TRIO / TRIO 1 (SMPO201600001)

Participants: AZS 98, s.r.o. (lead partner), CTU-UCEEB

Budget total / CTU: 998 kEUR / 160 kEUR

Justification of selection:

The RENCO project was dedicated to the development of environmentally sustainable concrete for use in building construction. The central objective of the project was to reduce the environmental burden of conventional concrete production by incorporating recycled aggregates, thereby contributing to the advancement of circular construction practices.

Over the course of the project, extensive research activities were carried out, resulting in significant scientific contributions in the field of recycled concrete. Among the key outcomes was the publication of the article *“The Utilization of Recycled Masonry Aggregate and Recycled EPS for Concrete Blocks for Mortarless Masonry,”* which has been widely cited.

An important achievement of the RENCO project was the successful construction of an experimental residential structure utilizing recycled concrete. This building served as a proof of concept, demonstrating the technical feasibility, structural performance, and practical applicability of recycled concrete in real-world construction scenarios. The data and experience gained from this implementation provided valuable insights for future research and application.

Importantly, the RENCO project served as a catalyst for a series of subsequent initiatives aimed at further exploring and refining the use of recycled materials in construction.

The RENCO project significantly contributed to fulfilling UCEEB’s mission by promoting innovative, energy-efficient, and environmentally responsible building practices. Through the integration of recycled materials and the advancement of circular construction methods, the project reinforced UCEEB’s commitment to sustainable development and applied research in the built environment.

Analytical Tasks for Czech Standardization Agency (2020-2025)

Customer: Czech Standardization Agency

Participants: CTU-UCEEB

Budget total: 1.96 mil. EUR

Justification of selection:

We are collaborating with the Czech Agency for Standardization on eight analytical tasks that have directly influenced Czech standards. This contract has been selected because of its size and its direct impact in the Czech national standards.

The contract is broken into these tasks:

- Fire Safety of External Thermal Insulation Composite Systems (ETICS)
- Establishing Normative Conditions for Increased Use of Wood in Construction Concerning Fire Safety
- Fire Safety of Assembled Façade Systems
- Revision of Classification of Structural Components from a Fire Safety Perspective
- Fire Resistance of Lightweight Roof Coverings
- Fire Safety of Refrigerants for HVAC Systems
- Pre-Demolition Audit and Building Deconstruction
- Recycled Materials in Construction – Testing and Preparation of Standards
- Determining Mechanical Properties of Hardwood Species

This project has significantly contributed to UCEEB’s mission of increasing the energy efficiency (tasks related to thermal insulation, facade systems, roofs, HVAC systems), environmental impacts of buildings (tasks related to timber structures) and development of the circular economy in construction (tasks related to pre-demolition auditing and recycling).

Table 3.3.1 Projects supported by public funds

In the role of beneficiary						
Provider ²⁵	Project name	Support (in thousands EUR) ²⁶				
		2019	2020	2021	2022	2023
Technology Agency of the Czech Republic	Grate coatings of a biomass combustion chamber preventing high-temperature corrosion and abrasion	-	-	-	29.8	61.2
Technology Agency of the Czech Republic		64.8	-	-	17.0	75.3
Technology Agency of the Czech Republic	Advanced design methods for key elements of multi-storey timber buildings	20.6	-	-	-	24.7
Technology Agency of the Czech Republic	Advanced Modular Cloud Computing System for Bridge Infrastructure Monitoring Utilizing Fibre Optics	-	-	-	71.3	162.7
Ministry of Culture	Architectural and Festive Lighting in the Context of Historic Buildings and Spaces	-	-	-	-	31.1
EUKI	CirCon4Climate - Strengthening Circular Construction Practices	-	-	-	-	67.4
Technology Agency of the Czech Republic	Comprehensive setting of conditions for the establishment and operation of energy communities in the conditions of the Czech Republic, including pilot projects	-	-	-	20.2	73.5
Technology Agency of the Czech Republic	DEPLOYMENT OF SMART RENEWABLE ENERGY COMMUNITIES	-	-	-	13.1	83.8
Interreg	Design and test of policies for reducing, repairing, recovering and reusing waste from electrical, electronic equipment and plastic in Central Europe	-	-	-	-	69.4
Technology Agency of the Czech Republic	Development of efficient tools to minimize production of construction and demolition waste, its monitoring and reuse	-	-	17.7	15.3	20.7
Grant Agency of the Czech Republic	Enabling energy transition in postsocialist housing cooperatives	-	-	-	-	47.5
EUKI – European climate initiative	Energy Efficiency Network – a cross-border energy consultant training	-	3.7	36.2	41.0	41.1
Ministry of Education, Youth and Sports	Engagement for sustainability - University leaders in SDGs II (UNILEAD II)	-	-	-	-	29.8

²⁵ If the provider is from abroad, please indicate the provider's country of origin in brackets. For the determination of the country of origin of the provider, the place of residence of the provider is decisive.

²⁶ Indicate the total amount expressed in thousands of CZK and the conversion of the total amount into Euro.

Grant Agency of the Czech Republic	Hydrological performance of multi-layered constructed soils	-	-	-	14.5	35.2
Interreg	Improving policies for waste management of electrical and electronic equipment	-	-	-	-	48.7
Ministry of the Interior	Increase the efficiency of the recovery of odor molecules with a composite nanofiber layer for use in criminal practice	-	-	-	20.8	13.9
Technology Agency of the Czech Republic	Increasing the safety of traction batteries for transport	-	-	-	-	84.0
Laudes Foundation	INDICATE - natIoNal buiLDing ICa dATa accElerator	-	-	-	-	100.7
European Climate Foundation	Life-cycle global warming potential of buildings	-	-	-	24.9	9.2
Erasmus+	Light and Illumination for Human Health - Realm Life Appl	-	-	-	-	0.2
Technology Agency of the Czech Republic	Methodology for smart thermal grid planning: exemplary scenarios and coordination tools for Power2Heat system integration at the municipal level	-	-	-	13.5	70.9
Technology Agency of the Czech Republic	Mobile recycling line for processing construction waste from mineral thermal insulation materials and use of recycled material including possibility of direct application on construction	-	-	7.2	8.3	-
Grant Agency of the Czech Republic	Possibilities of using natural fibers for the production of hybrid textile reinforcement in concrete	-	-	-	70.1	100.2
Ministry of Education, Youth and Sports	Sustainable and safe use of secondary materials as a key to circular built environment	-	-	-	-	18.5
Technology Agency of the Czech Republic	Tribotechnics of volumetric expanders for distributed energy systems	-	-	-	38.6	45.4
Operational Programme Research, Development and Education	Education Methodology for Sustainable Building	95.5	38.5	200.7	228.3	417.8
Ministry of Education, Youth and Sports	Dejvice Campus – Blue-Green Infrastructure (Diagnosis of the Current State of Rainwater Management and Water Balance Calculation)	-	-	-	85.8	-
Ministry of Health	Comprehensive pre-clinical evaluation of lateral lumbar spine fusion with hybrid biodegradable nanocomposite porous implant	22.2	21.8	-	25.7	-
Ministry of Education, Youth and Sports	University leaders in SDG (UNILEAD)	-	-	-	16.8	-
Ministry of Education, Youth and Sports	Long-term Concept of Development of a Research Organization	315.6	330.0	465.3	745.1	897.1

Grant Agency of the Czech Republic	Interactions between wooden surface and planar particles of TiO ₂	34.5	36.4	-	-	4.6
Ministry of Education, Youth and Sports	Sustainability Office	-	3.0	1.5	1.4	-
Ministry of Education, Youth and Sports	National database of building materials life cycle impacts and evaluation tool for buildings	1026.0	668.8	-	-	-
Ministry of Education, Youth and Sports	Low cost turboexpanders for decentralized energy applications – possibilities of 3D print manufacturing from modern plastic materials	13.0	13.0	-	-	-
EU ERDF – Operational Program Entrepreneurship and Innovation for Competitiveness	Supporting photovoltaic system for city electric buses, trolleybuses and buses	-	-	1.4	-	-
Technology Agency of the Czech Republic	Czech participation in the Annex 72 of the International Energy Agency	52.6	51.7	43.6	18.0	-
Ministry of Education, Youth and Sports	Improving the Quality of Support Infrastructure in the Field of Energy Efficient Buildings (Inform EEB-CZ)	75.2	138.7	162.1	46.9	-
Ministry of Education, Youth and Sports	Active Mineral Additives and Related Durability Properties of Portland Cement Based Concrete	33.6	25.2	-	-	-
Technology Agency of the Czech Republic	Hybrid wood-concrete supporting construction systems	-	7.0	28.1	-	-
Ministry of Health	Functionalized nanofiber mesh for incisional hernia prevention	45.7	45.7	-	-	-
Ministry of Health	Functionalized nanofibers for external coating of colorectal anastomoses	22.4	-	-	-	-
Grant Agency of the Czech Republic	Fungal growth on the surface layer of wood-based materials under dynamic boundary conditions	-	30.8	31.0	31.6	-
Grant Agency of the Czech Republic	Modern mosaic mortars in a microscope – methods for their materials characterization and degradation studies	37.8	37.8	-	-	-
Grant Agency of the Czech Republic	Transport of water, suspended particles and heat in engineered soils of urban green infrastructure	59.8	-	-	-	-
Technology Agency of the Czech Republic	Optimised expanders for small-scale distributed energy systems	-	0.3	50.7	63.2	68.7
Operational Programme Enterprise and Innovation for Competitiveness	Waste heat utilization for energy storage based on the concept of Carnot batteries	-	17.4	48.3	69.3	-
Technology Agency of the Czech Republic	Innovative ventilation unit with thermoelectric modules for control of air temperature	75.8	25.5	99.3	58.8	-
Technology Agency of the Czech Republic	Mechanical grater system for alternative biomass fuels with high water and ash content integrated into	12.8	32.3	47.0	34.7	-

	a combustion chamber of a microgeneration ORC unit					
Technology Agency of the Czech Republic	Predictive control of battery storage using photovoltaic energy source based on cloud irradiance forecast service	23.8	-	-	-	-
Technology Agency of the Czech Republic	Expert System for Digitizing and Integrating Data from Construction	-	-	39.1	-	-
Technology Agency of the Czech Republic	Control of battery storage for applications in industry in accordance with the requirements of the customer and distribution network	100.0	95.9	17.7	-	-
Technology Agency of the Czech Republic	System for fully stand-alone renewable electricity production	23.7	37.2	57.4	-	-
Technology Agency of the Czech Republic	Power generation ICE directly cooled by ORC working fluid for complex WHR	19.5	38.9	56.5	-	-
Technology Agency of the Czech Republic	Database of embodied environmental impacts of building construction systems and its applications for use in BIM tools Archicad and REVIT.	30.8	29.0	10.8	-	-
Technology Agency of the Czech Republic	Smart City Compass: Software supporting implementation and evaluation of smart measures in cities	43.7	66.7	42.5	-	-
Technology Agency of the Czech Republic	WATER IN THE CITY: Blue and Green Infrastructure Interdisciplinary	56.9	89.8	34.9	-	-
Technology Agency of the Czech Republic	Structural Health Monitoring of Bridges Utilizing FBG Sensor Technology	44.8	60.0	54.1	-	-
Technology Agency of the Czech Republic	Development of concrete lightweight columns with carbon reinforcement as element for load-bearing structures with loading and fire tests	45.6	68.2	60.3	-	-
Technology Agency of the Czech Republic	Automated fault detection and diagnostics system for building services	36.1	35.6	50.2	-	-
Technology Agency of the Czech Republic	3D active ceiling for indoor environment improvement	39.7	-	-	-	-
Technology Agency of the Czech Republic	Livable cities and communities: Guidelines for planning of public space in digital era	50.3	55.2	12.7	-	-
Technology Agency of the Czech Republic	Mobile Autonomous Unit for Water Generation in Desert Areas	125.7	115.9	30.1	-	-
Technology Agency of the Czech Republic	Quality and sustainable public construction: functional specifications, decision making and communication in building projects	57.8	56.0	24.9	-	-
Technology Agency of the Czech Republic	Autonomous curtain wall panel	76.0	48.4	19.5	-	-
Technology Agency of the Czech Republic	Combined heat and power (CHP) ORC unit with thermal output of 120 kW in containerized configuration	83.7	50.2	-	-	-

Technology Agency of the Czech Republic	Battery storage integration into a woodchip fired micro CHP (combined heat and power) ORC unit with thermal output of 50 kW	34.6	17.3	-	-	-
Technology Agency of the Czech Republic	Research of additive manufacturing (3D print) possibilities for manufacturing of expanders for low temperature decentralized energy applications	16.0	-	-	-	-
Technology Agency of the Czech Republic	Innovation and Development of New Fixings for Timber and Timber-concrete Structures	26.4	-	-	-	-
Technology Agency of the Czech Republic	Decision support system of urban mobility and intelligent settlement services including specific needs of individual persons	23.1	-	-	-	-
Technology Agency of the Czech Republic	Interruption of thermal bridge with variable applications	33.5	-	-	-	-
Technology Agency of the Czech Republic	Advanced control of heating and cooling systems by thermal comfort	33.6	-	-	-	-
Technology Agency of the Czech Republic	Centre for advanced materials and efficient buildings	574.5	486.3	459.2	247.1	-
Technology Agency of the Czech Republic	Use of local biomass as a fuel source, produced by aerobic fermentation technology, in the Wave system	44.7	74.3	46.7	27.7	-
Operational Programme Research, Development and Education	Centre of Advanced Photovoltaic	99.0	93.3	102.4	114.9	40.9
Operational Programme Research, Development and Education	Development of capacity for strategic research management at CTU in Prague	66.7	44.2	51.4	61.0	-
Operational Programme Research, Development and Education	International Mobility of Researchers in CTU	37.7	0.1	-	-	-
Operational Programme Research and Development for Innovation	Smart Prague Technology Transfer	541.0	-	-	-	-
Operational Programme Research, Development and Education	Assistance Vouchers of the Capital City of Prague	-	-	-	15.4	-
Ministry of Education, Youth and Sports	Design and Verification of Properties of Concrete with Recycled Sand from Construction and Demolition Waste	-	78.0	121.6	101.2	-
Technology Agency of the Czech Republic	Development of Tools for Optimal Energy Response of Buildings to Future Smart Grid Requirements and Their Impact on the Energy Market and the Environment	14.0	36.0	32.8	26.8	-
Central Bohemian Innovation Centre	Improvement of External Communication of the Research Team and Its Research Activities through Videos	-	-	6.5	-	-

Interreg	Policies for Renewable Energy Sources in industry	-	76.3	85.2	51.4	-
Ministry of Education, Youth and Sports	Principles of Sustainable Construction and the FIRSTLIFE Project within the International SDE21/22 Competition	-	-	-	6.4	-
Ministry of the Interior	Security Research – Modeling of Thermal Degradation and Combustion	-	2.7	-	-	-
Technology Agency of the Czech Republic	Simulation, Testing, and Digitalization for Construction 4.0	24.0	58.6	17.4	3.8	-
Total		4,434.5	3,323.7	2,666.8	2,475.8	2,739.9

In the role of another participant						
Provider ²⁷	Project name	Support (in thousands EUR)				
		2019	2020	2021	2022	2023
Technology Agency of the Czech Republic	On-line sensors and monitoring for conventional power industry	-	18.1	21.0	43.8	36.7
Operational Programme Enterprise and Innovation for Competitiveness	Advanced sensor for monitoring steel structures	-	-	25.8	90.5	57.4
Operational Programme Enterprise and Innovation for Competitiveness	Advanced shading systems for buildings	-	-	64.1	107.1	68.5
Technology Agency of the Czech Republic	Analysis of the potential for development of micro-cogeneration in the Czech Republic and a proposal for a suitable incentive system	-	-	-	35.6	43.8
Operational Programme Technology and Applications for Competitiveness	Application 1 - System for evaluating and facilitating the selection of electric cars and advanced inspection of the technical condition of the battery	-	-	-	-	7.0
Operational Programme Technology and Applications for Competitiveness	Application of intensive coherent source for environmental	-	-	-	-	18.6
Horizon Europe	Boosting the uptake of circular integrated solutions in construction value chains	-	-	-	-	42.8
Horizon 2020	Climate Positive Circular Communities	-	-	-	95.9	515.8
Technology Agency of the Czech Republic	Condition diagnostics and protection of bridge constructions system with application of WIM system	-	-	36.9	32.6	68.5
Technology Agency of the Czech Republic	Creating Actionable Futures	-	-	-	19.1	36.9

²⁷ Ibid.

Technology Agency of the Czech Republic	Digitation and automation of production processes of prefabricated energy efficient timber buildings	-	-	89.1	113.0	117.4
EUKI	Energy Efficiency Network – a cross-border energy consultant training	-	-	-	-	-
Operational Programme Enterprise and Innovation for Competitiveness	Equipment for obtaining water from the environment of desert air	-	-	-	229.5	139.2
Grant Agency of the Czech Republic	Experimental and numerical assessment of the bearing capacity of notches in timber beams at arbitrary locations using LEFM	-	-	43.8	54.5	40.2
Operational Programme Enterprise and Innovation for Competitiveness	Facade system with integrated heat exchanger	-	-	39.9	68.3	34.3
Horizon Europe	Accelerate poSitive Clean ENergy Districts	-	-	-	-	49.4
Horizon Europe	GLoalFlex - A Global as well as Local Flexibility Marketplace to Demonstrate Grid Balancing Mechanisms through Cross-sectoral Interconnected and Integrated Energy Ecosystems enabling Automatic Flexibility Trading	-	-	-	-	74.5
Operational Programme Enterprise and Innovation for Competitiveness	Healthy window	-	-	28.8	197.0	161.0
Horizon 2020	Highly advanced modular integration of insulation, energising and storage systems for non-residential buildings'	8.0	40.8	117.4	52.9	139.0
Operational Programme Enterprise and Innovation for Competitiveness	Inferential sensing of concentration/viscosity of abrasive slurries.	-	-	15.6	56.8	8.6
Operational Programme Enterprise and Innovation for Competitiveness	interGraces - Platform for integration of IoT components into SOA systems	-	-	-	94.5	88.1
Erasmus+	Light and Illumination for Human Health - Realm Life Appl	-	-	-	1.1	1.3
Operational Programme Enterprise and Innovation for Competitiveness	Microcogeneration from non-standard solid biofuels	-	-	-	44.3	85.6
Operational Programme Enterprise and Innovation for Competitiveness	Modular heating and hot water preparation system	-	-	23.7	45.2	29.9
Operational Programme Enterprise and Innovation for Competitiveness	Multifunctional compact source of heat and cold	-	-	28.2	64.1	16.1

Technology Agency of the Czech Republic	Municipalities talk about water: Communication of the implementation of rainwater management measures in cities	-	-	13.1	9.0	27.1
Technology Agency of the Czech Republic	Nanofibrous wound dressings with encapsulated bacteriophages for treatment of infected wounds.	-	-	-	48.2	-
National Recovery Plan	National Centre for Energy II	-	-	-	-	21.0
Technology Agency of the Czech Republic	Nature-Like Lighting for Laboratory Animal Facilities	-	-	-	-	42.6
Horizon Europe	New European Bauhaus STAvangeR	-	-	-	4.2	17.7
Operational Programme Enterprise and Innovation for Competitiveness	New generation of lighting with safety features	-	-	42.5	126.9	76.0
Horizon 2020	Plug-and-use renovation with adaptable lightweight systems	-	5.2	189.7	140.6	148.1
Technology Agency of the Czech Republic	Prefabricated recyclable wood-based frame building system	-	-	-	82.2	106.4
Technology Agency of the Czech Republic	Preparation of tools and models for the implementation of the	-	-	-	-	54.6
Operational Programme Enterprise and Innovation for Competitiveness	Pressure monitoring of wheelchair seating system	-	-	56.8	84.7	66.0
Horizon 2020	PROBONO The Integrator-centric approach for realising innovative energy efficient buildings in connected sustainable green neighbourhoods	-	-	-	5.7	7.9
Operational Programme Enterprise and Innovation for Competitiveness	R&D of II. generation of intelligent roof "EMETEC"	-	-	81.9	177.8	255.0
Operational Programme Enterprise and Innovation for Competitiveness	Recycling technology of construction and demolition waste for zero-waste system	-	-	37.5	74.4	70.8
Operational Programme Enterprise and Innovation for Competitiveness	Research and development of radio communication in IoT for industrial automation and smart metering	-	-	-	87.0	36.7
Technology Agency of the Czech Republic	Resilience of Smart Cities and Villages of the Moravian-Silesian Region	-	-	-	-	1.4
Operational Programme Enterprise and Innovation for Competitiveness	RoboPID - diagnostics and automatic tuning of controller parameters for industrial use in buildings	-	-	-	96.8	103.5
Technology Agency of the Czech Republic	Stationary and mobile devices to support circadian synchronization, treatment and prevention of mental disorders through full spectrum-light phototherapy	-	57.9	66.4	33.4	20.6

Horizon 2020	Sustainable energy Positive & zero cARbon Communities	4.8	86.7	88.9	37.1	85.1
Technology Agency of the Czech Republic	System for complex monitoring of timber constructions	-	-	42.0	35.1	86.3
Operational Programme Enterprise and Innovation for Competitiveness	Wireless sensors for diagnostics of inaccessible parts of building structures	-	-	17.5	215.6	171.2
Ministry of Health	Comprehensive pre-clinical evaluation of lateral lumbar spine fusion with hybrid biodegradable nanocomposite porous implant	11.9	3.7	-	-	-
Ministry of Education, Youth and Sports	Enabling the participation of research organizations in the European Energy Research Alliance (EERA)	5.0	10.9	9.6	-	-
Technology Agency of the Czech Republic	Hybrid wood-concrete supporting construction systems	78.4	79.1	124.9	25.6	-
Ministry of Industry and Trade	Recycling of modern and recycled materials	14.3	15.4	-	-	-
Ministry of Industry and Trade	Flexible construction system on basis of timber and high-performance concrete structures for energy efficient residential buildings	91.2	39.0	-	-	-
Ministry of Industry and Trade	Recycled Sand from CD Waste for Concrete and Mortars	83.4	76.8	-	-	-
Ministry of the Interior	Analysis of Security Approaches in the Design of Fire Protection of Buildings and Solution Proposal for the Czech Republic	37.5	12.4	-	-	-
Operational Programme Enterprise and Innovation for Competitiveness	Waste heat utilization for energy storage based on the concept of Carnot batteries	-	26.2	-	-	-
Technology Agency of the Czech Republic	Ontorun - automatic tagging of building data	-	-	7.2	-	2.8
Technology Agency of the Czech Republic	Recycling and transformation of construction plasterboard waste into new products for construction and value-added applications	-	-	-	14.6	17.5
Technology Agency of the Czech Republic	METAMORPH - Advanced hybrid organic-inorganic nanofibers for CO2 capture and photocatalysis	-	-	-	98.1	76.8
Technology Agency of the Czech Republic	Next Generation District - Complex design and control of local distribution networks using advanced control theory and numerical optimisation methods	45.0	21.2	22.6	30.9	-
Technology Agency of the Czech Republic	Projections of the flexibility in low and high voltage distribution networks related to electromobility and distributed-energy installations, particularly stationary batteries, in the Czech Republic until 2040	29.2	29.4	8.0	-	-
Technology Agency of the Czech Republic	Effective and safe energy from biomass	39.6	31.1	44.5	-	-

Technology Agency of the Czech Republic	Green Roofs and Facades as a Tool for Improvement of Thermal and Water Balance in Industrial Space	40.5	38.4	39.8	-	-
Technology Agency of the Czech Republic	Hydronics 4.0	140.8	114.9	82.9	-	-
Technology Agency of the Czech Republic	Environmentally friendly resilient residential buildings	114.2	104.2	-	-	-
Technology Agency of the Czech Republic	Environmentally Efficient Construction and Demolition Waste for Structures	42.6	43.9	-	-	-
Technology Agency of the Czech Republic	Oak fastener in timber structures: materials for normative anchorage	25.7	-	-	-	-
Operational Programme Enterprise and Innovation for Competitiveness	MARLIN: Making existing buildings smarter and more energy efficient	1.2	14.8	13.5	10.0	-
Operational Programme Enterprise and Innovation for Competitiveness	Development of fibre optic measurement instruments for underground constructions and retaining structures	-	5.0	32.1	51.9	-
Operational Programme Enterprise and Innovation for Competitiveness	Resource-Efficient Factories by integrating intelligent COMposite material applications	-	-	-	29.8	96.6
Operational Programme Enterprise and Innovation for Competitiveness	Open dispatching system with principles of business intelligence and semantic data description	-	-	59.5	87.6	57.2
Operational Programme Enterprise and Innovation for Competitiveness	Research and development of a mobile condensing minipower plant based on CHP and RES sources with built-in heat and electricity accumulation supplemented by intelligent control system	28.3	191.2	-	94.0	62.7
Operational Programme Enterprise and Innovation for Competitiveness	Turboexpander for a biomass-fired CHP ORC unit	-	-	68.5	144.4	51.4
Operational Programme Enterprise and Innovation for Competitiveness	Wall-building ventilation system	-	-	21.4	51.8	58.2
Operational Programme Enterprise and Innovation for Competitiveness	Mobile protective barriers suitable for urban areas for protection enhancement of soft targets against vehicle ramming attack	-	-	19.5	39.6	26.3
Operational Programme Enterprise and Innovation for Competitiveness	Development of Low-carbon Energy in Small and Medium-sized Municipalities	-	-	-	46.0	81.7
Operational Programme Enterprise and Innovation for Competitiveness	Predictive control and diagnostics of district heating systems	-	-	37.9	68.4	17.9

Operational Programme Enterprise and Innovation for Competitiveness	Fully automatic hot water boiler for biomass	-	21.9	91.6	115.7	2.5
Operational Programme Enterprise and Innovation for Competitiveness	Development of continual brazing furnace with combined displacements of products and integrated energy center	134.8	122.7	-	-	-
Operational Programme Enterprise and Innovation for Competitiveness	Research of the influence of used components on the led chip in the framework of the development of a new led module, intended for demanding applications in the chemical industry	-	-	43.8	77.2	-
Operational Programme Enterprise and Innovation for Competitiveness	Development of the energy-efficient heat recovery	48.3	32.9	-	1.1	-
Operational Programme Enterprise and Innovation for Competitiveness	Air handling unit with thermoelectric heating and cooling	79.5	193.5	-	-	-
Operational Programme Enterprise and Innovation for Competitiveness	System for efficient energy management	38.8	-	0.9	-	-
Operational Programme Enterprise and Innovation for Competitiveness	Multi-level Integrated energy planning and management for Advanced Renewable Cities	41.7	11.0	-	-	-
Operational Programme Enterprise and Innovation for Competitiveness	Tools for active energy management	57.4	-	-	-	-
Operational Programme Enterprise and Innovation for Competitiveness	Utilization of Waste Heat by its Transformation into Electric Energy	28.0	-	-	-	-
Operational Programme Enterprise and Innovation for Competitiveness	Protection against Electrical Arc and Fire Prevention	31.0	-	-	-	-
Operational Programme Enterprise and Innovation for Competitiveness	Development of new technologies firing lightweight ceramic aggregate	70.1	33.3	-	-	-
EU ERDF – Operational Program Entrepreneurship and Innovation for Competitiveness	Industrial Research and Experimental Development for Production in The Company VUP Medical, a.s.	59.2	3.8	-	-	-
Operational Programme Enterprise and Innovation for Competitiveness	Advanced Concrete Elements with Woven Reinforcement	3.3	-	-	-	-

Horizon 2020	Development and Advanced Prefabrication of Innovative, Multifunctional Facade Elements for Modular Retrofitting and Connection	17.7	-	-	-	-
Interreg	Towards low carbon city districts through the improvement of regional policies	-	-	-	3.9	-
Interreg	Financial Instruments for Energy Renovation Policies	9.7	-	4.6	56.5	-
Interreg	Policies for Renewable Energy Sources in industry	31.1	-	-	-	-
Operational Programme Enterprise and Innovation for Competitiveness	Research and Development of a System for Personalized Presentation of Scientific and Expert Capacities	-	-	-	48.4	7.3
Ministry of the Interior	Security Research – Modeling of Thermal Degradation and Combustion	44.6	43.3	38.2	34.9	-
Interreg	Towards low carbon city districts through the improvement of regional policies	13.2	55.9	48.1	0.1	-
Technology Agency of the Czech Republic	Utilization of Advanced Technologies in the Field of Odorology	-	52.5	60.8	61.6	24.7
Total		1,547.5	1,6260	2,007.4	3,986.8	3,991.9

Table 3.3.2 - Contract research activities

Client ²⁸	Activity name	Revenue (in thousands EUR)				
		2019	2020	2021	2022	2023
UNICO.ai CZ, s.r.o.	Design of a wireless communication system, an innovative project in the field of electrical engineering	7.6	-	-	-	-
UNICO.ai CZ, s.r.o.	Assessment of technical feasibility of projects in the field of electrical engineering (bluetooth tracker, wireless power transfer)	4.4	-	-	-	-
Baumit, spol. s r.o.	2022 Baumit Vapour diffusion	-	-	-	5.3	-
ABADIA a.s.	Abadia Voucher Balconies	-	-	-	-	16.8
AGROP NOVA a.s.	AGROP NOVA - fire openness of walls	-	-	-	2.4	-
Metrostav, a.s., divize 9	Master Manual Update	10.7	-	-	-	-
Metrostav, a.s., divize 9	Master's Handbook Update - Seminar	2.2	-	-	-	-
Czech Standardization Agency	Update of the recyklujmestavby.cz website	-	-	-	15.7	-
Obec Měňany	Analysis and design of heat supply system optimization	-	-	-	-	4.8
Liberecký kraj	Analysis of the effective use of secondary raw materials in the Liberec Region	-	-	-	-	6.4
Středočeské inovační centrum	Analysis of needs and prerequisites for the management of the Smart Cities concept in the Central Bohemia Region	15.7	-	-	-	-

²⁸ If the client is from abroad, indicate in brackets the country of origin of the client.

Obec Měňany	Needs analysis for setting up measures within the strategic development of the municipality	-	-	-	-	3.2
Město Kutná Hora	Analysis of the readiness of the city of Kutná Hora for the introduction of Smart City	7.6	-	-	-	-
Technofiber s.r.o.	Analysis of ozone propagation in a room during its disinfection	-	-	4.8	-	-
SOLIDSUN s.r.o.	Analysis of technical systems of family houses with regard to meeting future energy performance requirements of buildings	-	2.1	-	-	-
BOVA Březnice spol. s.r.o.	Analysis of the load-bearing capacity of the fittings of the company BOVA Březnice spol. s.r.o.	16.0	-	-	-	-
BOVA Březnice spol. s.r.o.	Analysis of the bearing capacity of the fittings of BOVA Březnice spol. s.r.o. II	-	15.9	-	-	-
LAYWOOD group s.r.o.	Load capacity analysis of prefabricated panels for timber buildings	16.8	-	-	-	-
CZECH PAN s.r.o.	Load capacity analysis of sandwich panels	-	11.4	-	-	-
Voda Červený Kostelec, s.r.o.	Analysis of sludge utilization and energy of WWTP	2.8	-	-	-	-
Stedina s.r.o.	Sanitation-free tap	-	-	-	-	20.0
Nanuntio s.r.o.	Biosensors	3.9	-	-	-	-
BlazeCut s.r.o.	BlazeCut - extinguishing bus engines	-	-	-	5.6	-
proFem - centrum pro oběti domácího a sexuálního násilí, o.p.s.	PROFEM Centre	10.5	-	-	-	-
INTAR a.s.	SBToolCZ certification - IZS Karlovy Vary	-	-	11.5	-	-
Energy Benefit Centre a.s.	Certification SBToolCZ - New building of the SŠŽ Sokolov school on p. p. no. 386/1, k. ú. Sokolov	-	-	-	10.7	-
Energy Benefit Centre a.s.	Certification SBToolCZ - Secondary School of Applied Arts Ceramics and Glass Karlovy Vary (2022)	-	-	-	8.3	-
Multiple conference participants	CESB22	-	-	-	54.9	-
Centrum pasivního domu	CPD-Update of the Strategic Research Agenda document	-	2.4	-	-	-
Czech Standardization Agency	Technical Normalization Centre	23.0	14.7	-	35.0	-
Česká zemědělská univerzita v Praze	CZU public lighting and insects	-	-	-	6.0	-
BYDLEX s.r.o.	Českobrodská-Consultation and control of the implementation of the construction	-	-	2.9	-	-
RERA a.s.	DigiVill - Use of digitalization in public administration - Cross-border analysis of approaches and tools for public spaces	-	-	-	3.9	-
Regulus, s.r.o.	Dynamic CT test	4.8	-	-	-	-
Slavos Slaný, s.r.o.	EA ČOV Slaný	-	-	-	-	6.0
ecokit s.r.o.	ECOKIT	-	-	5.2	-	-
ecokit s.r.o.	ECOKIT - consultation	-	-	4.0	-	-

monom works s.r.o.	Energy concept of the Jalový dům housing complex	-	-	-	-	2.2
Město Týnec nad Sázavou	Energy concept of KC Týnec	-	-	-	2.4	-
Obec Soběhrdy	Energy concept: New multifunctional municipal office building	-	-	-	3.0	-
Město Slaný	Energy management City of Slaný	-	-	-	5.8	-
E-expert, spol. s r.o.	Energy plus district for Karviná - Site analysis part	-	5.2	19.8	-	-
Úřad vlády ČR	Energy Poverty in Danube Region	7.4	-	-	-	-
FÉNIX Trading s.r.o.	Environmental footprint of Fenix	-	-	-	11.2	-
Impregnace Soběslav, s.r.o.	EPD Wooden sleepers	-	5.6	-	-	-
AGROP NOVA a.s.	EPD products Novatop	-	-	-	11.4	-
Equidomus s.r.o.	EQUIDOMUS	15.9	-	-	-	-
EXCON, a.s	Excon_Ocelodům_2023	-	-	-	-	13.4
České vysoké učení technické v Praze, fakulta stavební	Experimental measurements of the thermal-hydraulic properties of 3 capillary mat samples	-	-	8.8	-	-
Fénix s.r.o.	Fenix PV Forecast SK-PL	-	-	-	-	13.0
Fénix s.r.o.	Fenix inverter power control	-	-	-	3.8	-
FENIX Trading, s. r. o.	FENIX: HES control and API, DES portal	-	-	-	9.0	-
Chart Ferox, a.s.	FEROX	-	-	-	56.5	-
České vysoké učení technické v Praze	GAČR - trials in RCTs	-	-	-	4.8	-
Fakulta stavební ČVUT v Praze	H-CEMENT - 4 fire protection tests for steel construction	3.2	-	-	-	-
HELUZ cihlářský průmysl v.o.s.	Heluz - dynamic simulation of thermal and humidity behaviour of a building using HELUZ unfired bricks	4.7	-	-	-	-
více objednatelů (viz HitHit)	HitHit Water in the city	-	-	-	11.8	-
Městská část Praha 5	Evaluation framework for sustainability of construction in Prague 5	-	-	-	-	21.8
Kancelář generálního komisaře účasti České republiky na Všeobec	Hybernace Expo Legacy	-	-	-	12.0	-
České vysoké učení technické v Praze Fakulta elektrotechnická	IAQ sensors for FEL	2.7	-	-	-	-
Obchodní akademie Česká Lípa	IAQ04 - Ceska Lipa	-	-	2.0	-	-
Sociální služby města Kroměříže	ICT for Kroměříž	-	9.4	-	-	-
JRD Services s.r.o.	INDICATE - LCA analysis of an apartment building	-	-	-	-	4.0
CPI Services, a.s.	INDICATE - LCA residence Malkovského and Nová Zbojovka for CPI PG	-	-	-	-	6.4

UNICO.ai CZ, s.r.o.	The Rustavi Innovation Ecosystem - good practice research	-	-	2.1	-	-
Městská část Praha 7	Installation of 10 air quality sensors for Prague 7	-	4.9	-	-	-
GRIDEO s.r.o.	Intelligent community energy infrastructure transfer point	16.0	-	-	-	-
IPR Praha	IPR - Urbania II	-	4.0	-	-	-
IPR Praha	IPR - Exhibition	2.6	-	-	-	-
Instytut Techniki Budowlanej	ITB burner calibration	-	-	-	-	2.0
TGS nástroje-stroje-technologické služby spol. s r.o.	IV TGS	-	-	15.9	-	-
IXSOL s.r.o.	IXSOL	-	-	-	15.6	-
JRD Development s.r.o	JRD - participation Silurian	-	-	12.8	-	-
Czech Standardisation Agency	Catalogue of secondary raw materials II - stages 2a.2b,3	-	-	68.0	-	-
K.B.K. fire, s.r.o.	KBKfire PV panel tests	-	-	-	3.4	-
YOUNG4ENERGY s.r.o.	Comprehensive design of energy saving measures in brewery operation(Y4E)	-	15.5	-	-	-
Obec Soběhrdy	Concept of modernisation of energy management of buildings in the municipality of Soběhrdy	-	-	2.2	-	-
SYNER, s.r.o.	Control activities - SOŠ Učňovská II	-	-	-	7.0	-
Česká spořitelna, a.s.	EU Taxonomy Consultation for Česká spořitelna	-	-	-	3.2	-
A.D.N.S. architekti s.r.o.	Consulting services for ADNS architects - renovation of the building CR Římská 499/15	-	-	3.9	-	-
Karlovarský kraj	Regional Office of the Karlovy Vary Region - Building B	-	-	-	12.1	-
Město Krásná Hora nad Vltavou	Krásná Hora nad Vltavou - Basis for commissioning of the planning study	-	-	-	-	2.4
Ministry of the Environment	Criteria for environmental evaluation of New Green Savings projects	-	-	7.9	-	-
Saint-Gobain Construction Products CZ a. s., divize Isover	Laboratory measurements of the improvement of step sound insulation by Rigistabil floors	2.1	-	-	-	-
MFS DX s.r.o.	LCA of TTC OXYMA office building for MFS DX	-	-	-	-	4.8
MFS DX s.r.o.	LCA Halls GLP - Bratislava Airport	-	-	-	-	8.4
Wienerberger s.r.o.	LCA of material variants of the Wienerberger family house	-	-	-	-	7.6
AERS s.r.o.	License AERS II - Comprehensive Battery Storage Management System	-	-	2.8	-	-
ALTEKO, s.r.o.	Licence Alteko	-	-	-	-	2.0
EMET inovation s.r.o.	EMET licence	-	-	-	-	2.0
Feramat Energies, s.r.o.	Feramat DH4.ENERGY licence	-	-	-	-	2.0
CV Machining s.r.o.	License project VIVA	-	-	-	-	9.2
QUANTUM, a.s.	License Quantum	-	-	-	-	2.0
TECHTRANS PT s.r.o.	Licence TECHTRANS Multiheat	-	-	-	-	2.0

Subterra a.s.	Licence Agreement - Envelop for the construction of the Reconstruction of the School Českobrodská 362/32a, Prague 9	-	-	18.6	-	-
DAMGAARD Consulting s.r.o.	DAMGAARD License Agreement	-	-	20.0	-	-
Safibra s.r.o.	License Safibra TACR FBG bridge	-	-	6.0	-	-
LINET spol. s r.o.	Linet gas consumption monitoring	-	7.9	-	-	-
Středočeské inovační centrum	Energy management solutions manual for municipalities	-	9.9	-	-	-
Medicalc software s.r.o.	Medicalc - database test	40.0	-	-	-	-
LIKO-S a.s.	CO2 concentration measurement and flow visualization in the acoustic cell	-	-	-	-	2.3
Městská část Praha 7	Air quality measurements for Prague 7 including data processing and analysis	-	3.2	-	-	-
Saint-Gobain Construction Products CZ a.s., divize Rigips	Measurement of laboratory sound insulation of plasterboard walls	4.4	-	-	-	-
Saint-Gobain Construction Products CZ a.s., divize Rigips	Measurement of laboratory sound insulation of plasterboard walls	6.8	-	-	-	-
ELSYMCO s.r.o.	Measurement of technical parameters of the ventilation unit	-	-	-	-	2.1
Stroj-energijska tehnika d.o.o.	Measurement of collector thermal output	-	-	-	-	2.8
Spectrasol, s.r.o.	Measuring the effect of lighting on the performance of high school students, compared to a control group of students.	-	2.0	-	-	-
GT Energy s.r.o.	Methodological procedure for the design of air-to-water heat pumps - phase 1	-	-	-	-	3.9
magistrát hl. m. Prahy, Odbor ochrany prostředí	Methodology for the adaptation of school facilities in the territory of the capital city Prague	-	-	15.8	-	-
Metrostav a.s.	Metrostav-Historic windows	8.7	-	-	-	-
Metrostav a.s.	Metrostav-PKS windows 2019-experiment	15.3	-	-	-	-
AVAPS s.r.o.	miniFUR Supplement	-	-	-	3.0	-
AVAPS s.r.o.	miniFUR Development of a validation furnace for medium-scale fire tests	-	20.0	-	-	-
Město Horní Slavkov	Local Energy Concept of Horní Slavkov	-	-	-	-	19.8
CA Immo Real Estate Management Czech Republic s.r.o.	Local HVAC survey for WELL certification	-	-	2.6	-	-
Strojírenské inovační centrum, s.r.o.	MMcite - Parklet study	-	-	-	-	12.0
Skanska Reality a.s.	MOCU - Residential project Modřanský cukrovar - facade Rebetong - testing	-	-	-	11.3	-
Faster CZ spol. s r.o.	License IAQ Faster 2022	-	-	-	-	2.2
Město Litoměřice	Technology options for ZEVO Litoměřice	-	-	14.8	-	-

Městský úřad Rožnov pod Radhoštěm	Offer optimization and control of the cultural house project	4.2	-	-	-	-
Městský úřad Rožnov pod Radhoštěm	Offer optimization and control of the project of the cultural house II.	2.5	-	-	-	-
MFS Digital	OXYMA CAPEX / OPEX Analysis Tool - Stage 1 - Simulation	-	-	-	-	18.0
InoSens s.r.o.	DESIGN OF ELECTRONICS AND FIRMWARE FOR SENSORS USING IOT TECHNOLOGY	-	14.2	-	-	-
EGF Energy, spol. s r.o.	Draft methodology for the use of participatory design for the preparation of investment projects	-	15.9	-	-	-
Národní dřevařský klastr	NDK-Fibreboard	205.0	-	-	-	-
Nemocnice Valtice s.r.o.	Hospital Valtice - critical infrastrucutre	-	-	-	6.0	-
Národní filmový archiv	NFA to IFA	-	6.2	-	-	-
NOHO s.r.o.	NOHO - workshop Nové Kukleny	-	2.6	-	-	-
nano power a.s.	OP PIK voucher - Cooling of battery modules with non-conductive liquid	-	-	20.0	-	-
Asistenční centrum, a.s.	Opponent's opinion Mělník	-	-	-	-	3.2
AZS RECYKLACE ODPADU s.r.o.	Optimisation of the use of recycled brick aggregates for concrete screeds and mortars	-	-	-	-	19.9
Metrostav a. s.	Verification of noise transmission from a hot tub through the roof structure	-	3.5	-	-	-
Institut plánování a rozvoje hlavního města Prahy	Palmovka - socio-anthro survey	-	17.3	-	-	-
PASSERINVEST GROUP, a.s.	Parametric study to determine daylighting requirements	-	4.8	-	-	-
PKS okna a.s.	PKS windows 2019 - calculations	2.5	-	-	-	-
Státní fond životního prostředí České republiky	Background study on Energy Plus Buildings in the Non-Residential Sector (OPŽP)	-	-	7.6	-	-
Statutární město Chomutov	Support for the preparation of a project for the conversion of the former city spa into a 21st century library	-	-	-	-	8.0
Město Strmilov	Support for the reconstruction of the House of Culture Part B: Functional assignment	-	6.4	-	-	-
Dopravní podnik Karlovy Vary, a.s.	Support for the development of public lighting in Karlovy Vary	-	-	17.2	-	-
PROGRESUS invest holding s.r.o.	Support for the development of a structural system for wood and concrete-based residential buildings	-	-	-	3.4	-
Ústav pro studium totalitních režimů	SBToolCZ consultancy: the building of the Institute of Structural Engineering	5.1	-	-	-	-
Výstaviště Praha, a.s.	Assessment of the energy solution of the Holešovice Market Hall	-	-	-	-	5.4
Enerfis s.r.o.	Thermal comfort assessment for BREEAM assessment	-	-	2.4	-	-

JAGA N.V. - org. složka	Assessing the effect of the convector on thermal comfort and airflow	-	-	-	7.0	-
MESSY s.r.o.	Fire test of measures for fire-safe application of cellulose insulation in integration with the chimney body	3.1	-	-	-	-
PLOMER Engineering, s.r.o.	Prague voucher - Modular battery backup energy storage for electromobility and energy	16.5	-	-	-	-
FENIX Trading, s. r. o.	Predictive algorithm for storage charging control	-	-	-	30.0	-
Obec Trojanovice	Project HOPE - Revitalisation of the Frenštát Mine brownfield	-	-	-	-	5.9
DAM architekti s.r.o.	Preliminary evaluation of the impact of passive shielding	-	2.0	-	-	-
PLOMER Engineering s.r.o.	Additional PV system for transport vehicles	-	13.2	-	-	-
Rezidence Kladno s.r.o.	Case study of energy systems of family houses Residence Kladno Dubí Location Sever	-	-	2.4	-	-
Statutární město Chomutov	Preparation of the Smart City Chomutov concept	15.5	-	-	-	-
Brilon a.s.	Preparation of expert input to design documents for ventilation units	-	2.2	-	-	-
Metrostav a.s., Divize 9	Handbook Fire safety in buildings + 4 seminars	-	4.5	-	-	-
Centrum pasivního domu, z.s.	Smart City Židlochovice Framework Contract	-	3.0	-	-	-
Smíchovská střední průmyslová škola, Praha 5, Preslova 25	Reconstruction of classroom lighting - supply of modern lighting in 6 selected classrooms of the school using more efficient light sources	-	-	93.7	-	-
ČEZ a.s.	Review of high-temperature heat pumps	-	-	-	5.0	-
Saint-Gobain Construction Products CZ a.s. Divize Rigips	Review of technical documents and experimental analysis	-	4.6	-	-	-
Dopravní podnik hl. m. Prahy, akciová společnost	Plants in the metro - pilot installation	-	-	-	16.0	-
Městská část Praha 8	RSOP - SOD1a) Proposal for a System of Evaluation of Construction Plans	-	3.6	-	-	-
Městská část Praha 8	RSOP - SOD2 Elaboration of evaluation criteria	-	7.4	-	-	-
Městská část Praha 8	RSOP - SOD3 Setting up the verification process and optimising the evaluation system	-	9.0	-	-	-
České vysoké učení technické v Praze	SBToolCZ: Preliminary evaluation of the PD for Building B of FSV CTU	-	-	-	2.7	-
nano power a.s.	SIC voucher - Electrical communication unit incl. electrical wiring for battery storage	-	20.0	-	-	-
MoistureGuard s.r.o.	SIC voucher MoistureGuard	15.2	-	-	-	-
BARVY A LAKY HOSTIVAŘ, a.s.	Simulation of the energy performance of a building with a different type of roof structure	-	-	11.8	-	-
Město Slaný	Slaný - consultation SCZT	-	-	-	-	11.9
Město Slaný	Slaný - opinion boiler room K45	-	-	-	-	4.0
TUSPO CO. s.r.o.	Smartseal	-	-	-	14.4	-

Metrostav a.s.	Cooperation in the field of airtightness and implementation of airtightness tests - Green Port Strašnice project	-	-	-	7.9	-
CA Immo Real Estate Management Czech Republic s.r.o.	Determination of measures to improve the health safety of the common areas of the Amazon Court office building	-	-	4.4	-	-
CA Immo Real Estate Management Czech Republic s.r.o.	Determination of measures to improve the health safety of the common areas of the Visionary office building	-	-	4.4	-	-
Deloitte Advisory, s.r.o.	Product Carbon Footprinting - Epoxy Resins for Deloitte	-	-	-	6.6	-
AQTpipe s.r.o.	Determining the performance of ceiling heating and cooling	-	-	-	-	2.5
AQTpipe s.r.o.	Determination of ceiling heating and cooling performance for a composition with acoustic panels	-	-	-	-	2.1
Město Semily	Strakonice	-	-	-	20.2	-
SVÚM a.s.	Study - analysis of sliding materials in the energy sector	4.4	-	-	-	-
Město Týnec nad Sázavou	Study and additional consultations for the installation of a photovoltaic (PV) source on the roof of the cultural centre in Týnec nad Sázavou	-	-	-	-	4.2
Pražská developerská společnost, příspěvková organizace	Study of the energy solution for the construction of Dolní Počernice	-	-	3.6	-	-
ra15, a.s.	Olbracht Study for ra15 (part 1)	3.6	-	-	-	-
Olomoucký kraj	Study Olomouc Region	11.6	-	-	-	-
Pražská developerská společnost, příspěvková organizace	Study specifying the energy solution for the construction of Dolní Počernice in Phase 1 - Part 1	-	-	14.8	-	-
SVÚM a.s.	SVÚM - application of sliding materials in power equipment	-	-	-	-	3.6
SVÚM a.s.	SVUM - resistance with alloy degradation	-	-	-	-	4.8
SVÚM a.s.	SVÚM - material testing in corrosive environment	-	-	-	-	2.4
Technický a zkušební ústav stavební Praha, s.p.	SBToolCZ auditor training	-	-	-	3.9	-
SEVEN Energy s.r.o.	SEVEN FVE training	-	-	-	4.6	-
Multiple customers	SBToolCZ 2019 training	4.1	-	-	-	-
Česká geologická služba	Synergys Technical Study	-	-	-	39.6	-
ČVUT - FBMI	Therapeutic ultrasound	-	11.5	-	-	-
Visionary Prague, s.r.o.	Visionary thermal imaging	3.1	-	-	-	-
TESAŘSTVÍ BISKUP, s. r. o.	The Bishop's Carpentry - a study of the FVE	-	-	-	2.5	-
Atrea, s.r.o.	Air-to-water heat pump testing	-	-	5.4	-	-
Městská část Praha 5	Sustainable Prague 5: adaptation of the methodology	-	-	-	4.0	-

Město Slaný	UEK city Slaný	-	-	-	17.2	-
Město Strakonice	UEK City of Strakonice	-	-	14.4	-	-
ÚSTAV HEMATOLOGIE A KREVŇÍ TRANSFUZE	UHKT - Energy concept of the campus part 2	-	-	-	6.7	-
RD Rýmařov s. r. o.	Carbon footprint of building structures of RD Rýmařov	-	-	-	2.7	-
Fénix Trading s.r.o.	UI Optimization Simulator	-	-	-	4.8	-
Fénix Trading s.r.o.	Application of a genetic algorithm for SAS battery storage management in the Jeseník production plant - phase 1	-	-	-	21.2	-
Fénix Trading s.r.o.	Application of a genetic algorithm for SAS battery storage management in the Jeseník production plant - phase 2	-	-	-	25.3	-
Město Horní Slavkov	Territorial Energy Concept (part: Energy Community Concept)	-	-	-	-	4.8
ProNanoTech s.r.o.	Variable contact angle measuring device	-	14.8	-	-	-
Obec Jinočany	Vision for the development of the new city centre	-	-	-	9.3	-
Obec Zduchovice	Vision for the development of the Zduchovice municipality	-	-	-	-	6.6
ZAKLÁDÁNÍ STAVEB, a.s.	Fibre optics for the Pohůrka Tunnel load test	29.8	-	-	-	-
Spectrasol, s.r.o.	The effect of full-spectrum light on the visually impaired	-	-	-	34.4	-
Multiple customers	Water in the city: books on sale (123 pcs)	-	-	-	3.1	-
Prague Institute of Planning and Development	Analysis of the possibility of using international evaluation tools for municipalities in Prague	-	-	-	-	39.4
Městská knihovna v Praze	Entrance area of the Barrandov branch	-	2.4	-	-	-
Výzkumný ústav Silva Taroucy pro krajinu a okrasné zahradnictví, v.v.i.	VUKOZ supply of sensors-joint work on the experiment	-	-	4.6	-	-
Městská část Praha 7	Evaluation of outdoor air measurement data for Prague 7	-	2.9	-	-	-
State Environmental Fund of the Czech Republic	Computing tools New Green Savings (Area C)	-	-	8.0	-	-
ENERGOCENTRUM PLUS, s.r.o.	Settlement of the license from the Scada BI project	-	-	-	-	3.2
Window Holding a.s	Settlement of the license agreement from the Healthy Window project	-	-	-	-	41.1
Pronanotech, s.r.o.	Development of a methodology for market-competitive production and processing of advanced nanofibers	-	19.7	-	-	-
Wienerberger s.r.o.	Waste heat recovery Tondach Hranice	-	-	8.0	-	-
ACOND a.s.	Development of a partial software management block	-	-	-	8.0	-

AZS BETON s.r.o.	Development of concrete formulations with a lower carbon footprint	-	-	-	-	8.8
MAS Bohdanečsko, z. s.	Training and development of community energy projects at the MAS level: mapping	-	-	2.7	-	-
Fraunhofer-Institut für Holzforschung	Fraunhofer WKI 2019	14.4	-	-	-	-
Univerzita Karlova	Foreign publications	-	-	-	2.4	-
Ministry of Regional Development	Providing training in the use of the Smart City Compass software tool and providing expert and consultancy support to users of this software tool	-	-	7.8	7.8	-
Ministry of Regional Development	Provision of modifications and maintenance of the Smart City Compass software tool	-	-	-	6.6	-
Obec Trojanovice	Design principles for sustainable construction and energy concept for the CÉRKA project in Trojanovice	-	-	-	15.2	-
Zakládání staveb, a.s.	Slat load tests	29.8	-	-	-	-
Loyd Group s.r.o.	ZEVO PoC	-	-	76.0	-	-
Národní ústav duševního zdraví, příspěvková organizace	Evaluation of the effectiveness of the pilot installation of biodynamic lighting in DS TGM in Beroun	11.4	-	-	-	-
FIRESI s.r.o.	Test of automatic fire extinguishing system for bus engine compartment	-	-	2.3	-	-
Fakulta stavební ČVUT v Praze	Fire protection test of steel structure with wooden cladding	-	3.2	-	-	-
Saint-Gobain Construction Products CZ a.s. divize Weber	Test for the determination of the production and selected parameters of combustion products	-	-	2.3	-	-
JRD Development s.r.o.	Airtightness test - apartment house Michle	-	6.9	-	-	-
SVÚM a.s.	Testing the opaciometer concept in an operational environment	2.0	-	-	-	-
Státní fond životního prostředí	Change of the criteria of OPIE OP5 SC5.2	4.0	-	-	-	-
Město Chýně	Elaboration of the energy community concept for the town of Chýně	-	-	-	-	9.5
Czech Standardization Agency	Drafting a catalogue of secondary raw materials/materials suitable for use in the construction industry - 2. Part 1, stage 1	16.0	-	-	-	-
Prof. Ing. Petr Hájek, CSc	Seismicity and resilience search processing	10.0	-	-	-	-
Prof. Ing. Petr Hájek, CSc	Preparation of technical documents for the assessment of building resilience	-	11.2	-	-	-
Město Žatec	Žatec - stage I - analysis	-	-	-	-	4.4
Multiple customers	Contracts under NDA	351.5	1115.1	580.7	735.3	598.0
Multiple customers	Contracts below 2,000 EUR	60.1	72.6	64.2	71.4	108.6
Total		1081.2	1,534.6	1211.2	1,480.4	1127.7

Note: List and describe contract research activities with a revenue in a given calendar year, regardless of the amount of financial revenue.

3.4 Research results with existing or prospective impact on society

The evaluated unit shall briefly comment on a maximum of 10 (considered most significant by the evaluated unit) research results already applied or realistically heading towards application during the period of 2019–2023, based on the overview annex table 3.4.1 (it is recommended to indicate results with a link to projects listed in indicator 3.3). The evaluated unit must demonstrate in its description that the research results have led or will soon lead to positive impacts²⁹, on society (e.g. description of how the results are used by various users, the range of persons/institutions for which the result is relevant, measurable economic impacts, etc.). The evaluated entity shall indicate in its commentary whether the gender dimension is considered in these results and discuss the impacts of the results regarding sustainability.

Maximum range 300 words/result.

Self-assessment:

We have selected ten results, of which 8 are already applied and two that are well on their way to practical application.

Applied results

MoistureGuard

The MoistureGuard system was developed through a collaborative research and development effort between our timber construction specialists and experts in sensor technology. It consists of a set of sensors designed specifically for timber buildings, capable of detecting moisture intrusion and providing early warnings to building owners. By alerting users to potential moisture problems before they escalate, the system helps prevent serious structural damage, ultimately increasing the durability and safety of wooden buildings.

Following the success of the first functional prototypes, a spin-off company was established to bring the product to market. Today, this company, SENSOMATIC, has installed nearly 1,000 systems across Europe and is preparing to expand into Japan.

The project not only delivers technological and economic benefits by reducing risks for timber building owners, but it has also led to the creation of a fast-growing business. Additionally, UCEEB benefits from the project through licensing revenues, further supporting ongoing research and innovation in the field. By bridging advanced sensor technology with timber construction expertise, MoistureGuard has become a unique solution for improving the longevity and reliability of wooden structures.

Smart control algorithms for battery energy storage systems

In collaboration with AERS, we have developed a cloud-based solution that acts as a supervisory control system for home battery storage units. The system evaluates data on household energy consumption, weather forecasts, solar panel irradiation, and spot electricity prices, and based on this information, it sends control commands to the battery storage unit. This ensures that the operation of the storage system is optimized for maximum economic benefit to the owner. The control algorithms have been successfully licensed to AERS, enabling their implementation in real-world applications. They are already commercially running in more than 100 households and saving money to their owners and the number of installations is rising.

²⁹ See Terms definition.

envelop – low carbon building envelope for energy efficient buildings

Envelop is a lightweight timber-based curtain wall system developed by CTU UCEEB as an alternative to traditional metal-based facades, aiming to enhance energy efficiency in both new constructions and renovations. This innovative system has been licensed to several companies, facilitating its broader application in sustainable architecture. A notable implementation of Envelop was the comprehensive renovation of the Českobrodská Secondary School in Prague, transforming the 1970s-era building into a modern, energy-positive educational facility. The project utilized the Envelop facade system, with HOCHTIEF securing the license for its application and NEMA overseeing the manufacturing process. This renovation not only elevated the building to an energy-plus standard but also garnered multiple national and international accolades. For CTU UCEEB, the Envelop initiative has yielded economic benefits through licensing fees and, more importantly, contributes to the long-term reduction of buildings' energy consumption and carbon footprints. This project exemplifies the successful integration of research and industry collaboration, advancing sustainable building practices.

SBToolCZ – national certification system for sustainable buildings

SBToolCZ is a national certification system originally developed at the Faculty of Civil Engineering in 2008 and further advanced at UCEEB since 2016. SBToolCZ is fully adapted to Czech building standards and common construction practices. It provides an independent, certified assessment of building quality and has been successfully used in recent years for sustainable public procurement by Czech cities and regions. Its main societal and environmental contributions are in the fact, that the system enables to assess quality of buildings and the level of their sustainability, and it is a practical instrument for considering these aspects in public tenders. For UCEEB it has economic benefits coming from the licensing fees for each awarded certification and for the trainings of accredited persons.

Wave – ORC machine for production of electricity and heat from biomass

The Wave cogeneration unit is the result of years of research into machines that generate electricity from waste heat using the Organic Rankine Cycle (ORC). This particular system is a biomass combustion unit with a thermal output of 120 kW and approximately 8 kW of electrical power. It has obtained all necessary certifications and is ready for market deployment. The system is a scalable solution housed in a standard shipping container. One half of the container contains the biomass combustion equipment with heat exchangers for flue gas extraction, while the other half houses the ORC unit that generates electricity. The device can operate in island mode and serves as a backup power source. Currently, four Wave units are in operation, supplying electricity and heat. A pilot unit with a capacity of 50 kW has been installed in Mikolajice, Písek, and Herálec, while fully operational 120 kW units are installed at UCEEB. The Wave cogeneration unit contributes to society and the economy by promoting energy self-sufficiency, reducing reliance on fossil fuels, lowering carbon emissions, and providing a cost-effective, scalable solution for decentralized renewable energy production.

Contribution to development of Eurocode 5 standard

Our colleague Petr Kuklík is a member of CEN/TC 250/SC5, the subcommittee responsible for Eurocode 5: Design of Timber Structures. His expertise has helped shape the guidelines ensuring the

safety and efficiency of timber structures across Europe. He has made significant contributions to the development of this standard, particularly in areas related to the structural performance, fire resistance, and reliability of timber constructions, including timber-concrete composite structures. SC5 focuses on defining design principles, material properties, load-bearing capacities, and construction methods for wooden buildings and hybrid timber systems. This standard helps to introduce more timber buildings to the EU market, which in effect reduces the environmental impact of construction.

Water in the City – a popular handbook on blue and green infrastructure

“Water in the City” is a handbook designed to assist urban planners, architects, and designers in planning and implementing blue-green infrastructure in cities. The guide was developed as part of the TAČR Zéta project in collaboration with UJEP and is available for free download at www.vodavemeste.cz. According to website records, over 2,000 professionals have already downloaded it, providing detailed information on their professional backgrounds and intended use of the book. In addition to the digital version, 120 printed copies were distributed to all municipalities with over 10,000 inhabitants, receiving positive feedback from local governments. Due to high demand from architects and designers for a printed edition, a crowdfunding campaign was launched on the Hithit platform, successfully raising over €13,000. As a result, the guide is now also available in bookstores. By providing essential knowledge on sustainable urban water management, *Water in the City* fosters environmentally responsible city planning, supports local economies through infrastructure projects, and promotes long-term resilience against climate challenges.

Analytical Tasks for Czech Standardization Agency

We are collaborating with the Czech Agency for Standardization on eight analytical tasks that have had a direct impact on Czech national standards. This contract was selected due to its scale and its significant influence on the development of Czech standards.

The scope of these tasks includes:

- Fire safety of external thermal insulation composite systems (ETICS)
- Establishing normative conditions for the increased use of wood in construction concerning fire safety
- Fire safety of assembled façade systems
- Revision of the classification of structural components from a fire safety perspective
- Fire resistance of lightweight roof coverings
- Fire safety of refrigerants for HVAC systems
- Pre-demolition audit and building deconstruction
- Recycled materials in construction – testing and preparation of standards
- Determining the mechanical properties of hardwood species

This project has significantly contributed to UCEEB’s mission by enhancing energy efficiency (through tasks related to thermal insulation, façade systems, roofs, and HVAC systems), reducing the environmental impact of buildings (through the increased use of timber structures), and promoting circular economy principles in construction (through pre-demolition auditing and the use of recycled

materials). By improving fire safety regulations, encouraging sustainable building practices, and optimizing material use, this initiative not only enhances public safety but also fosters economic growth by supporting innovation and sustainability in the construction sector.

Results realistically heading to application

S.A.W.E.R., MAGDA and EWA – producing water from arid desert air

The successful S.A.W.E.R. technology, which demonstrated the ability to produce drinking water from dry desert air at EXPO Dubai, has led to several follow-up R&D projects MAGDA and EWA. In these projects, we downsized the system and, in collaboration with KARBOX, adapted it for the needs of the defense industry. At the request of a serious potential client, the technology was successfully tested in the Australian desert, confirming its effectiveness under real-world conditions. Currently, negotiations are in an advanced stage regarding the licensing of this exceptional technology.

Rooftop root water treatment plant and green roof from recycled materials

One of the key outcomes of the National Competence Center CAMEB was a functional prototype of a rooftop root-based greywater treatment system and the development of a green roof layering system utilizing recycled materials. These results were further advanced by our colleague Marek Petreje through a technology transfer voucher, allowing for the refinement and practical application of these innovations. Currently, negotiations are underway between him and CTU regarding the establishment of a spin-off company dedicated to the design and delivery of these sustainable systems.

Gender dimension of the research results

Generally, we consider the gender dimension when planning our research projects. Typically, this is relevant in the sociological research which we conduct in the relation to energy efficiency, sustainability and societal acceptance of innovative solutions. It also relates to the research in the field of indoor environment of buildings and in assistive technologies. The above-listed results do not fall to these categories, so the gender dimension was not the topic of investigation in these cases.

Sustainability

Most of the above-listed projects have a potential positive impact on the environment, thus supporting the environmental part of sustainability. The certification system SBToolCZ is developed directly to assess and promote sustainability in construction projects. Several of the results support the decarbonization of the built environment by supporting the development of the materials with low embodied carbon, such as timber and other natural materials that can replace more environmentally intensive alternatives (MoistureGuard, Envilop, analytical task for the Czech Standardization Agency focused on fire resistance of tall timber buildings, Eurocode 5). Other above-mentioned projects contribute to sustainability by providing clean energy and improve utilization of renewable energy sources (battery storage control, Wave ORC). Several projects contributed to efficient water management (S.A.W.E.R., Water in a city, green roofs and rooftop grey water treatment).

Table 3.4.1 - Overview of research results in the period under evaluation

Type of result ³⁰	Year of application	Name
Functional sample	2023	Rooftop roof water treatment plant
Patent	2021	Autonomous apparatus for extracting water from the air, United States of America. Patent US11065573. 2021-07-20.
Certified Methodology	2021	Water in the City
Patent	2023	Apparatus for extracting water from air with one air duct United States of America. Patent US11828047. 2023-11-28.
Result Reflected in Legislation and Standards	2023	TNI prEN 1995-1-1 Eurocode 5: Design of timber structures – Part 1-1: General rules and rules for buildings.
Result Reflected in Legislation and Standards	2023	TNI prEN 1995-1-2 Eurocode 5: Design of timber structures – Part 1-2: Structural fire design.
Prototype	2023	Combined Heat and Power ORC Unit for Wood Waste in Containerized Configuration
Prototype	2019	Small-scale Power Plant for Low Quality Biomass as a Fuel Based on Organic Rankine Cycle with Automatic Operation
Sold licence	2019, 2020	System for Comprehensive Evaluation of Moisture in Wooden Constructions, Utility Model CZ 27978. 2015-03-17.
Sold licence	2020	Light Curtain Wall from Wood-Based Panels, Utility Model CZ 26609. 2014-03-13.

Note 1: Please list and describe the results already applied in practice or heading towards application in practice with existing or prospective impact on the society (e.g. domestic or foreign patents, sold licenses, spin-offs, prototypes, varieties and breeds, methodologies, significant analyses, surveys, expert outputs for policymaking or other forms of non-publication outputs, etc.). Indirect results of research, development and creative activities with documented societal impact, e.g. expert activities, services to the public/government/scientific community, may also be reported.

TRANSFER OF RESULTS INTO PRACTICE

3.5 Transfer of results into practice

The evaluated unit shall briefly describe its system for transferring results into practice. It shall also indicate up to five of the most typical users of its results, whether in the university environment or in the non-university application/corporate sphere, detailing how it collaborates with them and how it seeks out new users (using a maximum of five specific examples).

It will also indicate whether and how it commercializes R&D&I results (e.g. selling licenses, setting up start-up or spin-off companies, etc.)³¹, providing brief description of the commercialization methods used. The effectiveness of the transfer of results and the commercialization of R&D&I results will be described using a selection of results (max. five) listed in annex table (Table 3.4.1).³²

Additionally, the evaluated unit shall briefly comment on the funds received during the period of 2019–2023 from non-public, non-grant sources (e.g. licenses sold, spin-off revenues, donations, etc.). A full summary shall be provided in annex table (Table 3.5.1).

Maximum 500 words plus 200 words for each provided example of finding a new user of results and commercialization.

³⁰ Specify the specific type of result. Add rows as needed.

³¹ In the case of military HEIs, their specific position is considered when evaluating the commercialisation/evaluation of R&D&I results.

³² If the commercialisation of R&D&I results is carried out in this way.

Self-assessment:

Technology transfer

Our technology and know-how transfer system are built on several key pillars, ensuring that our research findings are effectively translated into practical applications. These pillars include licensing agreements for our intellectual property, providing research and development services to industry partners, and participating in pilot projects to test and refine innovative solutions. Additionally, we actively engage in professional training programs, equipping specialists with cutting-edge knowledge and skills. A crucial aspect of our approach is also the transfer of expertise to our students through education and hands-on experience through their active involvement in our research projects and in international competitions such as the Solar Decathlon. This comprehensive strategy enables us to maximize the real-world impact of our research while fostering innovation and collaboration across academia and industry.

Commercialization of R&D&I results

Our research institute actively commercializes its research outcomes by focusing on the licensing of our protected intellectual property and proprietary know-how. Over the past years, our licensing revenues have seen significant growth, increasing from €2.9 thousand in 2019 to €86.9 thousand in 2023. This upward trend reflects our commitment to transforming innovative research into practical applications while fostering collaborations with industry partners.

Five most typical users of our results

1. **Industrial enterprises** benefit from our technologies and collaborative research efforts, integrating innovative solutions into their production and development processes.
2. **Investors in the construction sector** apply our innovations to enhance the sustainability and efficiency of their projects.
3. **Start-up companies** leverage our research results as the foundation for their business models, transforming scientific advancements into market-ready solutions.
4. **Local governments** utilize our methodologies and tools to improve the sustainability of their investment projects and urban planning strategies.
5. **Professional community** gains access to our expertise through specialized training programs and the innovative tools we develop, which facilitate their technical work and decision-making.

Five examples of commercialized results

The following selected five examples illustrate the variety of commercialization of our results. The first two examples represent a commercialization of through licensing to existing industrial companies, the third one represents licensing to a start-up company that has been founded to bring our research outcomes to the market, the third one represents an example how we commercialize our know how through providing lifelong expert education and accreditation and the last example presents a gathering of donations from the end users and supporters of our guidelines through a crowdfunding campaign.

1. In collaboration with the company **AERS**, we have developed an **advanced predictive control system for home battery storage**. This system enables advanced control by optimizing battery

usage and electricity trading with the grid, ultimately improving the economic return for the device owners. Our proprietary know-how has been **licensed** to AERS, ensuring that our innovative approach contributes to the wider adoption of smart energy management technologies. Now, there are over 200 units installed at the customers' homes.

2. **Envilop** is an innovative **lightweight timber-based façade system designed for energy-efficient new buildings and renovations**. It offers a high-performance, sustainable solution for modern construction and is available through licensing. The first major installation of Envilop was part of the energy-positive renovation of COTH High School on Českobrodská Street in Prague. The construction company SUBTERRA, responsible for the renovation, acquired the **license** to implement the system. The project has received numerous national and international awards, highlighting its impact and innovation in sustainable building practices.
3. The **MoistureGuard** system was developed through the collaboration of our experts in sensor technology and timber construction. It consists of a **set of sensors and a control unit that enables the early detection of moisture leaks in wooden buildings**. The technology was initially **licensed** to a newly established start-up co-founded by our employees, which has since grown into the successful company SENZOMATIC. Today, SENZOMATIC has almost one thousand installations across Europe and is now preparing to expand into the Japanese market, further demonstrating the global potential of this innovative solution.
4. **SBToolCZ** is a **national certification system for sustainable buildings**, originally developed at the Faculty of Civil Engineering in 2008 and further advanced at UCEEB since 2016. Unlike competing systems, SBToolCZ is fully adapted to Czech building standards and common construction practices. It provides an independent, certified assessment of building quality and has been successfully used in recent years for sustainable public procurement by Czech cities and regions. Commercialization is carried out through **paid training programs** for accredited professionals and **licensing fees** for each certified project.
5. **"Voda ve městě / Water in a city"** was a collaborative project supported by the Technology Agency of the Czech Republic (TA ČR), involving ČVUT UCEEB and UJEP. The key outcome of the project was a **comprehensive guide for urban planners, architects, and municipalities**, titled **"Voda ve městě"**, which provides in-depth guidance on **implementing blue-green infrastructure** in urban environments. The handbook supports conceptual design and demonstrates practical implementation through real-world case studies. It is freely available online at www.vodavemeste.cz, where it has already been downloaded by several thousand professionals. Additionally, a printed version is available in select bookstores, made possible by a crowdfunding campaign on Hithit, where we successfully raised over €13,000 from individual supporters.

Funds received during the period of 2019–2023 from non-public, non-grant sources

Commercialization at UCEEB in the period of 2019-2023 was focused primarily on selling licenses for protected intellectual property and for technological know-how. In this period, we did not receive and donations nor have any spin-off company yet. The summary of revenues from the sold licenses and donations is presented in table 3.5.1.

Table 3.5.1 - Summary of non-public revenues received during the period under evaluation

Type of revenue	Revenue (in thousands CZK/EUR)				
	2019	2020	2021	2022	2023
Sold licences	73 / 2.9	643 / 25.7	940 / 37.6	1,386 / 55.4	2,173 / 86.9
Total	73 / 2.9	643 / 25.7	940 / 37.6	1,386 / 55.4	2,173 / 86.9

Note: Enter funds raised for R&D&I from non-public sources besides grants or contract research (e.g. licences sold, spin-off company revenues, donations, etc.) in the calendar year.

POPULARIZATION OF VAVAI

3.6 The most important activities in the field of popularization of R&D&I and communication with the public

The evaluated unit shall briefly describe its main activities related to the popularization of R&D&I and communication with the public (e.g. popularization lectures, citizen science initiatives, etc.) during the period of 2019–2023 and provide up to 10 examples that it considers the most significant.

Maximum 500 words plus 200 words for each example given.

Self-assessment:

We tailor our science popularization efforts to three key target groups: the public, high school students, and the professional community.

For the public, we engage in large-scale events such as our participation in EXPO Dubai, deliver lectures at Science Café, and appear in media broadcasts on television and radio. Additionally, we produce educational videos on YouTube, making scientific topics more accessible to a wider audience.

High school students benefit from guided tours of our laboratories, where they gain firsthand insight into cutting-edge research and its real-world applications.

For professionals in the field, we actively contribute to trade fairs and conferences, publish popular science articles, and take part in expert discussion podcasts. Furthermore, we regularly share insights through specialized online platforms and professional journals, ensuring that our research reaches relevant industry groups.

Examples of R&D&I popularization for public

Media appearances

Between 2019 and 2023, CTU UCEEB strengthened its media and PR strategy with the goal of increasing awareness of its research activities and expert contributions. Through active collaboration with the media and systematic communication, we achieved significant media coverage, including articles in professional journals, online media, as well as television and radio. Experts from CTU UCEEB contribute their expertise to thematic reports and discussion programs focused on sustainable construction and energy innovations, including broadcasts on Czech Television and Czech Radio. For instance:

- “What does it take to build a sustainable house?”, A. Lupíšek and K. Klepačová on Czech Radio in 2020 (<https://www.youtube.com/watch?v=Q7leQTMF0QQ>)
- “How to deal with high energy prices? Scientists from CTU store surplus energy in batteries” J. Včelák and P. Wolf on ČT24 in 2021 (<https://ct24.ceskatelevize.cz/clanek/veda/jak-na-vysoke-ceny-energii-vedci-z-cvut-ukladaji-prebytky-do-baterii-27595>)

- *"Kladno without carbon"* M. Kuzmič in a documentary on ČT2 in 2021
(<https://www.ceskatelevize.cz/porady/1095913550-nedej-se/221562248420002/>)

Czech pavilion at EXPO Dubai

CTU UCEEB played a significant role in the Czech exhibition at EXPO 2020 in Dubai through the development of the S.A.W.E.R. (Solar-Air-Water-Earth-Resources) technology, which can produce water from dry desert air using only solar energy. This innovative system was a key feature of the Czech pavilion and earned recognition from the event organizers, receiving the award for "Best Innovation" at the World Expo.

Science café Kladno

On October 24, 2023, at Science Café in Kladno, Associate Professor Tomáš Matuška delivered a lecture titled "How to Turn Air into Water" which presented the device that we developed for the EXPO exhibition in Dubai. He discussed innovative methods for extracting water from atmospheric air, emphasizing their potential applications in arid regions.

R&D&I popularization for high school students

CTU UCEEB provides guided tours of its laboratories for high school students, providing them with a unique opportunity to explore cutting-edge research in sustainable construction, energy efficiency, and environmental technologies. These excursions offer experiences with innovative systems, allowing students to see firsthand how scientific principles are applied in real-world solutions. Through discussions with researchers, students gain insights into modern engineering challenges and career opportunities in the field of sustainable development. By engaging young minds in this way, UCEEB aims to inspire the next generation of engineers and scientists while fostering interest in technological innovation and environmental responsibility.

Examples of R&D&I popularization for the professional community

Regular participation in the Smart City Expo World Congress

The Smart City Expo World Congress is the world's largest and most influential event dedicated to urban innovation, held annually in Barcelona. It brings together leaders from global companies, governments, and organizations to explore the latest advancements in smart city technologies and solutions, fostering collaboration and knowledge exchange to create better urban environments. CTU UCEEB has actively participated in this prestigious event, showcasing innovative solutions and contributing to discussions on urban development. For instance, during the 2022 edition, representatives from CTU UCEEB, including Michal Kuzmic and Jana Simcinova, were present at the congress, engaging with attendees and highlighting the center's advancements in smart city initiatives.

FOR ARCH trade fair

At the FOR ARCH trade fair, employees from CTU UCEEB actively disseminate our research findings to a diverse audience. They participate in specialized conferences, such as the 9th annual "Fire Safety of Buildings" conference organized by TZB-info in collaboration with the Professional Chamber of Fire Protection. Through presentations and discussions at these events, our team showcases innovative solutions and shares insights on energy-efficient building technologies and sustainable construction practices.

Aquatherm

At the AquaTherm trade fair, employees from CTU UCEEB actively disseminate our research findings to a diverse audience. They participate in specialized conferences, deliver presentations, and engage in discussions, showcasing innovative solutions and sharing insights on energy-efficient building technologies. This activity helps us to communicate our outcomes to sustainable construction practices and facilitate the transfer of knowledge to industry professionals and the broader public.

Dřevostavby Volyně

At the Dřevostavby Volyně conference, which brings together hundreds of timber construction experts from across Europe, CTU UCEEB actively contributes to the dissemination of cutting-edge research. Our team regularly organizes specialized presentation blocks, showcasing the latest advancements in wooden structures, energy efficiency, and sustainable building technologies.

Popularization articles at a main Czech portal focusing on HVAC

Employees of CTU UCEEB actively engage in popularizing our research findings through the TZB-info.cz portal, a leading platform for building services and energy efficiency. By contributing articles and participating in interviews, they effectively disseminate knowledge and innovations to both professionals and the general public.

Professional streamed discussions at TVIZE

Experts from CTU UCEEB have actively participated in professional discussions on construction, architecture, energy, and ecology on the TVIZE platform. These discussions have had a significant impact, garnering tens thousands of views. Discussions are available at the links provided in the list of links related to the criteria 3.7.

IMPLEMENTATION OF RECOMMENDATIONS

3.7 Implementation of the recommendations in Module 3

The evaluated unit will briefly describe how it has implemented the recommendations for Module 3 from the previous evaluation period, if applicable.

Maximum 1000 words.

Self-assessment:

The following text summarizes the main **recommendations** from the previous evaluation period (**R**) and describes the implemented improvement **measures** (**M**).

R: The percentage of revenues from abroad should be increased.

M: Over the past period, we have made a concerted effort to increase our involvement in international projects. To achieve this, we have taken a more systematic approach to monitoring international funding opportunities and calls, ensuring that we identify and respond to relevant opportunities in a timely manner.

Additionally, we have actively engaged in international research networks such as COST, IEA, and EERA, which has strengthened our collaborations and visibility within the global research community. A key factor in our progress has also been the recruitment of more international researchers, whose expertise and connections have significantly contributed to our successful participation in international projects.

As a result of these targeted efforts, approximately one-third of our current projects now have an international dimension, marking a significant step forward in our global research engagement. We remain committed to further expanding our international collaborations and leveraging these connections to enhance the impact of our research.

R: Advice is to concentrate on specific research directions, as the topics. / Abstracts of the different projects indicate a very broad thematic range. / To increase the scientific visibility and output even from applied research projects 2 to 3 R&D&I fields should be defined thus to sharpen the profile of the Centre to a larger extent as it is now the case.

M: In the past period, we have concentrated on better aligning our research projects with our mission, ensuring they focus on our core research areas—sustainable building and energy at the scale of buildings and cities.

Our research teams serve as the main drivers of these topics, and to enhance their visibility, we have provided a clearer presentation of their focus areas and key research themes on our website. Additionally, we have introduced a structured approval process for project proposals, which includes presentations and discussions to assess their alignment with our center's mission.

At the same time, when our research results prove applicable in other fields, we actively facilitate their transfer to maximize the impact and benefit of the resources invested in our research.

R: Collecting patents should not be given priority in the early stage of the UCEEB. / The number of patents should be increased over the years, given the close cooperation with industry. The University or the Centre do not necessarily need to hold all these patents as they become quite costly over the years. Even more important would be that staff members are mentioned as co-inventors when they have contributed to the innovation. Even when the rights are transferred to industry what is typically the case in joint projects with industry it is documented that usefully results were gained through the cooperation, thus serving as basis for future industrial cooperations.

M: Our center focuses on applied research and the transfer of research outcomes into everyday life. One of the key pathways for this transfer is the licensing of protected intellectual property. Therefore, securing patent protection for our innovative solutions is a logical step in ensuring their impact and successful commercialization.

Recognizing the importance of intellectual property, the number of new patents is an integral part of our internal evaluation system, reflecting our commitment to transforming research into practical applications.

During the monitoring period, we registered a total of 30 granted patents, including 17 in the Czech Republic, 4 in the European Union, 4 in the United States, 3 in Australia, and one each in Canada and Israel.

R: The spin-off needs the full commitment of the Rectorate, to grow as expected.

M: The support for research commercialization and the establishment of spin-off companies provided by our rectorate has significantly improved in the past period, and we strongly feel this backing. Courses focused on intellectual property protection and its commercialization are now regularly organized, and we maintain ongoing consultations with the technology transfer coordinator regarding our plans to establish spin-off companies. One such case is currently in an advanced stage of negotiation.

Furthermore, representatives of the rectorate actively participate in presentations at our Innovation Day, further strengthening the connection between research, commercialization, and institutional support.

R: Basically, well-established prizes and awards given either on national and on international level need to be targeted, so to strengthen the research activities and to increase the scientific reputation and visibility of the Centre, especially outside Czech Republic.

M: In the past period, we have received numerous international and national awards, which we deeply appreciate. These accolades recognize both our innovative technologies and demonstration projects, as well as individual contributions to specific activities and lifetime achievements in our field.

Since our focus is on transferring innovations into everyday life, we consider the most prestigious award to be the **Best Innovation Award at EXPO Dubai**, recognizing our groundbreaking contributions to sustainable technologies. The S.A.W.E.R. system, designed to generate water from arid desert air, has gained international acclaim, particularly at EXPO Dubai. The **UAE Innovates Award 2022** was granted by the Center for Governmental Innovation under the patronage of Sheikh Mohammed bin Rashid Al Maktoum, highlighting the project's global significance in sustainability.

We significantly contributed to **Energy-plus retrofitting project of COPTH Českobrodská in Prague**. This ambitious energy-plus retrofit project exemplifies our commitment to sustainable urban development. The European Solar Prize 2023, awarded by EUROSOLAR and the European Association for Renewable Energy, underscores the project's innovation in solar architecture. The Czech Adapterra Award further highlights its role in climate resilience and adaptation.

Our research project supported by TA ČR led to the development of **the Sunflow LED lamp**, which was recognized at the LIT Lighting Design Awards 2023 for its innovative approach to human-centric lighting, enhancing well-being through biodynamic circadian regulation.

The municipality of Mikolajice was honored with the **Smart Cities 2022 Award** for integrating our WAVE pellet cogeneration technology, demonstrating a real-world application of innovative decentralized energy solutions.

More examples of our awards are listed in Table 3.2.1.

A LIST OF SUPPORTING DOCUMENTS/LINKS FOR MODULE 3

Document name	No. criteria	Location (link in HTML)
Database of our research projects	3.3	https://www.uceeb.cz/en/portfolio-en/
Handbook Water in the City	3.4, 3.5	www.vodavemeste.cz
"What does it take to build a sustainable house?", A. Lupíšek and K. Klepačová on Czech Radio in 2020	3.6	https://www.youtube.com/watch?v=Q7leQTMF0QQ
"How to deal with high energy prices? Scientists from CTU store surplus energy in batteries" J. Včelák and P. Wolf on ČT24 TV channel in 2021	3.6	https://ct24.ceskatelevize.cz/clanek/veda/jak-na-vysoke-ceny-energii-vedci-z-cvut-ukladaji-prebytky-do-baterii-27595
"Kladno without carbon" M. Kuzmič in a documentary on ČT2 TV channel in 2021	3.6	https://www.ceskatelevize.cz/porady/1095913550-nedej-se/221562248420002/

<i>"We all want to save on energy. But first we need to know how to measure it." J. Maščuch in moderated discussion at online platform tvize</i>	3.7	https://tvize.cz/watch/jakub-mascuch-vsichni-chceme-usetrit-na-energii-nejdrive-ji-ale-musime-umet-merit
<i>"Building materials are running out, they have to be recycled. The Czech Republic could be a leader in combined construction." M. Volf in moderated discussion at online platform tvize</i>	3.7	https://tvize.cz/watch/stavebni-material-dochazi-musi-se-recyklovat-cesko-by-mohlo-byt-lidrem-v-kombinovanych-stavbach
<i>"Community energy will enable the sharing of electricity between people. It will also bring green energy to historic city centres." P. Wolf in moderated discussion at online platform tvize</i>	3.7	https://tvize.cz/watch/komunitni-energetika-umozni-sdileni-elektřiny-mezí-lidmi-zelenou-energii-dovede-i-do-historických-center-měst
<i>"Renewable sources and recycling of construction waste will help decarbonise the construction industry." A. Lupíšek in moderated discussion at online platform tvize</i>	3.7	https://tvize.cz/watch/antonin-lupisek-dekarbonizaci-stavebnictví-pomohou-obnovitelné-zdroje-i-recyklace-stavebního-odpadu
<i>"A healthy indoor environment is not only fresh air, but also light, warmth and acoustics. People have different needs." D. Adamovský in moderated discussion at online platform tvize</i>	3.7	https://tvize.cz/watch/zdravé-vnitřní-prostředí-není-jen-cerstvý-vzduch-ale-i-světlo-teplo-a-akustika-lidé-mají-rozdílné-potřeby
<i>"Timber buildings are common in Europe today, but they are slowly gaining ground in our country. We export wood unnecessarily cheaply." P. Kuklík in moderated discussion at online platform tvize</i>	3.7	https://tvize.cz/watch/dřevostavby-jsou-dnes-v-evrope-bez-ně-u-nás-se-prosazují-pomalu-dřevo-vyvážíme-zbytečně-levně