Annex 8
'Agreement for the Completion and Financing of a Fundamental and Applied Research Project'
(29.08.2025, lzp-2023/1-0348)

Mid-term scientific project report

Project name: Investigation of innovative biomass-based panels for application in external building façade

1. Scientific excellence

The scientific objective of the project is aimed at development of innovative biomass-based cladding panels for application in external building facades. Four work packages (**WP**) were proposed to achieve the objective: 1) Panel development, 2) Testing and analysis of developed panels, 3) Utilization and life cycle assessment 4) Dissemination of results and technology transfer. The expected socio economical result of the project is the developed technology of 2 prototypes of the final façade panels with the measurements of 200 x 400 mm representing the best performance in external conditions after 18th month exposure. The scientifical output is 5 scientific publications submitted/published in peer reviewed journals indexed in Scopus database, with citation index at least 50% of the average in the field, and attended two international scientific conferences by presenting results of the proposed project. The project is implemented in Latvian State Institute of Wood Chemistry (LSIWC). In general, at the mid-term of the project, the research progress is in accordance with the accepted project version described in Part B "Description of the project".

To achieve the defined objective of the project, implementation of three WPs (1, 2 and 4) was launched by defined tasks according to the project plan without significant changes. The aim of **WP1** is to develop innovative high-density (1200 kg/m^3) panels using 3 different raw materials from local lignocellulose resources. The selected raw materials are wheat straw, hardwood (grey alder) and softwood (spruce/pine). All raw materials were purchased and mechanically crushed using a knife mill. It was found that the chips obtained as a result of mechanical crushing affect the subsequent panel manufacturing process. Namely, according to the plan, the task is to obtain 2 types of panel products for each raw material: 1) by pre-treating the raw materials in a steam explosion (SE panels) and 2) by adding a biobinder derived from birch outer bark – suberinic acids (SA panels) to the raw materials. Therefore, the raw materials were crushed depending on the type of panels: for SE pretreatment, a knife mill with a mesh diameter of 30 mm was used, while for SA panels, a crushed particles of size ≤ 2 mm were selected. Visual presentation of the panel production is shown in the Figure 1.

In the development of panels, the purpose of SE treatment is to destroy the lignocellulose structure and obtain a fibrous mass with self-binding properties. Therefore, the fibrous mass obtained after SE treatment can be pressed at elevated temperatures and obtain a board-like material without binders. Since this project is based on previously conducted studies, the SE processing parameters for grey alder and wheat straw were known (220℃, 2 min). The SE processing parameters of softwood (50% spruce and 50% pine) were clarified during this project by varying the reaction time in range of 60–150 s at 230℃. Following the recommendations of scientific literature, the SE-treated raw materials were centrifuged to release the liquid fraction. The SE solid residual then was passed through 2 wire rolls several times, making the fibrous mass fluffier. The SE mass was then dried to achieve the moisture content of 1–2% and hot-pressed at 160–165 ℃.

The production of SA panels consists of 1) mixing the prepared raw materials particles with a binder, 2) drying the furnish to a moisture content of 1–2%, and 3) pressing at 180 ℃. The suberinic acids-derived binder developed by LSIWC was previously used to produce medium-density (800 kg/m^3) boards from

birch wood particles. When developing high-density boards, the process was adapted by changing the amount of binder and the pressing process.

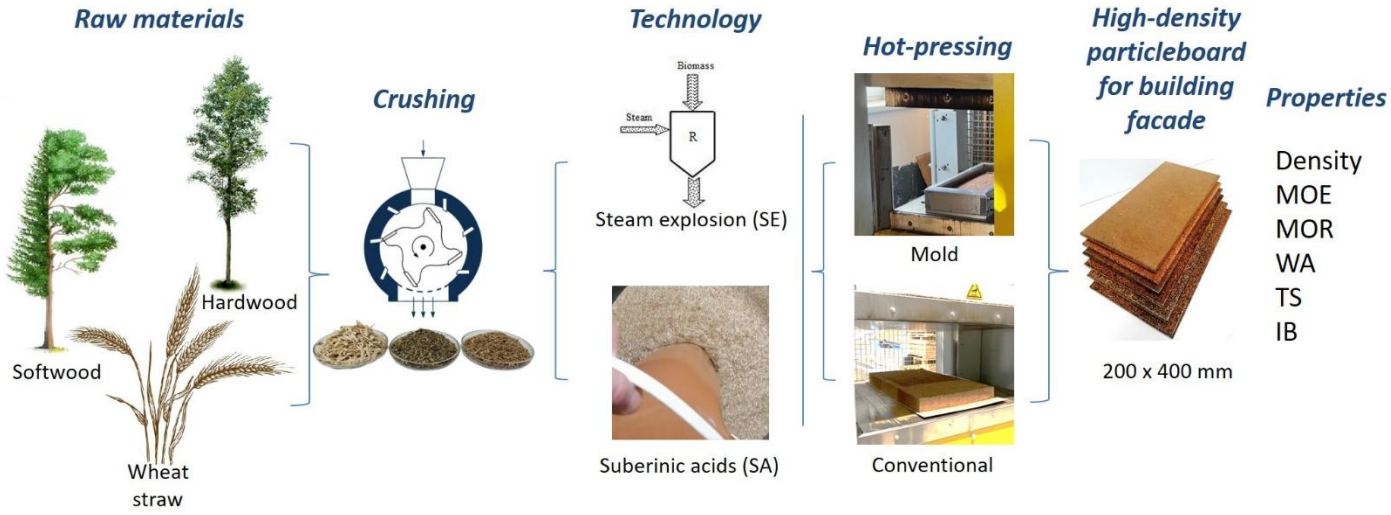

Figure 1. Production flow of high-density biobased panels for façade application.

Both types of the panels (SE/SA) were hot-pressed in 2 different ways obtaining 2 pressing types: conventional and mold pressing. A specially ordered dismountable aluminum mold was purchased for mold pressing obtaining the final samples with measurements of 10x200x400 mm without residual furnish. The panels obtained by conventional pressing had the initial measurements of 10x450x900 mm, then cut to the specimens with the same measurements as for mold panels. A cooling phase was introduced into the panel pressing process, which was necessary for the curing of natural lignocellulose components and to avoid the delamination of the panels. Over 200 panel specimens measuring 10x200x400 mm were produced for further panel evaluation. Half of the produced panel specimens were coated by different innovative coatings containing of 1) only purified SA, 2) SA + earth pigment (SP), 3) SA + chitosan (SH), and 4) SHP.

In the framework of **WP2**, the obtained panel samples were tested according to the approved methodology on density (EN 323), bending properties (EN 310), thickness swelling and water absorption by immersing in water for 24 h (EN 317), internal bonding (EN 319), IB after 2 h boiling in water (EN 1087-1), water drop contact angle within 90 s, FTIR spectroscopy, and long-term natural weathering. The natural weathering was established on a flat roof and designed on six vertical stands with vertically fixed panel samples oriented to the south and west (Figure 2). During the first three months of the natural weathering a total surface colour change (ΔE) was measured by a spectrophotometer that will be a subject to prepare presentation in the coming conference. Further the measuring is proceeded every 6 months including panel thickness changes and biological observation for mould fungi by microscopy tool.

On the project midterm the obtained results in terms of tested physical-mechanical properties indicate that wood-based particleboards outperformed wheat straw in both panel types. Each technology was adapted to the specific raw material and proven suitable for producing high-density boards. Furthermore, conventional pressing demonstrated superior performance compared to mold pressing in terms of the mechanical and physical properties achieved. According to the EN 312 standard requirements for the boards for use in humid conditions, water resistance was met only by the boards from SE grey alder wood (TS 7–17%) regardless of the pressing type. This indicates to the best performance of SE boards from grey alder for external façade applications, but also weakness of other investigated board types. The bending properties of all obtained boards were excellent (MOE 3720–9980 N/mm^2, MOR 18–66 N/mm^2)

and met the standard requirements. Almost all investigated panels achieved higher IB values according to the standard requirement (0.45 N/mm^2), in the best case (the same SE grey alder board) exceeding the value up to 6.7 times. Overall, the achieved satisfactory mechanical properties of investigated panels, especially high IB values hopefully indicate to the potential suitability for use in external façade application. The obtained results from the physical-mechanical testing of the panels were summarized in the first scientific paper.

Figure 2. Long-term natural weathering test of produced panels.

The obtained results from the testing of IB after 2 h boiling in water, water drop contact angle within 90 s, and FTIR spectroscopy are waiting to be summarized to reveal new information on investigated panels. These results will service as material for the next scientific publication.

The preliminary results of weathering suggest that the used coatings do not fully prevent moisture absorption, as indicated by increment in panel thickness. However, the addition of pigment improved color stability, with ΔE values in the range of 3–7, compared to significantly higher values in coatings without pigment (ΔE 11–30). Without the observation on color changes, further research will investigate the coatings' resistance to fungal degradation under prolonged exposure conditions.

2. Impact

2.1. Scientific results of the project

Scientific results partially mentioned in the previous section of the report are intended for dissemination according to the proposed plan. The first scientific paper based on the project results is submitted to the open access journal *Forests* having IF 2.5:

- Ramunas Tupciauskas, Andris Berzins, Martins Andzs, Rudolfs Berzins, Janis Rizikovs, Gunars Pavlovics. Physical-mechanical properties of innovative biobased particleboards for application in external building façades. Manuscript ID: *forests-3822101*.

First round of peer review process of the submitted manuscript was finished with decision "Minor revisions". During the preparation of the report the manuscript was revised according to the reviewers' recommendations, resubmitted, accepted for publication, and now published online. The second manuscript (Water resistance of fully bio-based particleboard intended for building façade application) is preparing to be submitted this year to the journal of *Applied Sciences* after the second conference mentioned below. The rest three manuscripts anticipated within this project proposal are planning to be submitted/published until the end of the project. Two conferences are confirmed to be attended this year:

1. *The 21st meeting of the Northern European Network for Wood Science and Engineering (WSE 2025)*, 7–**9 October 2025**, **Växjö, Sweden**. Oral presentation "Weathering resistance of fully biobased particleboard after three-month exposure" by Berzins, A., Tupciauskas, R., Andzs, M., Pavlovichs, G.
2. *The 14th edition of the International Conference "WOOD SCIENCE AND ENGINEERING IN THE THIRD MILLENNIUM" (ICWSE 2025)*, **November 6-8, 2025, Brasov, Romania**. Oral presentation "Properties of innovative biobased panels for application in external building façades" by R. Tupciauskas., Pavlovics, G., Berzins, A., Andzs, M.

The third scientific conference *BTechPro 2026* organized by LSIWC is planned to be participated on the next year presenting the results of panel weathering after one year exposure.

Additionally, the project scientific results and acquired knowledge are disseminated through several publicly accessible websites. First of all, the established section in LSIWC' website is supplemented by the project progress every year (in Latvian). The web page serves as a cost-effective way for widespread dissemination to all target groups and a self-archiving tool in case of Green Open Access. Social networks like Research Gate and LinkedIn are also utilized regularly spreading the project results to international audience in the Green Open Access manner. Video abstract presenting the project scientifical concept and implementation process was generated as virtual material for the coming conference WSE 2025 and is accessible for everyone in YouTube channel.

According to the national and Horizon Europe open access policy, Data Management Plan (DMP) of the project was elaborated in the platform ARGOS and published in the platform Zenodo. The DMP include development and application of uniform data collection methodology to accurately document all project-related activities (experimental procedures, results, observations, etc.), and ensures the effective management of the project according to FAIR principles: findable, accessible, interoperable, and reusable.

2.2. Research development opportunities

During the project implementation, the team of the project took a part on the State Research Programme in the national project "Innovation in Forest Management and Value Chain for Latvia's Growth: New Forest Services, Products and Technologies" (Forest4LV). The project was confirmed for funding during September 2024 – December 2025. It combines two national research institutes including LSIWC and one university aiming to enhance innovative forest management and new forest services, products and technologies in Latvia. The aim of our team in the project is investigation of ecological particleboard for furniture application using locally available softwood (pine) and suberinic acids derived from birch outer bark as binder.

On November 1st 2024, a project on the use of prebiotics in poultry farming and the use of production residues in crop farming has been launched under the call Interventions of the state and EU support measure LA16 "Support for the implementation of European Innovation Partnership working group projects". The collaboration project involves 5 partners with the aim for our team to obtain xylo-oligosaccharides-rich liquid substrate by steam explosion pretreatment of out husks. The team involvement to the project submission and implementation occurred through previous collaboration with Ltd. "Biorefic". A previously made contract research provided the extended scientific research with the aim to investigate prebiotics from crop residues through pretreatment and expertise of our team. The field of prebiotic research provides extended research opportunities, knowledge and skills for our team acquired before.

Based on mentioned collaboration with Ltd. "Biorefic", our team was involved in preparation and submission of international scientific project under the CBE JU call 2024. The objective of submitted

(September 18, 2024) by Latvia University project was to develop innovative functional feed and food ingredients from sustainable, underutilized agrifood biomass and dairy side-streams through advanced upcycling and biotechnological processes. Between the 16 international partners, the aim for our team was investigation of steam explosion pretreatment process for effective production of xylo-oligosaccharides from underutilized agrifood biomass as prebiotics for dairy side-streams. Unfortunately, the project application was not approved for funding.

Looking for new research opportunities, a synergy between this project and another one was achieved. A PhD candidate Martins Andzs was involved to participate in mobility of MSCA RISE project CELISE (Grant Agreement No. 101007733) by visiting Universidad Cooperative de Colombia (UCC) in Columbia during November 6th – December 7th, 2024. Training of cocoa and coffee cultivation was explored sharing potential collaboration and solutions in various biorefining processes especially using steam explosion pretreatment for investigation of new products containing fiber of cultivated and available crops. In such a way an international dimension was achieved to this project, obtaining new scientific results abroad, and increasing competence and knowledge. Without the gained international experience during the visit, the synergy between two projects was focused on the processing of cocoa bean pod husk through steam explosion pretreatment to produce and investigate fiberboard panel with potential for preparation and submission of scientific paper.

During the implementation of the project new collaboration was established with the higher education institution in Lithuania Kauno kolegija (KK). An agreement was signed between LSIWC and KK for cooperation in research, educational, organizational, informational, practical and other activities with a contact person from the side of LSIWC Dr. R.Tupčiauskas. In the framework of the agreement, the first research project "Modelling and study of the properties of structural elements from biodegradable composite" was prepared by KK calling the funding from their research resources. However, the project was not confirmed for the funding. The started collaboration continued by preparation of another international pre-proposal “Fermentation-based Integrated Fiber Extraction and Resource Valorization for Developing Recyclable Organic Products” on the M-ERA.NET call 2025. Unfortunately, the submitted application was considered ineligible. Finally, the collaboration was achieved in the framework of Erasmus+ by hosting for one week a researcher and lecturer of KK Dr. Gintaras Keturakis aiming the staff experience exchange for professional development.

A new project proposal “Unsorted textile waste as a potential new material for furniture panels” was prepared and submitted by the team of the project in the framework of Open Call for 2025 of Fundamental and Applied Research Projects of Latvian Council of Science. It is expected that the submission results will be announced in September 2025. The new project proposal continues the development of current project in terms of steam explosion application by valorizing unsorted and non-usable post-consumer textile waste into high-value fiberboards designed for cabinet furniture. The new project submission is an evident contribution to further scientific development simultaneously maintaining and improving the project staff with a growing possibility.

Another collaboration was established by the team of the project with entrepreneur MeadoWays SIA by involving as partners in the project proposal under the LIFE Programme that was submitted on June 6 2025. The proposal was aimed to develop, demonstrate and promote innovative techniques, methods and approaches including steam explosion for reaching the objectives of Union legislation and policy on environment, and to contribute to the knowledge base and, where relevant, to the application of best practices. The proposal was rejected this year; however, it is expected to improve and resubmit the proposal next year.

From May 26 to June 20, 2025, the LSIWC hosted three students from the Italian Istituto di Istruzione Superiore “Enrico Mattei” as part of an Erasmus+ mobility initiative. One of them, Sara Manes, was under the supervision of Dr. Ramūnas Tupčiauskas providing research skills and tasks for some project

activities. The students spent four weeks exploring the daily routines of scientific work while improving their practical laboratory skills at LSIWC.

The activities of scientific cooperation within the scope of the project implementation are listed in Table 1.

Table 1

No	Cooperation institution/organisation, country	Form of cooperation	Result	Period
1.	MeadoWays SIA, Latvia	Technology transfer	1 project submitted	From January 2024
2.	Ltd. "Biorefic", Latvia Latvia University, Latvia	Contract research, scientific	2 projects submitted; 1 approved, on implementation.	From August 2024
3.	Latvian State Forest Research Institute "Silava", Latvia; Latvia University of Life Sciences and Technologies	Scientific	Implementation of the National project Forest4LV	September 2024 to December 2025
4.	Universidad Cooperative de Colombia, Columbia	Staff/experience exchange, scientific	Staff exchange visit, new knowledge gained	November 6 to December 7, 2024
5.	Higher education institution Kauno kolegija, Lithuania	Scientific	Signed collaboration agreement; 2 projects submitted; 2 collaboration visits	From February 2025
6.	Istituto di Istruzione Superiore "Enrico Mattei", Italy	Staff/experience exchange	Staff exchange visit, skills upscaled.	May 26 to June 20, 2025

2.3. Socio-economic impact of results

At the beginning of the project implementation raw biomass materials were obtained through the contacts of Latvian Academy of Agricultural and Forestry Sciences. The local farmers "Tujasmuiža" in Limbaži district (Latvia) and Edgars Romanovskis from SIA Latgales dārzeņu loģistika also kindly helped to manage delivery of wheat straw. Birch outer bark for the binder production was kindly supplied by BetulinLab from AS Latvijas Finieris (Riga, Latvia), which is the largest plywood manufacturer in the eastern Europe. In such a way the raw materials industry sector is informed about the current developments with a potential for further technology transfer and investments. The established webpage and social networks containing the project' updated information also works as effective platform with potential impact for cooperation with both industrial and scientifical sectors.

The development of green building materials has a social impact on sustainable use of biomass products, restriction of global warming and healthier society. The project results so far are published in one high impact journal, and are going to be presented in international conferences as mentioned in section 2.1. above. The obtained results of developed high-density panels show promising properties required for industrial application. These results are obtained by developed technology which is intended to be offered for industrial representatives in the form of license in the end of the project. Moreover, implementation of the project continues that will provide additional results like long-lasting weathering testing and LCA, allowing a comprehensive evaluation of the developed cladding panels. This may increase the common added value of bio-based products particularly the cladding panels for external application. The project results also offer the solution for use of widely available or even waste biomass by processing it to value

added cladding materials with reduced CO_2 contributing to the European Green Deal and Circular Bioeconomy.

According to the OECD scientific branches FOS classification of engineering science and technology, the project activities combine 2 research sectors of Chemical engineering (2.4) and Materials engineering (2.5). Implementation of the project promotes the development of scientific and technological human capital and improves the expertise of professionals contributing to the creation of cooperation networks. The use of waste biomass for the development of fully bio-based cladding materials contributes to three priority direction in science by 1) evaluation of the potential of local waste biomass for value added increase of innovative technology and materials, 2) sustainable and energy-effective use and 3) development of knowledge-based bioeconomy.

Table 2

No	In cooperation with	Form of cooperation	Result	Period
1.	Latvian Academy of Agricultural and Forestry Sciences	Informative, consultations	Delivered wood raw materials	From January 2024
2.	Latgales dārzeņu loģistika, Latvia	Informative, consultations	Delivered wheat straw	From September 2023
3.	Latvijas Finieris, Latvia	Informative, potential technology transfer	Delivered raw material for binder production	From January 2024
4.	Ekonamai, Lithuania	Informative, potential technology transfer	Exchange of information	From 2022

2.4. Publicity and communication

In the framework of the project communication under the **WP4** without the above-mentioned international conferences, the project was presented in European Researchers' Night 2024 and Shadow Day 2025 these are summarized in Table 3. The first event is initiated by European Commission to be organised annually in scientific institutions and is intended to popularize science and its current achievements. The event in LSIWC was visited by more than 300 persons of different interests. The project concept and main results were demonstrated to young people from secondary/high schools and students from universities and research institutes. The participation in the event with updated project results is anticipated also this and the second year.

The second event was organized by "Junior Achievement Latvia" and is targeted to the pupils of Latvian schools, in which two girls shadowed Dr. Ramūnas Tupčiauskas. The girls were introduced to the studies or our team and were elaborated by some testing, of the project samples, e.g., measurement of panel density. In addition, as was already mentioned in the section 2.1. the project scientifical concept and implementation process was recorded as Video abstract for the coming conference WSE 2025 presented as virtual material and is accessible for everyone in YouTube channel. This video additionally was shared in LinkedIn to increase the target audience.

To increase the project impact, the team was involved in a short video communication taken by a national media team to be shown in a rubric "Science and Technology" of the national broadcast "Rīta panorāma". As well, an interview with the project general implementer R. Tupčiauskas was taken and published in the local journal "Baltijas koks" (The Baltic tree). The main topic of the interview was related to the award for contribution to the Forest sector given to the team of the project in relation to the previous

investigations in biobased thermal insulation materials. However, the interview included also the current studies of the team including concept of this project.

In such a way the project results were spread widely to the public audience providing the reciprocal benefits for both the project team and each interested participant. Without the mentioned communication events the established webpage in LSIWC' website containing the project updated information also works as effective publicity tool for provision of information to the public. The attended public events and scientific conferences provide the dissemination of the project results reaching both target groups of scientific and consumer society.

Table 3

No	Communication channel (for example, television, radio, social media, etc.)	Activity (for example, interview, popular science article, seminar, etc.)	Planned/reached target audience (a description of the target audience for the activity, and the amount of the audience reached)	Available at (provide a link to where the activity or information about the activity is available)	Date of publication/ event
1.	Researchers Night	Public event	336 attendees including pupils, students and their relatives, as well researchers from other institutes	https://kki.lv/en/latest-news/european-researchers-night-2024	October 1, 2024
2.	Shadow Day	Public event	22 pupils from different Latvian schools	https://kki.lv/en/latest-news/shadow-day-2025	April 4, 2025
3.	Social media - Youtube	Video popularization	All target groups. 38 views as on 28 August, 2025.	Investigation of innovative biomass-based panels for application in external building facade	June 26, 2025
4.	Social media – Journal "Baltijas koks"	Interview	Audience of forestry and wood processing employes.	Baltijas Koks žurnāls meža un kokapstrādes nozares profesionāļiem un interesentiem	June edition (295), 2025
5.	Social media - LinkedIn	Post	Wide audience of 200 followers	link	August 25, 2025

2.5. Contribution to the capacity building of the scientific team of the project, including students, and to the improvement of the study environment

The project scientific staff proposed initially was a little changed in terms of a student responsible for the production of suberinic acids as binder and coating. The PhD student Raimonds Makars highly impacted by the last pandemic left the scientific activities in LSIWC shortly before the project was started. He was changed by another PhD student Rūdolfs Bērziņš also specialized in the extraction and

characterization of suberinic acids. Rūdolfs was involved for one year during implementation of WP1 according to the project plan. It was great opportunity for him to work with our team investigating novel biobased panels for façade application. His contribution by providing suberinic acids facilitated submission of the first manuscript of the project and will continue on the next submissions during the project.

Therefore, the staff change did not impact the project activities and implementation. The rest of the project staff named in the project proposal are working in the project successfully. As evidence on this indicates the acquired results described in the previous sections of the report. The involved staff are well-motivated and capable to work at LSIWC implementing the research tasks according to the project activities. The project staff meetings occur regularly communicating the achieved results, progress and possible further adjustments of the project implementation. Implementation of the project includes many activities like preparation of raw materials, planning and performing of experiments, processing and interpretation of obtained data, preparation of scientific manuscripts, managing and communication within the project staff and with public from scientifical, private and industrial sectors. Such experience builds the capacity of the scientific staff and enhances its career prosperity not only within LSIWC, but also at European research level to hire well educated and skilled scientists and engineers.

The project scientific manager Dr. Gunārs Pavlovičs enhances his own skills and is advised by the general implementer senior researcher Ramūnas Tupčiauskas by organizing the scientific and public communication and providing the publicity of scientific results including this report. During the project implementation the involved as an applicant of doctoral degree, a researcher Mārtiņš Andžs has successfully defended his dissertation on hemp-based thermal insulation and manage of WP2. Mārtiņš also has visited the Colombian University as mentioned above enhancing his potential for international scientific experience and collaboration. The third PhD student Andris Bērziņš assist implementing all WPs by performing different works according to the project plan. Besides the project activities, Andris is successfully developing his doctoral thesis under the supervision of Dr. Ramūnas Tupčiauskas and is planning the defense till the end of the project.

The involved PhD students have an excellent possibility not only to work in real scientific laboratory environment by providing results for publicity, but also to visit meetings and international conferences by presenting the project results. All the students are involved not only in the experimental activities, but also in preparation of scientific manuscripts based on the project results.

Table 4

Doctoral and master theses supervised or advised by the project leader or project leaders within this project (if defended, indicate this in the last section of the table, accompanied by the date and the corresponding council)				
No	Author of the thesis	Title of the thesis, level of studies, link to the database of doctoral/final theses	Supervisor and consultant	Thesis defense date
1.	Mārtiņš Andžs	Loose-fill heat insulation material obtained from hemp shives by steam explosion. Doctoral thesis	Prof. Jānis Grāvītis Dr. Inese Filipova Dr. Ramūnas Tupčiauskas	12 December, 2024
2.	Andris Bērziņš	Investigation of eco-friendly thermal insulation materials from renewable industrial crops residuals. Doctoral thesis in progress.	Dr. Inese Filipova Dr. Ramūnas Tupčiauskas	Expected in 2026

3. Implementation

In general, on the midterm of the project implementation its progress fits the work plan outlined in the project proposal and is going to be continued in the next period. Some minor risks were faced during the implementation of the project and appropriate changes established as prevention to achieve the fulfilment of the proposed tasks. The first risk faced was related to the change of one staff member as described above. The second risk was related to a slight delay of activities implementation according to the proposed project schedule. The year 2024 was very tight for the team in terms of many activities not only in the framework of this project as described above, but also due to parallel active projects and additional submissions. As well, the real amount of proposed works was understood only during the implementation of the project that actually exceeds the project budget including capacity of the project team. All together took additional time that influenced the project schedule including postponement of the report preparation. However, at the mid-term of the project all the main proposed tasks are achieved including the first manuscript as pointed out above.

Coating of the developed panels was also quite challenging because of new developing coatings including chitosan and suberinic acids. Since the birch outer bark for production of suberinic acids was delivered by Betulin Lab, it was recognized that it contains too much of unextracted betulin. This resulted the quality of coating and need for adjustment in technology. The coating technology finally was developed during the project investigating content of main constituents and curing conditions. A bit challenging was also establishment of panel weathering test. Initially it was thought to assemble the developed panels on the external wall of LSIWC hangar by replacing it ceramic cladding. However, the measurements of the ceramic cladding elements exceeded the obtained panel samples. Therefore, it was decided to build the specific stands and locate them on the roof of a technical building of LSIWC to meet the real conditions of exploitation (see Figure 2). The panel samples were assembled on the stands on 15 April 2025 and will be tested till the end of the project achieving full 18 months.

As was mentioned above the involved applicant of scientific degree Andris Bērziņš is aimed to submit his thesis till the end of the project. Although the topics of his thesis and this project are not directly related, Andris is working on investigation of biobased façade panels. It is decided to include one chapter to his dissertation devoted to the solution of biobased building wall construction including investigated panels as façade material.

The dissemination plan of the project results is performed according to the proposed work plan. On the midterm of the project one manuscripts is submitted and published in the Scopus-indexed journal with a high index factor (IF 2.5, citescore 4.6). The next scientific paper is on schedule this year, therefore, it is expected that all the publicity indicators will be achieved without delay till the end of the project. Participation in international conferences will be fulfilled this year, however, also continuing on the next year with at least one conference.

There should be noted that all project risks faced until the midterm have no impact on further project fulfilment and its budget, because they were prevented by appropriate solutions. In terms of the project budget, the first year was fulfilled with 99.6% according to the financing plan. The financial statement of the project implementation in the first year was successfully confirmed by the Council. The minimum required workload (1 FTE) of all students involved was taking into account and successfully achieved as well. Organization of the project management and implementation methodology of activities remains the same as in the project proposal because it seems effective enough to achieve all objectives and indicators during the next period of the project.