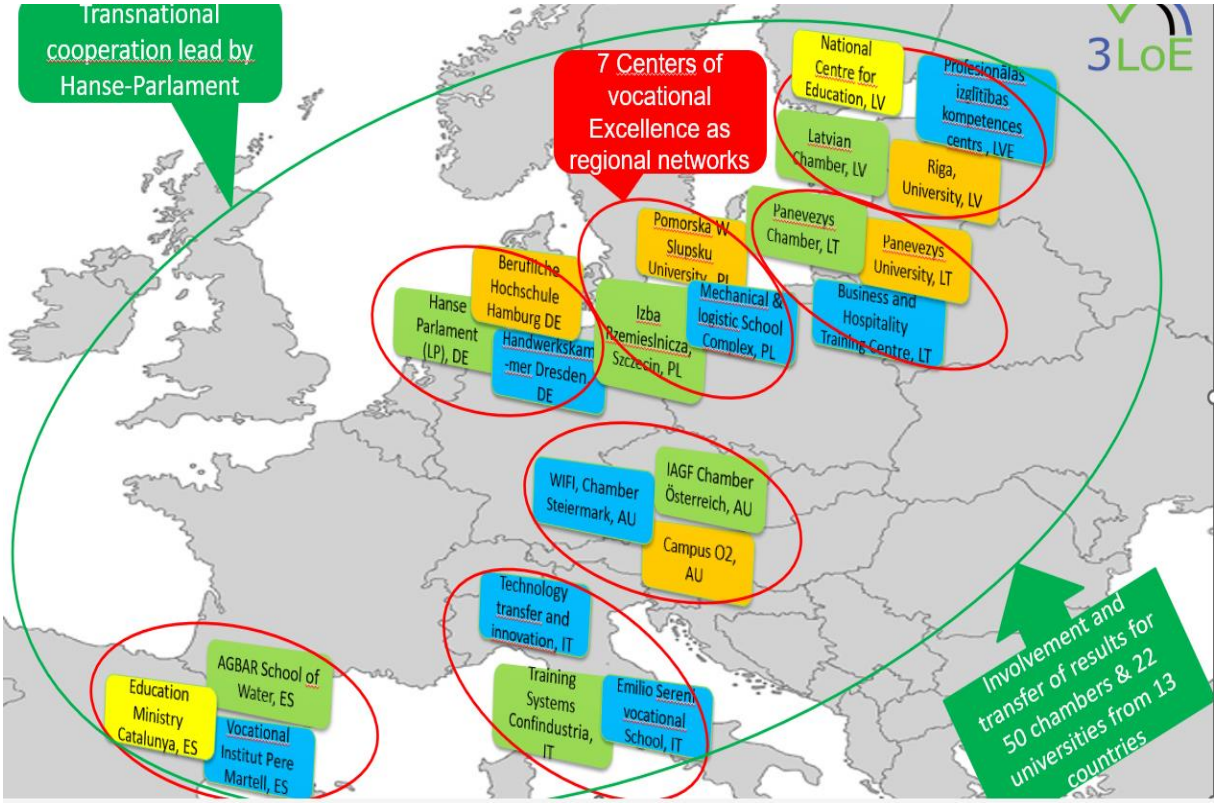
Result 4.3 Result
Green Economy training programs

Implementation and Evaluation

Partner



Language

English

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Project Summary and Introduction

About the 3LOE project

Around 99% of all EU businesses are SMEs, creating up to 70% of all jobs. In general, SMEs have good growth prospects for the future and are particularly well equipped to solve environmental problems and to enhance the green economy. However, in most of the project countries, SMEs are confronted with a shortage of skilled workers and young entrepreneurs. This shortage of skilled workers is even more alarming taking into account that due to aging of current entrepreneurs, a large and growing number of companies will have to be handed over to the next generation. Furthermore, young specialists and entrepreneurs often lack the qualifications and skills needed in order to respond to contemporary developments in the fields of energy, climate and environmental protection. The following problems have been identified in SMEs working in the fields of green economy, energy and environmental protection:

- Blatant and growing shortage of skilled workers.
- Large qualification deficits, especially in the Green Economy.
- Loss of attractiveness and low qualification of school-based VET.
- Low rates of further training and insufficient orientation of offers to SME needs.
- Ageing of entrepreneurs and increasing shortage of young people (demographic change).
- Failure of business transfers and low rates of business start-ups.
- Low innovation rates and insufficient productivity.
- Not enough cooperation between universities and SMEs and a lack of teaching geared to SME needs.
- Comparably low internationalization of SMEs and vocational training providers.
- Lack of national level support for SMEs”.

To meet these challenges, work-based learning and new paths in vocational training must be provided through cooperation between educational institutions, economic chambers and SMEs. University graduates are often well-qualified in theory, but lack practical knowledge, skills and abilities that are crucial for SMEs. For this reason, VET reforms must also involve higher education, and should implement dual bachelor's degree programs that combine a bachelor's degree with vocational training and on-sight work in companies.

In the 3LOE project, an innovative and complex project structure with 22 project partners from 7 countries as well as 60 associated partners from 13 countries was designed. In each country, centers of vocational excellence (COVEs) in Green Economy will be established, managed and their permanent continuation ensured. A transnational cooperation of the centers will be developed, extended to 60 education stakeholders from 13 countries and operated permanently in an institutionalized form. The centers will offer a wide range of dual education measures in vocational training, further education and higher education, that are being developed, tested and evaluated in the project. These educational measures on EQF levels 3-7 focus on Green Economy, Digitalization and Entrepreneurship. Furthermore, vocational and educational consulting and innovation support for SMEs will be developed and implemented. In total, seven Train-the-Trainer programs will be developed and implemented permanently by the project partners. All results will be transferred to the 60 associated partners together with implementation advice.

The objectives and aimed outcomes of the 3LOE project can be summarized as following:

1. Foundation of a three-level Center in each project country

1.1 Building the "Green Economy" skills alliance for qualifications in SMEs with educational and economic actors from the 7 project countries; development of information and cooperation tools.

1.2 Expansion of the skills alliance to the 60 associated partners from 13 countries, comprising chambers of commerce, SME associations, as well as universities of applied sciences/colleges.

1.3 Development, testing and evaluation of a curriculum and teaching materials for Train the Trainer courses for personnel and center management (vocational schoolteachers, trainers in SMEs and lecturers in further and higher education institutions).

1.4 Evaluation of the construction and operation of the seven centers of Excellence and of the transnational cooperation.

1.5 Development of business and financing plans and ensuring the long-term continuation of the seven centres and transnational cooperation.

1.6 Development, consulting and introduction of political strategy program.

2. Implementation and realization vocational training

2.1 Development and implementation of a tool for vocational and qualification counselling as well as a training for consultants and teachers to use the tool.

2.2 Implementation of the dual system, so that work-based learning is put into practice in the project countries.

Preparation and transfer of curricula and examination regulations for dual vocational training for different professions and implementations in Poland, Lithuania, Latvia and Spain.

Development, test and implementation Trainings for teachers to conduct dual vocational training as well as Training of trainers in SMEs.

2.3 Development political concept for the training and integration of young people with learning difficulties for young people with learning difficulties (EQF level 3).

Development, test and implementation of a dual vocational training "Specialist for Building Insulation”.

2.4 Development, testing and evaluation of education programme, teaching materials and examination regulations for the provision of sector-specific qualifications already during the initial vocational training for stronger learners. Implementation in the dual system, so that work-based learning is put into practice in the project countries.

2.5 Development and implementation five-year technician training „Ecologic Solutions in Logistics”.

3. Implementation and realization of further vocational training

3.1 Development and implementation of concepts and instruments for the management of continuing vocational training.

3.2 Development, test and implementation of a Train-the-Trainer program for teachers to conduct further training.

3.3 Development and implementation of a concept "SME-fair digitalization" as well as development, test and implementation of two train the trainer programs "Basic and advanced digital skills".

3.4 Transfer and implementation of four further trainings Energy Saving and Renewable Energies.

3.5 Preparation, transfer and implementation of six further trainings in the Green Economy.

3.6 Development, testing and evaluation of different training programs and teaching material for owners, managers and qualified workers of SMEs (EQF level 5 and 6). The trainings are specifically tailored to SME needs and different qualification levels and combine the transfer of technical, professional and management know-how.

- Training Enterprise and Entrepreneurship in Green Economy
- Training Energy Service Manager
- Trainings vocational Master Carpenter and Electric
- Training Construction Technician
- Training Service Technician
- Training Sustainability in foodservice industry

3.7 Development of regulations for new continuing education occupational profiles with a focus on the green economy.

3.8 Development of an integration programme for the unemployed (EQF level 4) in order to be able to place the unemployed in permanent jobs through further training seminars and a further training qualification.

4. Implementation and realization of higher education

4.1 Preparation and transfer of curricula, evaluation and examination regulations for two existing dual Bachelor degree programmes "Management of Renewable Building Energy Technology" and "Business Administration for SMEs".

4.2 Development and beginning of implementation of new dual Bachelor degree programs

- Business Administration & Sustainable Management of SMEs
- Entrepreneurship and Innovation in Green Economy
- Logistics - Green Supply Chains
- Service technician
- Tutorial "Sustainable management Climate neutrality for companies"

4.3 Development, test and implementation of four study modules (EQF level 6) on SME management in the Green Economy sector, which will be carried out in the dual study system and integrated into existing Bachelor degree programmes.

4.4 Development and implementation of concept for innovation promotion Solutions for manageable R&D tasks of SMEs and conducting manageable R&D projects for SMEs-

4.5 Development, testing and implementation of Training program for university lecturers and SME advisors.

5. Dissemination, transfer and use of the project results

5.1 Development of a concept and summary evaluation of the dissemination results of all partners

5.2Transfer of all educational measures to 60 educational institutions in 13 countries and needs-oriented implementation consultations as well as realization of a bundle of measures for further dissemination of the project results.

5.3 Further dissemination activities such as presentations online, at third-party events, press releases and conferences.

5.4 Book with all results of the project and distribution via book trade.

For each of the three levels of educational measures there will be:

- Target-group-specific educational programs.
- Curricula, teaching materials, etc. developed in a leading role by the educational institutions of the respective level, whereby the educational institutions of the other levels (in particular universities) participate in an advisory and supportive manner.
- Representatives of the participant target groups involved in the development work.

All educational measures will be tested with the respective target groups under different national conditions in the countries, evaluated and completed on the basis of the evaluation results with application notes.

About the Green Economy training programs

Different advanced training courses in green technologies will be offered to trainees with vocational training and several years of professional experience, to acquire skills in water, wastewater, waste and circular economy. Selective courses are specifically tailored to the needs of the target groups “SME-owners and managers” and “SME professionals”. The imparted learning content is cross-occupational, experts and interested companies from all lines of trades will be addressed. The learning results are rated at EQF level 5.

The offered advanced training courses may be supplemented by an integrative program for the unemployed with relevant pre-qualifications, thus, improving their chances on the lab our market.

A striking obstacle faced by SME is lack of time and permanent overburdening of their owners as well as their impossibility to release employees from work for a long-er scope of time to engage them in advanced trainings. There is also particular interest in ensuring that, as far as possible, qualifications offered should match individual skills needs of the employees and, at the same time, address specific SME issues. In response to such demands, a structural concept will be applied in the project, consisting of the following items:

- 2-3 learning phases with classroom teaching, delivered on two days per week, possibly Fridays and Saturdays,

- in between, longer on-the-job teaching periods at the trainees' workplace, covering three to four months,
- Proposal for teaching periods at the trainee's workplace:
  a) coaching by same trainers that are also delivering classroom teaching,
  b) optional and customized e-learning options,
  c) if possible, implementation of a specific development project within the company, in the topic area of the respective advanced training (e.g. introduction of Cradle-to-Cradle, recycling, etc.), involving as many employees as possible, thus, ensuring joint team learning.

An appropriate training method is, e.g., "Knowledge According to Individual Needs (KAIN)"[1].

Following years of experience in advanced training of trainees in numerous European projects, the Hanse Parlament has developed and successfully tested the above-mentioned "KAIN" three-part training method that is characterized by:

a) achieving of a common knowledge base of participants with various pre-qualifications.

b) particular emphasis on individual experience of each course participant.

c) demonstration of design possibilities for changing or improving individual status of training participants in pursuing their project goals.

Under the project, the presented KAIN-method or any similar teaching and learning scheme shall be developed and applied, such as to match, to the greatest possible extent, specific SME demands as well as individual trainees` needs. Such approach also encourages readiness to further education, both among SME and among participants, in as much as most of the countries involved in the project, should improve employee participation in professional development and upgrade trainings with respect to imparted skills and competencies. According to EU targets, at least 15 per cent of adults should participate in lifelong learning. This figure is significantly higher in the Scandinavian countries, ranging from 19.6 % in Norway to 29.6% in Sweden, while in Lithuania and Latvia it is 6.0% and 7.3% respectively. In Poland, it was the lowest rate in the BSR - 3.7% and 8.4% respectively in Germany, below the EU-28 average at 10.8% (Eurostat). Practice in Scandinavian countries has shown that their highest advanced training rates are achievable thanks to e-learning, self-study and individual on-the-job coaching.

Under the project, six advanced training courses of each 30 to a maximum of 50 hours of classroom teaching will be implemented:

A Preparation and management of SMEs for work in the Green Economy

B Waste reduction and recycling management

C Wastewater treatment and recycling management

D Water supply and water saving

E Cradle-to-Cradle in SME

F Energy generation from wastewater and waste

[1] See Result 4.2 KAIN Method & Train the Trainer Program

The developed curricula and teaching materials will be tested and evaluated in different countries. Thus, different national conditions are included at the stage of development and project completion, thus significantly encouraging their use in different countries.

The developed curricula and teaching materials for the six trainings were transferred electronically and in paper form to all eight COVEs, they are also available in Google drive and have been published on the project website for future use.

As further results listed below are the implementation reports, an evaluation concept and evaluation reports.

1. Implementation Training Preparation and management of SMEs for work in the Green Economy

1.1 Business and Hospitality Training Centre[2]

Introduction

The global transition toward a sustainable society is being driven by political, economic, social and environmental imperatives. The European Skills Agenda outlines that "businesses need workers with the skills required to master the green and digital transitions, and people need to be able to get the right education and training to thrive in life". This transition brings challenges for both the education providers and employers to ensure that the workforce is equipped with the skills required for new, and more sustainable ways of working.

Sustainability in hospitality sector becomes not only a trend but also a challenge to many of the SMEs in Lithuania. Hospitality professionals, especially entrepreneurs and managers, need to gain knowledge to be able to develop new sustainable business models and value-added products that meet the expectations of the society. Thus, the tailor-made trainings can help to promote the transformation of the sector towards a new modernized vision of HORECA (Hotels, Restaurants, Catering) that supplies nowadays demand in original, quality and healthy products while being sustainable, taking the most of new technologies and being a driver for innovation.

Training 1: Sustainability in restaurants

Relevance of the training:

The course helps to creatively and systematically create sustainability in restaurants. It introduces the goals of sustainability development and real methods of their application. It helps to understand the importance of society, environment and resources in order to develop a modern restaurant. It introduces the learner to 2021-2022 sustainable restaurant trends in the world.

Aims of the training:

- ✓ Provide knowledge that will successfully help to create and expand sustainability goals in restaurants.
- ✓ Introduce successful examples of Lithuanian business.
- ✓ Analyze specific examples and provide solutions that would help to optimize restaurant activities in the field of sustainability.

Objectives of the training:

1. Understand the concept of sustainability and history of restaurants.
2. Analyse the 17 key Sustainable Development Goals (SDGs).
3. Review sustainability trends in restaurants in 2021–2022.
4. Understand sustainable menu planning, product selecting and public participation.

[2] Prepared by Profesinio mokymo centras "Žirmūnai"/ VET Centre Zirmunai

Contents of the training:

No	Topic	Learning content
1.	History	What is sustainability? The history and relevance of sustainability.
2.	Sustainability goals	Sustainability development goals and environment.
3.	Trends	2021-2022 sustainability trends, fashions, new experimental solutions in restaurants.
4.	Menu	Menu and sustainability. Dish creation, quality, plating. Selection and use of products.
5.	Society. Environment. Supply.	How do restaurants contribute to sustainability?
6.	Watching and analysing video messages	Reflections, evaluations and suggestions from researchers and restaurateurs.
7.	Practical task	How much does it take to create sustainability in a restaurant: crockery, furniture, drinks?
8.	Guest speaker. Company visit.	Guest speaker from the restaurant "OPEN": Challenges and benefits of running a sustainable restaurant. Visit to a sustainable restaurant "Senatorių pasažas": best practice example.

Training 2: Sustainable health tourism

Relevance of the training:

The course helps to creatively and systematically create sustainability in wellness services provision. It introduces the goals of sustainability development and real methods of their application. It helps to understand the importance of society, environment and resources in order to develop services that support and maintain health and well-being, covering the dimensions of wellness: physical, intellectual, emotional/psychological, social, spiritual, environmental. It introduces the learner to sustainable health tourism trends in the world.

Aims of the training:

- ✓ Provide knowledge that will successfully help to create and expand sustainability goals in health tourism.
- ✓ Introduce successful examples of Lithuanian business.
- ✓ Analyze specific examples and provide solutions that would help to optimize welness service provider's activities in the field of sustainability.

Objectives of the training:

1. Understand the concept of sustainability and history of health tourism.
2. Analyse the 17 key Sustainable Development Goals (SDGs).
3. Review sustainability trends in wellness and health tourism in 2021–2022.
4. Understand how sustainable health tourism can achieve its goal: to combine the promotion of consumption with the conservation of resources.

Contents of the training:

No	Topic	Learning content
1.	History	What is sustainability? The history and relevance of sustainability.
2.	Sustainability goals	Sustainability development goals and environment.
3.	Trends	2021-2022 sustainability trends, fashions, new experimental solutions in health tourism.
4.	The concept of wellness and services	Wellness and sustainability. Climate therapy, peloid therapy, baleotherapy.
5.	Society. Environment. Supply.	How does health tourism contribute to sustainability?
6.	Virtual Reality (VR) innovations in health tourism	Introduction of innovations in business operation in order to enhance sustainability.
7.	Practical task	Developing a sustainable Wellness package.
8.	Guest speaker. Company visit.	Guest speaker from the welness operator "SPA VILNIUS": How to make development of health tourism more sustainable? Visit to the SPA centre "Eglės sanatorija": best practice example.

1.2 Panevezys Chamber of Commerce Industry and Crafts[3]

Introduction

The training is classified at EQF level 4 in the national system of continuing vocational training. The training is valuable as the acquired knowledge and skills are very useful in today's labour market. But the greatest benefit is that the acquired knowledge of the green economy will help SMEs to adapt to the changing world and to manage their businesses towards green economy. They will be able to implement new technologies, tools and methods in everyday activities of the companies.

The training was conducted according to the KAIN method in three stages. The first phase – in distance learning mode in April 2021. The second phase was individual work and self-study in companies, preparation of presentations on companies' problems and solutions. Individual work was guided by the consultant. The final third stage - presentations of companies' activities at a joint face-to-face meeting of participants in June. The participants presented their experiences of classroom training, teacher-assisted individual work and search for problem solutions.

Admission and organization of the training

Participation was on a voluntary basis. Invitation for companies to participate in training under the ongoing project was disseminated by emails. Interested companies were invited to participate in the training and a group of 15 participants was formed including

[3] Prepared by Panevezys Chamber of Commerce Industry and Crafts

business owners, top managers and employees of the companies. The training was attended by representatives of companies from various sectors: construction, trade, food production, production of art glass, metal processing, hospitality, insurance, travel and other service sectors.

Number of lessons, amount of self-study learning: 24 hours (3 days) of full-time lessons, 10 weeks of self-study learning under the supervision by the consulting teacher.

The Implementation of training was organized on part-time basis.

This course is based on the KAIN-method that creates a common knowledge base for participants with different backgrounds in training and consulting processes. It takes account of the individual experience of participants, shows possibilities to change/improve the situation of the participants on site for the pursuit of project goals and change measures, sharpens the knowledge of possible needs for change, and enables those involved participants to design the right measures and implement them correctly. The KAIN-method is characterized by:

1) achieving of a common knowledge base of participants with various pre-qualifications.

2) particular emphasis on individual experience of each course participant.

3) demonstration of design possibilities for changing or improving individual status of training participants in pursuing their project goals.

The following methods were used in training process:

- Lectures including lections, videos and discussions concerning the topics of videos and / or lections,

- Individual learning including reading of given articles, getting known with activities, responsibilities and rights of related organizations, assessments, e. g. designing a business plan of own business or employer,

- Practical learning on the job and realization of a corresponding project in the company with consulting support by the teacher,

- Concluding presentations.

The training was conducted by lecturers and consultants, experienced in teaching and consulting services, their CV is provided to the Lead Partner.

The period of consultations and individual work continued for 10 weeks in total, the participants were supported and advised by the consultant. During individual meetings in the companies and online meetings the consultant worked with a company team assigned to the project. During the meetings, the relevant problems of a specific company were analysed and possible solutions were suggested. The consultant encouraged the team to brainstorm, look for ideas and suggestions. Afterwards, the employees made their own decisions and prepared a presentation. Individual meetings were held upon necessity. The consultant performed distance monitoring gave certain directions if needed.

Participants profile and organization of the training

Age of the training participants - from 33 to 50 years old:

- 8 people between 51-68 years old

- 3 people between 40-50 years old

- 4 people between 33-39 years old

Participants by gender:

- 4 men

- 11 women

Education background – university or technical school degrees of different professions.

Country of origin – Lithuania.

Participating SMEs represented the following sectors:

Construction, trade, food production, production of art glass, metal processing, hospitality, insurance, travel and other service sectors.

Execution of the Training

The training was carried out according to the Curriculum ,,Preparation and management of SME's for work in Green Economy".

The training process was composed of three phases:

1. Classroom teaching

The training was held online due to the pandemic situation. The participants were introduced with the concept of green economy, related EU and local strategies, tools, models and possible eco-innovations in SMEs, etc. It was discussed how green SMEs can contribute to the environment through their products, services and business practices. The participants were given introduction to the planning, implementation and critical evaluation of their own project work to be carried out in the second part of the training. The trainers took into account the individual needs and particularities of the participants.

2. Self-study with external support also was provided online. During this part, the participants had the task to analyze environmental issues in their companies, apply the knowledge acquired in the first part and find out what green economy tools and solutions could be implemented, what benefits and risks it could bring. The participants had to prepare a presentation of the project work for the final seminar.

The teacher provided constant consultations and support to participants in achieving goals of their individual project work.

3. Report and reflection

Participants observed what kind of barriers and enablers they found in their companies, what tools and applications would benefit the green economy management functions of the company best, how would they transfer the tools and technology into the organization, etc. Participants made brief reports and prepared presentations which were presented during the concluding seminar on 17 June 2021. Overview of the reports is given below.

Implementation reports of specific development projects within the companies

The participation of all economic actors - companies and organizations - is important for the country's economic transformation from linear to circular (green) economy.

In Lithuania, the implementation of the green economy is rather fragmented and mainly focused on compliance with environmental requirements and laws and depends on business goodwill towards green economy.

Sector-specific problems have been identified within the training and individual project work. However, many environmental issues to be addressed are common to companies in all sectors therefore they are often highlighted in reports and presentations of companies belonging to different sectors of activities.

Metal processing sector (UAB Avaterma)

The company indicated that it produces non-standard metal products. Most of them are exported to EU countries. Large amounts of electricity, gas, water and other natural resources are used for the production process. There is also an issue of CO2 emission. By introduction of technological innovations, the company plans to reduce CO2 emissions by 40 % within 3 coming years. In spite of existing primary cleaning systems there are still areas to be improved. Every year new equipment is put into operation, which reduces pollution, protects the environment and sends the waste to re-usage. However, this industry is very problematic in terms of the green economy. The company's team made calculations what investment will be needed each year and what processes have to be improved. It is important that problems are known, and efforts are made to solve them, starting with the most urgent ones.

Food production and catering services (UAB Žaliasis Žiogas and UAB Geld Baltic)

The main obstacle to introduce innovations of circular economy in SMEs is the lack of financial resources and systematic information.

One of the main environmental issues in this sector is large amounts of packaging and other waste, especially plastic. This problem was significantly increased by the pandemic situation as catering companies could only provide take-away food services that require large amounts of single-use packaging. The companies strongly believe that waste amounts can be reduced in their sector if the following measures are introduced:

- reusable environment-friendly containers and food packaging instead of disposable ones;
- reduction of food waste generated;
- correct sorting of waste and composting green waste;

In addition, they are giving focus on the following:

- use of green energy and energy-efficient equipment;
- reuse or extend the period of use of equipment / products (i.e. by repairing);
- saving water in production and household and use of rainwater in household;

The companies aim not only to make their business greener but also to educate people so that the future generations can live in sustainable environment. They are going to conduct gastronomic educational sessions "Reducing Food Waste to Save the Planet" to the public on the following topics: synergy of fresh ingredients, spirit of sustainability and healthy lifestyle; ways of waste-free cooking; vegetable-based food trends, etc.

The companies have brought many new innovative ideas from international food exhibitions SIAL in Paris and ANUGA in Cologne and they plan to adapt them to their everyday work.

Food businesses expect to benefit from EU financial support in the new funding period from the year 2021 and implement green economy measures and innovations in their companies.

Building and construction (UAB Kriaute house and UAB Kriaute)

The companies aim to adapt their projects to Sustainable Development parameters which becomes a significant competitive advantage and is appreciated by potential investors.

These days, companies are greatly influenced by customers' pressure to do business in a more environmentally friendly way. The construction industry has expanded its focus from issues of limiting energy consumption to site planning, waste management, materials selection and design.

One of the major challenges in greening the construction sector is that as an industry, it is fragmented and disjointed. A single construction project can involve hundreds of different organizations in a supply chain. Besides, construction industry is the single largest global consumer of resources and raw materials and produces an enormous amount of waste.

When the construction sector in Lithuania started implementing green technologies, much attention was concentrated on energy efficiency, insulation, passive solutions for heating and cooling, appliances and systems improvements as well as maintenance and usage. Now another step towards sustainable construction is designing buildings using less material. Besides, the use of recycled and more environmentally friendly building materials is one of the ways for reducing the greenhouse gas emission within the created built environment.

Five criteria are usually employed to assess the sustainability of buildings at the construction phase, including the project management, the responsible purchase of building materials, the use of legal timber materials, the construction waste and the protection against environmental contamination. Certification is a mandatory requirement for new buildings since 2007, the energy performance class of new buildings and building units must not be lower than class A.

Energy Efficiency (EE) renovation program has been implemented in Lithuania since 2004, its target is renovating all multi-apartment buildings to modern energy efficiency standards by 2050. After the renovation, their energy efficiency should increase by more than 60% on average and CO2 emissions should decrease by more than 80%.

Besides, in order to prolong the service life of buildings and constructions, preventive examinations (annual periodic inspections) are carried out twice a year. Timely preventive repairs can significantly extend the service life of buildings without additional large investments.

The training revealed that in this sector it is very important to change the construction design and materials used, to replace steel and concrete with organic materials. Another large problem is construction and demolition waste. According to the rules on construction waste management such waste must be sorted out at the construction site, kept separately and then taken to specialized landfills. However, not all companies do this despite the risk of large fines and material liability for violations. New EU regulations regarding waste management is going into force in 2021-2024 and companies will have to follow them. When introducing any new process / technology businesses always estimate the future benefits, expenses, and the material and social payback.

Electrical installations and equipment manufacturing (UAB Elektros įranga)

The company usually provides services to other business entities, assembles electrical units which are installed in manufacturing and dwelling buildings. It also manufactures electrical equipment for household consumers. The company is implementing green economy measures, providing training to its employees on sustainable production and consumption. There are waste sorting containers in the office and production premises, plastics are sent for recycling. Defective products are also disassembled by separating plastics from metal and other components and then the sorted materials are returned to the production process and reused. It can be assessed that the company applies the principles of the green economy partially. During the training a strategy for the transition from linear to circular production cycle was developed and implementation deadlines were set, considering financial opportunities and development plans.

Hospitality and spa services. (UAB Via Unica, Etno SPA Romantic and VšĮ Sveikatos oazė)

Providers of hospitality and spa services were represented by a hotel, SPA centre and swimming pool. The hotel and SPA centre have introduced several sustainable consumption products: small disposable hygiene products provided to customers have been replaced with larger containers that have been used for a long time. Worn towels and bedlinen are given to the animal shelters for further use. The hotel uses only organic linen bedding and accessories as well as items made of natural materials: leather, wood, stone. The hotel also has a water treatment system for watering flowerbeds and the lawn. Rainwater is also collected and used to maintain the surrounding environment. All souvenirs (e. g. pens) and paper are made only from recycled materials.

The hotel and SPA centre are spreading the message that they strive for sustainable consumption, to protect the nature and its resources, to use them rationally and economically. This encourages customers to form their own sustainable habits.

The swimming pool needs a lot of water for its activity, a lot of energy resources are used to heat water and the premises. For many years the company was receiving subsidies from the city municipality budget. But now it has installed solar panels that generate sufficient amount of heating for the pool water and the whole building. As a result, the company has made significant cost savings and has used the savings to implement other green economy measures. The company operates on the principle ,,Infrastructure designed for durability. Less is more".

Insurance services (ADB Gjensidige and UAB SDG)

The training was attended by representatives of insurance companies who shared their best practices on the sustainable use of resources in office premises. The use of paper and document printing is reduced to almost zero level. All documents are digitalized and securely stored on remote servers and can be used by the employees as needed.

Another area of focus is reduction of office waste in general and strict sorting of unavoidable waste (separate containers for plastic, glass, etc.). The teams aim to completely eliminate the use of plastic and single-use products in the companies.

They also implement "Clean office policy" – spacious office without large cabinets of drawers for storage of documents, many green plants and clean tables.

One more green initiative of these companies is car sharing when going to customers. This way they aim to make the necessary trips as economical as possible and to reduce air pollution.

Production of glass art (UAB Glasremis)

Glass manufacturing companies typically accumulate large amounts of glass breakage. Glass itself is composed of natural resources only and is fully recyclable. The breakage of clear glass is returned to the manufacturing process. The use of colored glass waste is much more limited, it can be used by glass artists or in certain glass-art educational programs. The two sorts of glass must be strictly separated and not mixed in the glass melting furnace as even small amount of colored glass will spoil the whole clear glass batch. Uncontaminated wood waste can also be used in the production of glass.

The biggest environmental impact from glass manufacture is that glass melting furnaces consume large amounts of natural gas and release CO2. The vision of the company is to become powered by green electricity and to offer low or zero carbon glass items for its clients.

Travel services (UAB Vestekspress)

Companies in travel sector were among the most vulnerable during the pandemic. The company lost more than 50 % of employees, reduced office space, staff worked remotely. However, the pandemic situation has brought some positive things in terms of sustainable management of business. During individual consultations with the staff team the company's strategy and goals for the future were developed: cost saving through sustainable consumption, reorganization of work for office staff, implementation of digital innovations, reduction of paper use and printing, increased use of electronic communication instead of phone calls, refusal of plastic food containers and disposable coffee cups, etc. The company policy is to encourage customers to choose the most economical and environment frindly ways of travel, follow the motto "Real wealth is based on use, not ownership."

Other service providers (UAB Pauluma and Law company)

The training was also attended by very small companies with up to 5 employees. They have developed measures for implementation of green economy principles which will be implemented in 2021/22. They do not require large financial resources but encourage sustainable waste management, composting green waste, collecting rainwater and using it for cleaning and plant watering. The furniture selling company intends to return all the packaging to the furniture manufacturers. This way the packaging can be reused several times, its lifetime prolonged and the amount of plastic waste decreased. Waste wood with lacquered surface from furniture production is not accepted by heat supplying companies as it is not suitable for burning and energy production due to large amount of chemicals. This is a problem that will need to be addressed in the nearest future.

The consumer is the main driver of changes; thus, it is vital to be able to better understand and clarify consumer desires. More and more consumers declare that sustainability is important for them, they are willing to change their shopping habits to reduce negative environmental.

impact and they seek products that align with their values. Therefore, it's now important for producers to offer items based on specific qualities tailored to meet consumers 'demands, classified as eco-friendly, organic, parabens-free or similar products.

The principles of circular economy implemented in production processes will create more value.

Main Findings and Conclusions

No exam was taken at the end of the training; participants were not awarded a certificate or diploma.

The participants agreed that general conditions, the overall content of the training course and theory/practice ratio were suitable. They gained new valuable insights, knowledge and skills during the training. Most of the participants said they would be able to use the gained knowledge in their professional life. They indicated the following training topics as the most relevant and useful:

- Green economy: opportunities and challenges
- Capacity building: Green economy strategy, action plan and staff's skills and knowledge development at SMEs
- Financial possibilities for SMEs
- The strategy and policy of the European Union

The participants were happy they had a possibility not only to work on their own projects but also to discuss, exchange ideas and experiences with people from other companies. They learned different ways how principles of green economy can be implemented in real life of SMEs and worked to find solutions suitable for their own companies.

Panevezys Chamber of Commerce Industry and Crafts conducted training, consulted the project participants - companies, and organized a joint final seminar of all participants, during which the participants gave their presentations on the project work, research and its results. They also assessed the benefits of the project and the willingness to continue participating in further activities.

By answering questions in the evaluation questionnaires participants noted that the training was interesting, useful, expanded their knowledge on the topics of green economy. They agreed that all companies have to start making changes towards green economy without delay; only those who adapt to new standards of business development requirements will be able to continue their activity. This requires new investments, and some participants see it as one of the major challenges.

The participants said they would implement their planned GE measures in their companies and recommend such training to others: their colleagues, staff, friends, partners, shareholders. A more detailed analysis of the surveys will be done by the evaluator PP11 RSU.

The training could be continued by Panevezys Chamber of Commerce Industry and Crafts in the future for employees and managers of SMEs from various industrial sectors. When needed, the training could be modified according to individual needs of the participants.

1.3 Sistemi Formatici Confindustria[4]

[4] Prepared by SFC Sistemi Formatici Confindustria in collaboration with ECOLE ASSOLOMBARDA

Executive Summary

The course “Preparation and management of SMEs for work in the Green Economy” proposed by WIFI partner of 3loE has been revised and adapted to the training needs of the mechanical engineering business environment operating in the Lombardy region of Italy.

SFC Sistemi Formativi Confindustria collaborated with ECOLE – which is the business service company of ASSOLOMBARDA, the main representative association of companies in Lombardy Region – to adapt the “Preparation and management of SMEs for work in the Green Economy” training program to the local needs.

ECOLE has long been working on the training needs of the corporate population and in the last three years has focused on the issue of digital transition as an enabler of new sustainability policies.

ESG issues have now become part of everyday business, but Italian SMEs often struggle to adopt a structured approach suffering in many cases from the demands of compliance with environmental and governance policies.

Methodology for adaptation curriculum to Italian training needs

For the reasons mentioned above ECOLE designed a training course on sustainability issues that started from the path available in the 3LoE Project collection and adapted it to the specificities of Italian SMEs and their strong need for accompaniment towards a new sustainable business model.

The starting course was “Preparation and management of SMEs for work in the Green Economy “

The main objective of the course has been confirmed: “Preparation and management of SMEs for work in the Green Economy” main objective is to equip employees or potential employees with fundamental knowledge and skills about Sustainability, Circular Economy and Green Innovation. The knowledge acquired will enable small and medium sized enterprises to respond quickly and sustainably to the challenges of our rapidly changing world.

The themes of the pathway were in line with the training needs of Italian SMEs. However, the course was readjusted in terms of the training methodology. The pathway designed for Italy does not include the self-study phase because SMEs in our territorial context struggle to find the necessary time to carry out project work independently.

From these considerations it was decided to increase the classroom training to a total of 60 hours divided into several modules, cratered by:

- involvement in the training sessions of innovative startups and other companies that have developed sustainable impact products and services that can inspire SMEs.
- alternating training with ESG knowledge transfer and in-company coaching to facilitate its application.
- facilitation of networking activities among participating companies, innovative startups and research and innovation centers engaged in sustainability issues.

Expected output

At the conclusion of the training, participants have been empowered to activate the organization on sustainability issues by being able to rely on these outputs:

- Knowledge of the principles of sustainability and circularity
- Ability to run a workshop with company management to transfer the need to structure the company's approach to sustainability issues, the creation of a Materiality Matrix
- Ability to use one of the self-assessment tools on ESG issues to understand gap to fill and priorities;
- Ability to structure a sustainability plan;
- Creating a network of companies equally committed to ESG issues from which to learn and possibly collaborate.

Target

SME entrepreneurs; Design and Engineering Manager; Production Manager; Procurement and Logistics Manager; possibly Marketing and Communication Manager.

Structure of the Training Program

The Program is structured in 4 modules for 9 meetings and a total of 60h

Module 1: Sustainable development and the framework (8 h)		
Mod 1A The principles of sustainability-the 2030 Agenda goals and the European response to ESG challenges. From a linear to a circular business model	4 h	• The concept of sustainability applied to business management - impacts , costs and benefits . The introduction of the 3 ESG pillars in business decisions. • The 17 goals of the 2030 agenda and their declination in the business operating context. • The EU tools to support SMEs for the Green transition. • The Circular Economy Action plan (EU) Case history: - SME that has adopted ESG principles into its business model. Workshop: Application of exposed principles to the operational context of participating companies.
Mod 1B Non financial reporting	4h	• The GRI standards - Introduction and linkage to the goals of the 2030 Agenda. • The European Taxonomy. • The NFRD (Non-financial reporting Directive) regulations. Case History: "ECOMATE: Introducing a platform for self-assessment on ESG criteria ".
Module 2: The New Business Model (24h)		
Mod 2A	8 h	The principles of circularity

The circular company		The circular supply chain /Recovery, recycling/product life extension as a service. The impact on processes and product. The mapping of raw materials, sources and supplies. The mapping of waste, production waste and its destination. Case History: “MixCycling: from waste materials to biopolymers "
Mod 2B Platforms for the circular economy	8h	The function of matchmaking platforms The different types of platforms and related services: - Swapping - Sharing - Looping Case History: "Sfridoo: Platform for the circular economy" Workshop: Simulated use of the platform
Mod 2C Stakeholder involvement in the transformation process	8h	The redesign of the supply chain in a circular logic. Stakeholder involvement. Tools and mode of operation Workshop: How to deal with the change from a linear to a circular model
Module 3: Circular Business Model and Ecodesign (16h)		
Mod 3A Circularity and production processes	8h	Il life cycle assessment (LCA) Case history -Adoption of LCA in the company- The case of a textile SME
Mod 3B Circularity and product	8h	The market for secondary raw materials Industrial symbiosis Ecodesign and circular products (the choice of materials, the redesign of processes. Sustainable Production, Product End-of-Life Management, Design for the Circular Economy). Workshop: supply chain, process and product innovation.
Module 4 : The role of technology (12h)		
Mod 4A New technologies to support Sustainability	6h	Enabling technologies for a sustainable business model. Artificial intelligence (and its subsystems) to support Circularity.
Mod 4B New sustainable business models	6h	Sustainability in enterprise policies: technological, organizational, training and communication innovation for new sustainable competitive models.

Certification
At the conclusion of the course, a certificate of transparency of acquired skills is with reference to the INAPP Directory of Labor and Qualifications Atlas (Atlante del Lavoro e delle Qualificazioni).

Participants and companies involved
The pilot involves 6 participants, coming from 6 enterprises belonging to the mechanic sector and operating in Lombardy.

1. G.COMM SRL
2. FEAT GROUP SPA
3. COMBI ARIALDO SNC
4. CASTEL SRL
5. ITALIANPACK SRL
6. VALVITALIA SPA

Teachers
Senior expert in Innovation and Sustainability with a focus on practical knowledge.

Experts on specific thematic issues (LCA, industrial symbiosis, etc…)

1.4 Departament D'educació- Generalitat de Catalunya[5]

Introduction
The Introduction should cover the following aspects:

- Contextualisation within the overall project:
  The main objective of the training "Preparation and management of SMEs for work in the green economy" is to provide employees or potential employees with knowledge and skills on Sustainability, Circular Economy and Green Innovation. The acquired connections allow small and medium-sized companies to respond quickly and sustainably to the reputes of our world that change quickly.

- How was the testing of the tool carried out, where and when:
  The testing has been 100% presential. The sessions were developed in the afternoon during the months of September and November. It is also important to mention that the chosen curriculum was the short one so that it could be completed in due time. The training was taught by two trainers so that each of them could offer their personal experience in terms of Green Economy.

- Significance of the tool:
  Even though most of the students in the course had some knowledge about green economy in their lives, the aim of the tool is to give participants skills and knowledge required to manage the business toward green economy. In this sense, they have been doing different challenges in order to find different situations where they can act to improve tomorrow.

[5] Prepared by Gema Almagro, Departament D'educació- Generalitat de Catalunya

- Special features of the implementation:

  The curriculum was adapted and translated into Catalan. It was a blended type of training: 20 hours the training was contact hours with the trainer and the other 150 hours had to be done by the participants at the company. They have made a presentation in a seminary of their challenge.

Admission and organisation of the testing

- Selection of participants, possible admission requirements
  The selection of the participants has been done between our students due to some of them are workers in different companies. They have to be representatives of pines and some experience as a qualified workers/ specialists in the environment.

- How were the participants approached and won?
  One way to win over participants was to involve them in learning. On the first day the trainer asked them what their doubts were and also what their needs were. During the following sessions, all these issues were dealt with and solved. Another aspect that could be highlighted is that most of the examples and exercises were based on what they could apply at the company. One thing that really helped (which will be explained more in detail later on) was that the trainer worked in the water sector for several years and they had experience and training in environment, so they could explain different experiences applicable on a day-to-day basis in SMEs.

- Organisation of the implementation (face-to-face or online)
- The contents and exercises have been prepared on an online platform (Moodle), but face-to-face hours have been respected. The practical part has taken place in different companies.

- Brief notes on counsellors and teachers, their qualifications and experience
  Eduard Fernández de la Vega is an Industrial Technical Engineer from the Polytechnic University of Catalonia (UPC). With more than 30 years of experience in managing water distribution networks, he currently combines his functions as Head of the Operational Control Center of Aigües de Barcelona with teaching in the Higher-Level Training Cycle in Energy and Water, at the Esteve Institute Terradas, as well as in the Water School (AGBAR), in which he participates as an expert tutor in different professional training programs.

- Brief notes on accompanying advice, support for participants, etc.

  The trainer explained the participants a lot of different experiences in order to be able to those situations than can be applied in each of the companies where they work.

Participants profile and organisation of the training

- Participants by age, gender, educational background, profession, country of origin, etc. 4 women and 23 men took the training. They all are, as it can be seen in the chart below, some of them students and some of them, also workers.
- Explanations and notes on implementation

The assessment was achieved by carrying out dynamic activities in class, carrying out group work and, finally, exposing the work to a panel (formed by expert teachers in the field). In this way, it was possible to verify the degree of assimilation of the contents worked by the participants.

- Observations and feedback from counsellors
  The trainers adapted some of the contents on the curriculum to make them more accessible to the reality of Catalan workers in a Catalan company. They took advantage of some materials from her Postgraduate Certificate in Education (for example, the topic on the selection and hosting of apprentices according to the criteria established by the Department of Education of the Government of Catalonia). They also used the “Manual de tutores de empresa en la FP Dual” by the Bertelsmann Foundation and materials by other institutions such as the Consell General de Cambres de Catalunya (Chambers of Commerce Association) and the Alianza para la FP Dual (Dual Vocation Training Alliance).They introduced the topic of multiple intelligences and changed the individual learning styles and learning principles (project learning, problem-based learning, flipped classroom, etc.) As a whole, they have found the learning process of adults very interesting.
- Strengths of the tool as seen by the participants
  The participants now know how to apply the green economy not only in SMEs but in their daily life, and they have reacted very positively. They have received good environmental awareness.
  Here are the literal words of some of the participants:
  “Thank you so much for the training and help. I think It will help us to carry out actions in accordance with the green economy in our day to day”.
  “A very interesting training. It has solved many doubts about what the green economy really is and what actions to carry out”.
- Weaknesses of the tool as seen by the participants
  The participants mention that they will not be able to transfer knowledge as accurately as the trainers.
  They have found it difficult to transmit all the knowledge received to the rest of the company's workers.
  The hours of the course are considered very fair to be able to go deeper into the subject.

Main Findings and Conclusions

- Summary assessment of implementation
  Considering that the course has been carried out in the first week of the beginning of the school year, the work carried out by the students has been very satisfactory. The presentation made by the different groups has been highly valued both by the rest of the students and by the trainers.
- Strengths and advantages of tool
  The training has opened their eyes and has awakened their curiosity in a several aspects of green economy.
- Hints for future use, suggestions for possible improvements or further developments
  The development of the curriculum should be more flexible so that it could adapt better to the social and working reality of each country.
- Will the counselling with the tool be continued by the partner in the future? For which target groups?

Yes, we hope it will be continued at the same format. It has been adapted to the Catalan need and it would be a pity if it was not used again. Once it has been adapted, the curriculum could be aimed at any professional sector just by changing the examples.

1.5 Zespol Szkol Mechanicznych i Logistycznych im. inz. Tadeusza[6]

The "Preparation and Management of SMEs for Work in the Green Economy" training program is designed to equip small and medium-sized enterprises with the knowledge and tools necessary to thrive in a rapidly evolving economic landscape that prioritizes sustainability and environmental responsibility. As the global market increasingly shifts towards green practices, SMEs face both unique challenges and opportunities. This training aims to bridge the gap between traditional business operations and the demands of the green economy, ensuring that SMEs are not only compliant with current regulations but also positioned for long-term success.

At the heart of this training program is the recognition that sustainable development is no longer a niche concept but a fundamental aspect of modern business operations. The program begins with foundational modules that introduce participants to the basic principles and importance of the green economy. These initial sessions lay the groundwork for more advanced topics, providing a comprehensive overview of sustainable practices, resource management, and ecological business strategies. Participants will gain a clear understanding of how integrating green practices can lead to cost savings, improved operational efficiency, and enhanced market competitiveness.

The training also addresses the practical aspects of implementing green practices within an SME. Modules on waste management, ecological technologies, and regulatory compliance offer hands-on tools and strategies that can be directly applied to daily operations. By learning from real-world case studies and engaging in practical exercises, participants will be able to visualize the tangible benefits of green practices and develop actionable plans tailored to their specific business contexts.

Furthermore, the program emphasizes the importance of financial opportunities and capacity building for SMEs. Understanding the various funding sources available, from EU and national grants to regional and local financial support, is crucial for enabling the transition to green operations. Participants will be guided through the process of applying for these funds and creating strategic action plans that align with their sustainability goals. This not only facilitates the implementation of green practices but also fosters long-term growth and resilience in an increasingly eco-conscious market.

Overall, this training program aims to empower SMEs with the knowledge, skills, and resources needed to navigate the complexities of the green economy. By fostering a deeper understanding of sustainable development and providing practical tools for implementation, the program prepares SMEs to meet current environmental challenges

[6] Prepared by Zespol Szkol Mechanicznych i Logistycznych im. inz. Tadeusza

and capitalize on the opportunities of a green future. The ultimate goal is to create a business environment where sustainability and profitability go hand in hand, ensuring that SMEs can thrive while contributing to a more sustainable world.

The starting point for organizing this training was the material created by Satakunta University of Applied Sciences (SAMK). We used the curriculum of this training as a foundation and adapted and extended its content to suit the needs of our trainees. By leveraging SAMK's comprehensive curriculum, we ensured that our training program was built on a robust and well-researched framework. However, recognizing the unique challenges and opportunities faced by our specific audience, we tailored the content to better align with the practical realities and strategic goals of our participants.

This adaptation process involved incorporating additional modules that address local regulatory contexts, industry-specific challenges, and emerging trends in the green economy. We also expanded the scope to include more detailed case studies and practical exercises, ensuring that the training is not only theoretically sound but also highly applicable to real-world scenarios. Through this customized approach, we aim to provide our trainees with a deeply relevant and impactful learning experience, equipping them with the skills and knowledge necessary to excel in a sustainable business environment.

This training was ideally linked to the creation of a specialization in ecological solutions in logistics for logistics technician students and a pedagogical course for entrepreneurs to become vocational instructors. In this way, we educated students on the one hand, but also entrepreneurs on the other. This dual approach allowed us to create a multi-level model for developing human resources according to the concept of environmentalism and bringing our educational offer closer to the needs of the labor market.

By integrating ecological solutions into the logistics technician curriculum, we ensured that students receive a comprehensive education that combines technical logistics skills with a strong foundation in sustainable practices. This prepares them to enter the workforce as knowledgeable and capable professionals who can drive green initiatives within their organizations.

Simultaneously, by offering a pedagogical course for entrepreneurs, we empowered business leaders to become vocational instructors. This not only enhances their own understanding of green practices but also equips them to mentor and train their employees effectively. This pedagogical approach helps bridge the gap between theoretical knowledge and practical application, fostering a culture of sustainability within businesses.

Together, these efforts create a synergistic effect, aligning our educational programs with the evolving demands of the labor market. By addressing the needs of both students and entrepreneurs, we contribute to a more sustainable economy while ensuring that our graduates are well-prepared to meet the environmental challenges of the future.

Module 1: Introduction to the Green Economy

Contents:

- Basic concepts and definitions related to the green economy.
- History and evolution of the green economy.
- The role of the green economy in the global and local context.
- Examples of countries and companies implementing green economy practices.

Objectives:

- Provide participants with a basic understanding of the green economy.
- Understand the importance of the green economy in addressing global environmental challenges.
- Lay the foundation for more advanced topics.

Benefits:

- Gain a solid theoretical foundation on the green economy.
- Increase environmental awareness among participants.
- Motivation to further explore and implement green practices in companies.

Module 2: Green Economy: Opportunities and Challenges

Contents:

- Analysis of opportunities arising from the green economy.
- Identification of challenges and barriers in implementing green practices.
- Examples of successes and failures in the green economy.
- Strategies to overcome challenges.

Objectives:

- Help participants recognize potential benefits and obstacles.
- Understand how to overcome challenges associated with implementing a green economy.
- Inspire participants to act towards a green economy.

Benefits:

- Better preparation for implementing green practices in companies.
- Realistic view of opportunities and challenges.
- Ability to plan and strategize in the context of the green economy.

Module 3: Sustainable Development in SMEs

Contents:

- Fundamentals of sustainable development.

- Integration of sustainable development principles into SME operations.
- Examples of sustainable practices in SMEs.
- Tools and methods supporting sustainable development.

Objectives:

- Introduce participants to the concept of sustainable development.
- Understand how sustainable development principles can be implemented in SMEs.
- Provide tools and methods to support sustainable development.

Benefits:

- Better understanding of sustainable development.
- Ability to implement sustainable practices in companies.
- Improve company image and increase competitiveness.

Module 4: Resource Management

Contents:

- Techniques for efficient management of natural resources and energy.
- Tools for monitoring and reducing resource consumption.
- Examples of companies efficiently managing resources.
- Practical exercises and case studies.

Objectives:

- Learn efficient resource management in companies.
- Understand how resource reduction impacts costs and the environment.
- Provide tools for monitoring and managing resources.

Benefits:

- Reduction of operational costs.
- Decrease in the company's ecological footprint.
- Improvement in operational efficiency.

Module 5: Ecological Business Practices

Contents:

- Methods to reduce the company's carbon footprint.
- Implementing recycling and reuse practices.
- Examples of companies applying ecological practices.
- Tools and technologies supporting ecological practices.

Objectives:

- Understand how to implement ecological practices in companies.
- Learn methods and tools supporting ecological actions.
- Motivate to adopt pro-ecological solutions.

Benefits:

- Reduction of the company's negative environmental impact.
- Improvement of the company's image as environmentally responsible.
- Attraction of customers and investors interested in sustainable development.

Module 6: Waste Management

Contents:

- Techniques for waste minimization.
- Strategies for recycling and reusing materials.
- Tools for waste management.
- Examples of companies effectively managing waste.

Objectives:

- Learn effective waste management methods.
- Understand the importance of recycling and reuse.
- Provide tools supporting waste management.

Benefits:

- Reduction in the amount of waste generated by the company.
- Decrease in costs related to waste disposal.
- Better compliance with environmental regulations.

Module 7: Ecological Technologies

Contents:

- Overview of modern technologies supporting the green economy.
- Analysis of benefits and costs associated with implementing ecological technologies.
- Examples of companies using ecological technologies.
- Practical exercises using new technologies.

Objectives:

- Understand the role of technology in the green economy.
- Learn to evaluate and select appropriate ecological technologies.

- Prepare for the implementation of technologies in companies.

Benefits:

- Improvement in operational efficiency.
- Reduction of the company's environmental impact.
- Easier access to new markets and customers.

Module 8: Ecological Regulations and Standards

Contents:

- Overview of current regulations and standards concerning environmental protection.
- Analysis of the impact of regulations on SME operations.
- Examples of companies complying with ecological regulations.
- Tools supporting regulatory compliance.

Objectives:

- Understand existing ecological regulations and standards.
- Learn methods and tools supporting regulatory compliance.
- Prepare for audits and controls related to environmental protection.

Benefits:

- Avoidance of fines and penalties for non-compliance.
- Improvement of the company's image as environmentally responsible.
- Increase in competitiveness in the market.

Module 9: Financial Opportunities for SMEs

Contents:

- Overview of funding sources: EU, national, regional, and local.
- Procedures for applying for funds.
- Examples of companies benefiting from various funding sources.
- Tools and support for SMEs in the application process.

Objectives:

- Understand available funding sources for SMEs.
- Learn procedures for applying for funds.
- Prepare for successful financial acquisition.

Benefits:

- Increase in the company's financial capabilities.

- Facilitation of green practice implementation through access to funds.
- Increase in the company's growth and expansion opportunities.

Module 10: Building Capacity

Contents:

- Green economy strategy.
- Action plan for SMEs.
- Development of personnel skills and knowledge.
- Examples of companies building capacity in the green economy.

Objectives:

- Learn to create and implement a green economy strategy.
- Understand the importance of an action plan.
- Develop personnel skills and knowledge in the context of the green economy.

Benefits:

- Increase in the company's operational efficiency.
- Improvement of the company's image as innovative and green.
- Preparation of the company for long-term sustainable development.

Module 11: Green Economy Tools and Instruments

Contents:

- Overview of tools supporting the implementation of green practices in companies.
- Analysis of benefits and costs associated with various tools.
- Examples of companies using green economy tools.
- Practical exercises using tools.

Objectives:

- Understand the role of tools in the green economy.
- Learn to evaluate and select appropriate tools.
- Prepare for the implementation of tools in companies.

Benefits:

- Improvement in the company's operational efficiency.
- Reduction of the company's environmental impact.
- Easier access to new markets and customers.

Module 12: Case Studies

Contents:

- Analysis of examples of companies successfully implementing green practices.
- Lessons learned from successes and failures.
- Practical lessons for application in other companies.
- Discussions and experience sharing among participants.

Objectives:

- Understand practical aspects of implementing green practices.
- Learn from the experiences of other companies.
- Motivate to act towards a green economy.

Benefits:

- Better preparation for implementing green practices in companies.
- Increase in confidence in taking pro-ecological actions.
- Facilitation in adapting green practices across different industries.

These modules together create a comprehensive training program that prepares small and medium-sized enterprises to effectively operate in the green economy, providing both theoretical knowledge and practical tools and strategies.

The participants in this training were entrepreneurs working with the school and individuals who attended the pedagogical course. A total of 40 participants took part. The course took place at our school during the 2023/2024 school year.

1.6 Latvian Chamber of Crafts[7]

Introduction

Upon joining the project “3LoE – Three-level centres of professional excellence: Qualification, entrepreneurship and innovation in the Green Economy”, one of the main educational goals of the Latvian Chamber of Crafts was to gain and provide new knowledge and skillsets for employees and employers of SMEs, who make up a large part of the Chamber’s members.

“Preparation and management of SMEs for work in the Green Economy” aims to address the unique challenges faced by small and medium-sized enterprises (SMEs) seeking to transition into the landscape of Green Economy. The curriculum covers a comprehensive array of topics, including strategies, policies and financing opportunities tailored to the green sector.

For employees and owners of SMEs, the importance of such a course cannot be overstated. In an era where environmental sustainability is no longer an option but a

[7] Prepared by Latvian Chamber of Crafts

necessity, SMEs play a crucial role in driving eco-friendly initiatives and fostering sustainable business practices.

The course not only equips participants with general knowledge but furthermore hones their skills in navigating the complexities of supporting and applying this knowledge in practice. The course integrates practical components, offering real-world case studies, hands-on exercises, and interactive workshops. This approach ensures that participants not only understand the theoretical foundations but also gain practical skills to implement sustainable strategies within their respective enterprises.

Within the broader context of the 3LoE project, the "Preparation and Management of SMEs for Work in the Green Economy" course plays a pivotal role in achieving the project's objectives by empowering SMEs and in turn providing knowledgeable partnership opportunities for education, training, and higher education institutions.

The course contributes to the overall enhancement of professional excellence within the three targeted levels of qualification, entrepreneurship, and innovation. Latvian Chamber of Crafts' commitment to this initiative.

Admission and organisation of the training

All participants taking part in the training were Latvian Chamber of Crafts members (self-employed persons or SME employees, supervisors or employers).

The dissemination of information about the chance to participate in this course was done by phone and e-mail, as well as information on the Latvian Chamber of Crafts web page.

The training was attended by 15 participants - 12 men and 3 women.

The lecturer Nellija Livčāne was chosen based upon previous cooperation and her specialization in economy-related topics.

Before the first workshop, the trainer – Nellija Livčāne – adjusted the provided training materials to fit this country, area, branch and companies in question.

Based on the best practice curriculum provided by Wirtschaftsförderungsinstitut der Wirtschaftskammer Steiermark, the training was split into three parts:

1. First workshop (3 days)

Time duration (in hours)	Topic
Day 1	
0.5	Welcome, registration, training arrangements and material hand-out.
1.5	Concept of Green Economy. Green economy in SDGs. SDG related activities in Latvia.

1.5	Green economy: opportunities and challenges for SMEs. National and international examples.
1.5	Group work and joint discussion on green economy opportunities and challenges in SMEs.
2	The strategy and policy of the European Union: Green growth and circular economy. National and regional strategies.
1	Group work and joint discussion on National and regional roadmaps and actions plans: Role of SMEs.
Day 2	
1.5	Financial possibilities for SMEs: European Union, Latvian and regional financing.
1.5	Group work and joint discussion on skills and knowledge demand in green economy at SMEs.
1.5	Capacity building: Green economy strategy, action plan and staff skills and knowledge development at SMEs
1.5	Green economy approaches at SMEs: technology, investments and finance. Role of eco- innovations at SMES. Best practices – local and international.
1.5	Group work and joint discussion on green economy innovations in SMEs.
Day 3	
2.5	Green economy tools and instruments.
2.5	Green business models, including company presentations (both local and Baltic company cases of implemented green economy solutions, models, etc.).
1.5	Group work and joint discussion on green economy innovations in SMEs.
1.5	Introduction to self-studies and project work.

2. Self-study with external support (12 weeks);

3. Conclusion workshop (2 days):

Time duration (in hours)	Topic
Day 1	
0.5	Welcome, registration and material hand-out.
7.5	Student presentations, discussion and feedback of the trainer.
Day 2	
6	Welcome, registration, training arrangements and material.

2	Wrap-up discussions, conclusions and achievements of trainees, feed-back survey.

Participants profile and organisation of the training

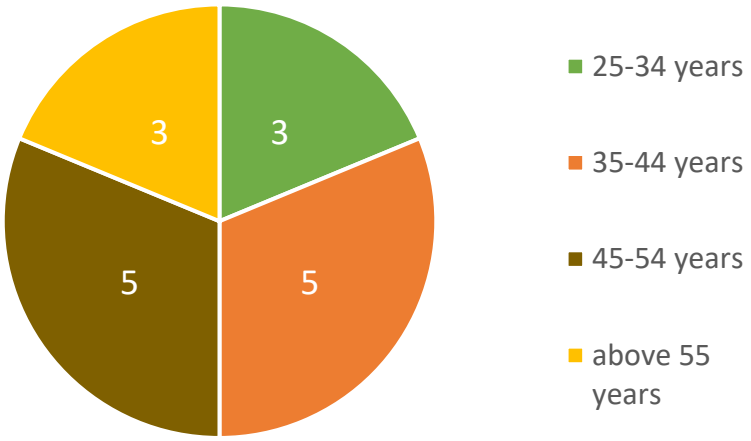
The training was held from the October 6 to December 9, 2022.

The training was carried out in hybrid mode – both in person and online.

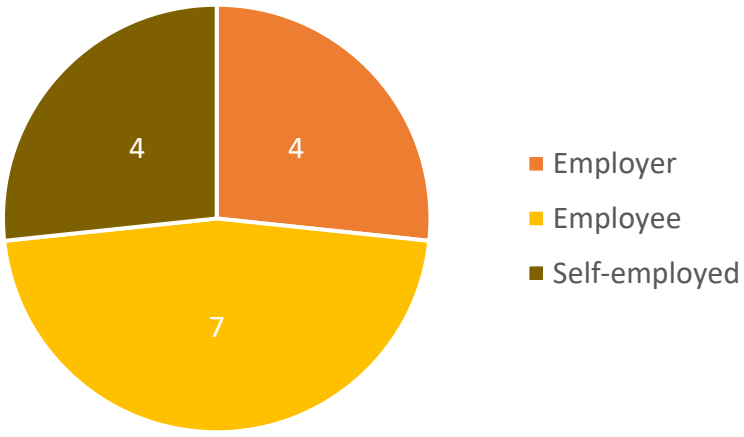
All of the participants of the Preparation and management of SMEs for work in the Green Economy were members of the Latvian Chamber of Crafts.

There were 3 female participants and 12 male participants.

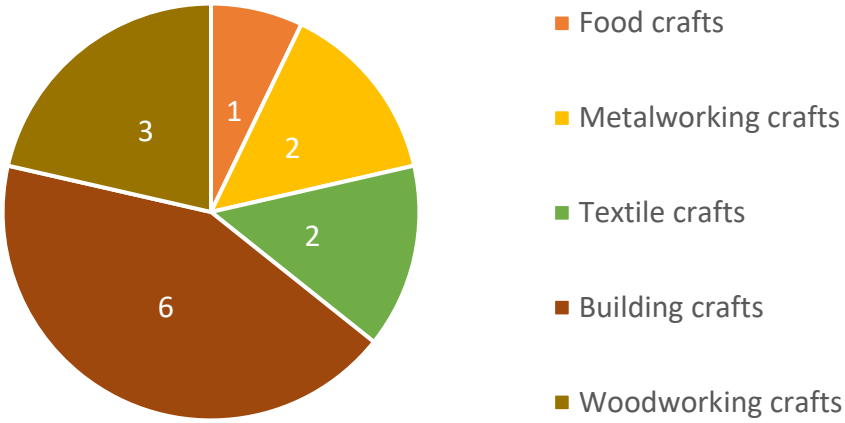
Age of participants:



Most training participants came from SMEs. Two participants were self-employed craftsmen:



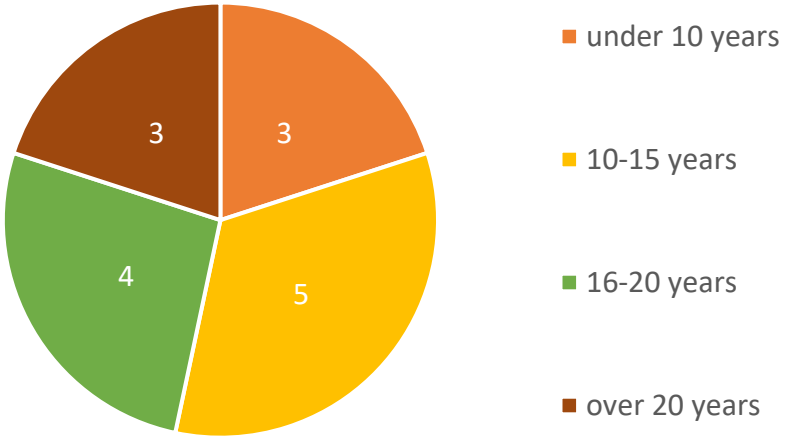
Following is the variety of crafts groups represented by the participants:



The represented crafts were:

- food crafts – baker,
- metalworking crafts – car mechanic, blacksmith,
- textile crafts – tailor,
- building crafts group – plumber, carpenter, painter, tinsmith, potter,
- woodworking group – woodworker.

The work experience of the trainees ranged from 7 to 44 years:



Execution of the Training

As previously described, the training consisted of a three-day long introduction workshop, 12 weeks of self-study work and a two day long conclusion workshop. The execution of each of the phases is described below.

First workshop
Day 1
Participants arrived, registered, and received training materials. An overview of the training schedule and objectives was given.

Concept of Green Economy.
Introduction to the concept of Green Economy and its significance within the Sustainable Development Goals (SDGs). The session highlighted SDG-related activities specifically in Latvia, emphasizing the local context, for example, the NGO report on the implementation of SDGs.
Concept of Green Economy. Green economy in SDGs. SDG related activities in Latvia.
Discussion on the opportunities and challenges the Green Economy presents to SMEs, illustrated with national and international examples. This helped participants understand the broader impact and potential benefits for their own businesses within different crafts fields.
Green Economy: opportunities and challenges for SMEs. National and international examples.
Participants engaged in group work to identify and discuss opportunities and challenges of implementing green economy practices in SMEs. The participants were split into groups according to their craft group. The opportunities and challenges of different craft groups, such as food and building crafts were compared.
The strategy and policy of the European Union: Green growth and circular economy. National and regional strategies.
Overview of the European Union's strategy and policy on green growth and the circular economy. The session also covered national and regional strategies, linking EU goals to local contexts. Reading material such as summaries of recent discussions and Green Economy-related research articles were provided.
Group work and joint discussion on National and regional roadmaps and actions plans: Role of SMEs.
Group discussion focused on national and regional roadmaps and action plans, particularly the role of SMEs in these plans. Participants brainstormed how their specific craft business could align with and benefit from these strategies, once again highlighting the possible risks and unclarities. A closing discussion about the day's insights was led by the lecturer.

Day 2
Financial possibilities for SMEs: European Union, Latvian and regional financing.
Presentation on various financial opportunities available for SMEs from the European Union, Latvian, and regional sources, including potential support from NGOs. The session aimed to equip participants with knowledge of funding avenues to support green initiatives.
Group work and joint discussion on skills and knowledge demand in Green Economy at SMEs.
Group activity to identify the specific skills and knowledge required for implementing green economy practices in SMEs. Participants used a flip chart to note possible qualities an employee may need to help a company grow in the green economy context. The noted qualities were first grouped, then commented on and supplemented by the lecturer.

Capacity building: Green Economy strategy, action plan and staff skills and knowledge development at SMEs.
Discussion on developing a green economy strategy and action plan within SMEs, including necessary staff skill and knowledge development. The lecturer added onto the qualities noted by participants in the previous activity.
Green Economy approaches at SMEs: technology, investments and finance. Role of eco- innovations at SMES. Best practices – local and international.
Examination of technological innovation, investment practices, and financial aspects of green economy approaches in SMEs. Best practice examples of eco-innovations from local and international contexts, as well as different craft groups were presented and further discussed and compared by the attendees.
Group work and joint discussion on Green Economy innovations in SMEs.
Participants collaborated to explore and discuss potential green economy measures that could be implemented in their SMEs. The attendees were first grouped by their crafts, afterwards a larger discussion was held. This session aimed to generate practical ideas and solutions.

Day 3
Green Economy tools and instruments.
An overview of various tools and instruments available to support green economy practices: green procurements, action plans, monitoring frameworks, policy toolkits. This included practical examples and demonstrations of how these tools can be applied in SMEs and self-employed context.
Green business models, including company presentations (both local and Baltic company cases of implemented green economy solutions, models, etc.).
Presentation of local and Baltic companies that have successfully implemented green economy solutions. The case studies of building, food and textile companies provided real-world examples and inspiration for participants.
Group work and joint discussion on green economy innovations in SMEs.
The lecturer presented the sustainable business model canvas and more examples of innovative business models. A continued group discussion on green economy innovations was held, allowing participants to refine their ideas and develop actionable models.
Introduction to self-studies and project work.
The lecturer presented an outline of the self-study and project work to be undertaken. Participants were given instructions and resources to continue their learning and apply the concepts discussed in their own businesses. A consultation schedule was set up.

Self-study work (12 weeks)
The 12-week self-study phase involves the application of knowledge acquired during the initial training phase to real-world projects within the participants' companies. This phase aims to facilitate sustainable learning and practical improvement by having participants implement, evaluate, and document their own projects under real conditions.

The process is supported by professional trainers who provide varying degrees of consultation and coaching.

Week-by-week breakdown of self-study work execution:

Weeks 1-2. Planning and setting objectives:

Conducting an initial assessment of the company's current status regarding sustainability, ecological issues, and green economy practices.

Defining clear project objectives based on the company's needs.

Meeting with company management and/or employees to discuss the planned project and gathering input.

Developing a detailed project plan including goals, measures, and expected outcomes.

Support:

Lecturer provides guidance on setting realistic objectives and creating a comprehensive project plan.

Weeks 3-4. Baseline assessment and research:

Conducting further assessment to understand the current state of green economy practices within the company.

Researching barriers and enablers for implementing green economy initiatives.

Identifying tools and applications that could benefit the company's green economy management functions based on knowledge from initial workshop.

Support:

Technical consulting on data collection and assessment methods.

Coaching on identifying suitable tools and technologies for the project.

Weeks 5-6. Detailed planning and strategy development:

Developing a detailed strategy based on baseline assessments and research findings.

Outlining necessary resources for potential implementation, such as materials, technology, and human resources,

Creating a communication plan to engage stakeholders and ensure their support.

Drafting initial recommendations and proposed steps for implementation.

Support:

Lecturer provides ongoing consultations to refine strategies and recommendations.

Assistance with resource allocation and stakeholder engagement plans.

Weeks 7-8. Mid-project review and refinement:

Conducting a mid-project review to assess progress.

Adjusting the project plan and recommendations as needed to address own and lecturer’s identified challenges.

Continuing development of detailed action plans.

Support:

Intensive coaching to address challenges and refine strategies.

Mid-project evaluation session to ensure alignment with project goals.

Weeks 9-10. Finalizing plans and documentation:

Finalizing the detailed action plans and recommendations.

Preparing comprehensive documentation of the project, including challenges, tools, proposed benefits, and potential risks.

Ensuring all recommendations and plans are well-articulated and supported by research.
Outlining final project work report and presentation.
Support:
Regular check-ins with lecturer to review documentation and receive feedback.
Weeks 11-12. Evaluation, reflection, and presentation preparation:
Conducting a thorough evaluation of the proposed plans and recommendations.
Reflecting on the learning process, documenting insights and areas for future improvement.
Preparing final report summarizing the project, including challenges, tools identified, proposed benefits, and potential risks.
Creating a presentation for the concluding seminar.
Support:
Final coaching sessions to assist with evaluation.
Guidance on preparing report and presentation for the concluding seminar.

Second workshop
Day 1
Welcome and Registration
Participants arrived, registered, and received necessary materials for the workshop, such as worksheets for evaluating other participants and noting down interesting parts of their presentations. The session included an overview of the workshop's objectives and schedule.
Student Presentations, Discussion, and Trainer Feedback
Participants presented the project work completed since the initial training sessions. Each presentation was followed by a discussion where peers and the trainer provided constructive feedback. This extensive session allowed for in-depth analysis and provision, helping participants refine their approaches and solutions. The participants noted their interest in the solutions invented by participants of different crafts groups.

Day 2
Wrap-Up Discussions, Conclusions, and Achievements of Trainees, Feedback Survey
A comprehensive wrap-up discussion was held to review the key takeaways from the training program. Participants discussed their achievements, challenges faced, and future plans for implementing green economy practices in their SMEs. The session concluded with a feedback survey to gather participants' insights on the training's effectiveness and areas for improvement. This feedback was very valuable for refining possible future training implementation.

Main Findings and Conclusions

The "Preparation and management of SMEs for work in the Green Economy" training implemented by the Latvian Chamber of Crafts provided a comprehensive framework for craftsmen – SME employees, employers, and self-employed individuals to understand and engage with green economy. The training was structured to cover both

theoretical and practical aspects, ensuring participants gained a well-rounded understanding of sustainable change processes in companies, financial opportunities and legal frameworks concerning environmental issues and green economy.

Participants were introduced to the foundational principles of green economy. This knowledge is crucial for aligning their business practices with global sustainability trends and national objectives. The training provided numerous examples and case studies, both local and international, showcasing successful green economy initiatives. This allowed participants to draw parallels with their own businesses and consider feasible green innovations.

By covering EU strategies, national policies, and available financial resources, the training equipped participants with the information needed to plan and fund green initiatives.

Group work and joint discussions facilitated a collaborative learning environment where participants could share ideas, challenges, and solutions relevant to their specific craft group. This networking opportunity was invaluable for fostering new partnerships and support systems among craftsmen and SMEs.

Networking, as well as the huge input of the lecturer during the 12-week self-study phase was mentioned as a positive in most participant evaluation sheets. The self-study phase work was a crucial component of the training program, providing craftsmen with the opportunity to develop actionable plans to enhance their own companies' engagement with the green economy. The trainees working in SMEs mentioned the appraisals they received from colleagues for taking such an initiative.

At the final workshops, participants came up with an idea to ensure sustained impact - a structured follow-up program could be implemented. This could include periodic check-ins about the sustainable growth of the companies, additional workshops, or an online platform for ongoing support and knowledge sharing.

In conclusion, the training was a significant step towards empowering craftsmen and SME stakeholders in Latvia to engage with and benefit from the green economy. By addressing the suggested improvements, future iterations of the training can be implemented and become even more impactful, providing participants with the tools and confidence needed to drive sustainable growth in their businesses.

1.7 T2I - Trasferimento Tecnologico e Innovazione Scarl[8]

Introduction

In the context of the Circular Economy and the Green Economy, Sustainable Chemistry represents an essential and strategic component for the design of industrial processes, materials and products that minimize environmental impact.

With the aim of disseminating and making these concepts applicable in various industrial sectors, this course first provided a general introduction to the concept of sustainable chemistry and green chemistry, and then focused on the design and selection of materials and processes from a sustainability by providing methodological tools useful for various application contexts.

The course had 24 enrolled people and 24 participants.

The frontal teaching part included 8 hours of lessons, divided as follows:

- System boundaries and concept of sustainability
- Green and sustainable chemistry and its role in the circular economy
- Examples: solvents and processes
- Critical raw materials: definition, relevance and approaches to criticalit
- Material classes: selection and circularity options (glasses, composites, textiles, polymers)

The frontal teaching part was followed by in-depth study through project work with the support of researchers from the Department of Chemical Sciences (DiSC) of the University of Padua. The project work was structured to be useful for the design of processes, materials and products that minimize the environmental impact in the participants' company. At the end of the course the participants thus obtained a concrete analysis of their business context regarding the design, selection of materials and processes with a view to sustainability.

Course Planning

The training course included in-person activities in the initial phases and at the end of the course, as well as an activity carried out mainly remotely (but including two short in-person appointments) so as to allow the development of the project work:

Thursday 21 March 2024, 2.30pm-6.30pm (4 hours)

Room 2I, Earth Sciences Centre, via G. Gradenigo, n. 6, Padua

Initial workshop with the presence of teachers, researchers from the University of Padua and company case studies

Friday 22 March 2024, 08.30-12.30 and 14.30-18.30 (8 hours)

Room 2I, Earth Sciences Centre, via G. Gradenigo, n. 6, Padua

[8] Prepared by Padua University

In-depth study on the topic with Prof. Silvia Gross, identification of the object and initial setting of the project work (organised by company cases) with researchers from the University of Padua

From Monday 25 March to Tuesday 21 March 2024 the researchers supported the distance learning students in the development of the Project Work

The following in-person appointments were also scheduled for a group update on the progress of the project work:

Friday 12 April 2024, 2.30pm-6.30pm (4 hours); Room 2I, Earth Sciences Centre, via G. Gradenigo, n. 6, Padua

Friday 10 May 2024, 2.30pm-6.30pm (4 hours); Room 2I, Earth Sciences Centre, via G. Gradenigo, n. 6, Padua

Wednesday 22 May 2024, 09.30-12.30 and 14.30-18.30 (8 hours); Room 2I, Earth Sciences Centre, via G. Gradenigo, n. 6, Padua

Final workshop during which the students presented the project work and were able to discuss with the university professors who participated in the initial workshop and with the researchers who accompanied them in the development of the thesis.

Chapter 1 Sustainable chemistry

Through the contribution of frof . Gross, as part of the course "Sustainable chemistry in the design of processes, materials and products", the concept of sustainability and its historical evolution was introduced to the class.

The following topics were then explored in depth during the meetings:

- the Anthropocene: system boundaries and boundary conditions.
- resources and their flows (Sankey diagrams).
- primary and secondary raw materials.
- water, energy, materials: the link with the green transition.
- new paradigms: sustainable and green chemistry.
- circular economy and its categorization.
- critical raw materials: supply chain and mitigation actions.
- circular chemistry and its principles.
- design and selection of materials from a critical perspective of raw materials.

Chapter 2 The parameters of sustainable chemistry

Thanks to the contributions of Prof. Marco Fantin, the participants have instead:

- learned how to quantify the sustainability of a chemical process.
- learned and tested the parameters of Green Chemistry Metrics).
- learned to evaluate the sustainability of chemical processes of interest for the business case-
- focused on the problem of solvent selection.

The modules were aimed at:

- increasing awareness of sustainable chemistry among industry professionals.
- training on reducing the environmental impact of industrial chemical processes.
- training on improving energy efficiency and use of resources.
- promoting technological development in the chemical sector.
- improving the competitiveness of companies through differentiation based on sustainability.

Also, in view of the project work, it was illustrated by the teacher and tested by the students how to evaluate the sustainability of a chemical process (12 principles of green chemistry). Necessarily, multiple aspects were considered together:

- use of resources, including renewable resources.
- energy efficiency.
- risks to health and the environment.

Chapter 3 Project work

The students were supported in the development of the project work by both Prof. Silvia Gross and Prof. Marco Fantin of the Department of Chemical Sciences of the University of Padua.

After participating in the initial workshops, the students identified, with the help of the teachers, the themes which they then developed as part of the project work for the company context.

Through two refresher appointments in the classroom and in person in April and May 2024, Gross and Fantin supported and accompanied the students in defining the essay in order to offer them ideas.

The 12 principles of green chemistry were used as a guideline to make the project works homogeneous with each other.

The times explored by the students were:

- eFoamX PRO - Application of Green Chemistry Metrics to compare different process and raw material solutions
- Application of Green Chemistry Metrics for comparing different electrical insulation processes
- Analysis of the qualitative and quantitative production process based on the 12 principles of green chemistry and solvent selection guide
- Hubergroup: Application of Green Chemistry Metrics for comparing two types of ink
- Application of Green Chemistry Metrics to compare 2 possible fabric chemical recycling processes
- FRESHTHERM - Application of Green Chemistry Metrics to compare 2 possible thermal insulation processes
- Reduction of waste in the cellulose acetate tumbling process
- Composite materials - reinforced polymers: search for sustainable alternatives

- Reduction in the use of fossil fuels for the production of biobased plastics. Impact assessment and proposals for a circular project
- Implementation of a Spray-Painting Line for MDF Doors

Chapter 4 SWOT analysis of the training course

Strengths - be accompanied by university professors in the development of a project based on company needs -involvement of university professors in support	**Points of weakness** - impossibility for some trainees to participate (as they would have liked) in all the training in person due to work commitments
Opportunity - being able to follow up on what was set in the PW in perspective with expert teachers intercepted during the training course -networking in workshops carried out and within the class group	**Threats** -difficulty in carving out time to dedicate to project work considering the full-time commitment in the company

The Faculty

The course faculty is made up of teachers and researchers from the Department of Chemical Sciences - DiSC , University of Padua.

The scientific coordination is by Prof. Silvia Gross, Full Professor, Department of Chemical Sciences (DiSC), University of Padua and DFG Mercator Fellow, Graduiertenkolleg , Justus Liebig Universität Giessen, Germany. She is coordinator of the interdisciplinary group of Chemistry and Sustainable Technologies for the Circular Economy, the innovative master's degree course involving twelve departments of the University of Padua. She has experience as a CNR researcher at the Institute of Condensed Matter Chemistry and Energy Technologies - ICMATE-CNR, Padua Section and CNR researcher at the Institute of Molecular Sciences and Technologies (ISTM), Padua Section. She was Associate Professor of Inorganic Chemistry at the University of Nova Gorica, Slovenia.

Prof. Marco Fantin of the Department of Chemical Sciences of the University of Padua. Prof. Fantin was born in Bassano del Grappa, Italy in 1987. He studied molecular electrocatalysis under the supervision of prof. Abdirisak Isse and prof. Armando Gennaro at the University of Padua. In 2015, he moved to Carnegie Mellon University, PA, USA, to the group of Kris Matyaszewski, to apply electrochemical tools to solve challenges in polymer chemsitry. In 2017 Prof. Fantin was visiting scholar under the supervision of Prof. Edmondo Benetti at ETH, Zurich, to study polymerization and coating on surfaces. In 2018 he visited Prof. Rinaldo Poli at CNR, Toulose, to learn more about

organometallic catalysis. From 2019 to 2021 Prof. Fantin worked in the largest coating research laboratories in the world, at PPG Coatings Innovation Center in Allison Park, PA, USA. In 2021 he joined University of Padova as assistant professor (rtdB).

1.8 Handwerkskammer Dresden[9]

Introduction

The integration of artificial intelligence (AI) into the everyday office life of companies in the skilled trades and other industries offers enormous potential for increasing efficiency and optimizing work processes. The seminar 'AI application ChatGPT - your personal assistant in the skilled trades office' aims to equip skilled workers with different job profiles across all industries with the skills they need to use ChatGPT and similar text-based AI tools effectively and deploy them in their personal working environment.

The two one-day seminars took place on 19 March 2024 and 9 April 2024 from 8 a.m. to 3 p.m. full-time, with each seminar comprising 8 teaching units of 45 minutes each.

The event is designed to be interactive and includes trainer input as well as best practice examples. The participants have the opportunity, supported by the use of suitable technology (PC or laptop with internet connection), to directly learn the AI application CHAT GPT in a playful and creative way through exercises and by choosing their own work-related examples. The seminar was held in presence.

The seminar offers a practice-orientated basic overview of how ChatGPT and other similar AI tools work. Participants will learn which requirements must be met in order to use the tools properly, how to communicate with these systems and which strategies are necessary for successful use. Various use cases will be presented that show how ChatGPT can be used as a writing assistant, tutor or creative assistant. In addition, current issues relating to data protection, copyright and ethical principles will be addressed.

In order to ensure that the seminar runs smoothly, it is necessary to check the current technical standards and other organizational details and requirements of the respective tools, such as necessary accounts for Microsoft or Google accounts, and to discuss and, if necessary, set them up with the participants in advance of the training.

Approval and organization of the training

The seminar is aimed at office staff and office specialists, clerks with a wide range of tasks, employees of commercial departments in various industries, team coordinators, specialists, experts, specialist speakers and all persons who would like to acquire advanced AI application knowledge for their work.

Participants can register independently via the training centre's course portal at https://njumii.de Participants are motivated to enroll by the desire to gain further training in their position and for the performance of their own Job. The costs of the training

[9] Prepared by Handwerkskammer Dresden

are usually borne by the company, as the possible transfer of new tasks or the more efficient performance of current tasks creates corresponding added value.

Participants receive comprehensive support at the Dresden Chamber of Crafts training centre. Customer support is the point of contact before the start of the course, e.g., about costs, time frame, general conditions and admission requirements. After registration or at the start of the course, the course administration takes over the participant support. At the beginning of the course, they will provide comprehensive information on the general conditions in the centre and the course schedule. A welcome, information on break times, house rules and instructions are provided at the start of the course. The course administration team will also answer any questions that arise at the beginning or during the course.
The Course comprised 1 working day in presence with 8 full-time teaching units. General basic PC knowledge is a prerequisite for admission. There is no special entry requirement in terms of specific vocational training.

The assigned lecturer/trainer has a degree in business informatics, is a professional practitioner and works as a managing partner of an IT consulting company in the field of digitalization/software development and online marketing. He previously worked for many years at IBM Germany as a business IT specialist. His topics, on which he has regularly held seminars and presentations at various institutions for many years, include social media, online communication, the digitalization of business processes and the Internet of Things and Services.

Participant profile and organization of the training

Participant profile 1st training, training date, 19 March 2024:

The seminar was attended by 7 participants, 1 male and 6 female. The following trades/industries were represented: 1 x organ building, 1 x interior design, 3 x commercial office/administration specialists, 1 x automotive mechatronics technician, 1 x baker/confectioner, 1 x building fitter.

Participant profile 2nd training, training date 19 March 2024:

The seminar was attended by 7 participants, 2 male and 5 female. The following trades/industries were represented: 3 x commercial office/administration specialists, 4 x bakers/confectioners.

Realization of the training

The seminar was conducted according to the following syllabus. The syllabus for the seminar on the use of ChatGPT as a personal assistant in the trade office has the following content structure:

1. Introduction to AI and ChatGPT, brief overview of AI in the back office
    - Introduction to ChatGPT: What is it and why is it relevant?
    - Relevance of AI in the trade

2. Login and Immersion in ChatGPT
    - Calling up and logging in to OpenAI
    - First steps: User interface and selecting the tool
3. Areas of application of ChatGPT in craft enterprises
    - Case studies and real use cases
    - Potential in: Customer communication, copywriting, marketing, social media, internal communication
4. Limitation, challenges and best practices
    - The art of asking questions: Precise input for optimal results
    - What to do in case of problems? An overview of common challenges
    - Tips for optimising the use of ChatGPT in the back office
5. Partial part: Working with ChatGPT
    - Live demonstration: From the idea to the finished text
    - Group work: Creating your own texts for various use cases (letters, social media posts, complaints, etc.)
    - Feedback round: sharing and discussing the content created
6. Integration and implementation in everyday life
    - How can ChatGPT be seamlessly integrated into existing processes?
    - Best practices for regular use
    - Tips for training and introduction in the team
7. Conclusion and open questions
    - Summary of the most important findings of the day
    - Open questions and discussion
    - Next steps and resources for further work with ChatGPT

The curriculum aims to enable participants to use ChatGPT efficiently and responsibly in their day-to-day work.

No examination was taken. Participants receive a personal certificate of attendance at the end of the seminar; a sample is attached to the report.

The feedback from participants via the questionnaires was predominantly very positive. The only comments made were the desire for a follow-up seminar with additional and wide-ranging application examples and the desire for thematically complementary seminars. No further potential was identified by the participants.

In retrospect, the trainer did not provide any significant tips for improving the quality of implementation. In order to be able to carry out training that is as varied as possible with a wide range of application examples, a high level of sector diversity among the participants is generally desirable. However, this cannot usually be realized in practice.

Main results and conclusions

After completing the seminar, participants will be able to integrate ChatGPT and other AI tools into their daily workflow to automate tasks and make their work more creative.

They will gain an understanding of how ChatGPT works and will have learnt how to fully exploit the potential of AI.

The strengths of the training include the selected and applied highly practice-orientated mix of methods consisting of trainer input, instruction and subsequent implementation using examples chosen by the participants themselves. The number of participants was deliberately limited to a maximum of 8 in order to guarantee the individualized nature of the support provided by the trainer.

The conscious and competent use of artificial intelligence (AI) enables the resource-saving deployment of personnel (e.g. in the writing or creative area). This can also initiate transformation processes in small and medium-sized companies and optimize personnel deployment in view of the existing shortage of skilled workers.

The seminar ‘AI Application ChatGPT - Your Personal Assistant in the Craft Office’ is a valuable training program for professionals interested in understanding and applying the latest AI technologies. With a strong focus on practical applications and a comprehensive curriculum, it provides participants with the tools they need to be successful and effective in a specific field of activity in an increasingly digitalized world of work.

The training will be continued on the basis of the successfully tested seminar program with the same partner and the named target groups. In terms of content, the fast-moving nature of the topic must be taken into account when continuing the program and appropriate adjustments to the curriculum must be made on an ongoing basis by those involved in administration.

A useful addition to the seminar on offer is the topic of AI - image generation. This is also offered by the training centre of the Dresden Chamber of Crafts.

2 Implementation Training Waste reduction and recycling management

2.1 Panevezio Prekybos Pramones Ir Amatu Rumai[10]

Introduction

The training is classified at EQF level 4 in the national system of continuing vocational training. The training is valuable as the acquired knowledge and skills are very useful in today's labour market. But the greatest benefit is that the acquired knowledge of waste reduction and recycling management will help SMEs to adapt to the changing world and to manage their businesses towards green economy. They will be able to implement new technologies, tools and methods in everyday activities of the companies.

The training was conducted according to the KAIN method in three stages. The first phase was implemented in distance learning mode at the end of October 2021. The second phase was individual work and self-study in companies, preparation of presentations on companies' problems and solutions. Individual work was guided by the consultant. The final third stage - presentations of companies' activities at a face-to-face meeting of participants in January 2022. The participants presented their experiences of online training, teacher-assisted individual work and search for problem solutions.

Admission and organisation of the training

Participation was on a voluntary basis. Invitation for companies to participate in training under the ongoing project was disseminated by emails. Interested companies were invited to participate in the training and a group of 17 participants was formed including business owners, top managers and employees of the companies. The training was attended by representatives of companies from various sectors: textile, construction, trade, food production, production of art glass, hospitality, entertainment, travel and other service sectors.

Number of participants: 17.

Number of lessons, amount of self-study learning: 30 hours (6 days 5 hours each) of online lessons, appr. 160 hours of individual learning as well as project work (includes 12 hours of coaching for every company) and 8 hours of final workshop and assessment.

Implementation of the training was organized on part-time basis.

This course is based on the KAIN-method that creates a common knowledge base for participants with different backgrounds in training and consulting processes. It takes account of the individual experience of participants, shows possibilities to change/improve the situation of the participants on site for the pursuit of project goals and change measures, sharpens the knowledge of possible needs for change, and enables those involved participants to design the right measures and implement them correctly. The KAIN-method is characterized by:

1) achieving of a common knowledge base of participants with various pre-qualifications;

2) particular emphasis on individual experience of each course participant;

[10] Prepared by Panevezys Chamber of Commerce Industry and Crafts

3) demonstration of design possibilities for changing or improving individual status of training participants in pursuing their project goals.

The following methods were used in training process:

- Lectures including lections, videos and discussions concerning the topics of videos and / or lections,

- Individual learning including reading of given articles, getting known with activities, responsibilities and rights of related organizations, assessments, etc.,

- Practical learning on the job and realization of a corresponding project in the company with consulting support by the teacher,

- Concluding presentations.

The training was conducted by lecturer and consultant, experienced in teaching and consulting services, the CV is provided to the Lead Partner.

The period of consultations and individual work continued for 12 weeks in total, the participants were supported and advised by the consultant. During individual meetings in the companies and online meetings the consultant worked with a company team assigned to the project. During the meetings, the relevant problems of a specific company were analysed and possible solutions were suggested. The consultant encouraged the team to brainstorm, look for ideas and suggestions. Afterwards, the employees made their own decisions and prepared a presentation. Individual meetings were held upon necessity. The consultant performed distance monitoring and gave certain directions if needed.

Participants profile and organisation of the training

Age of the training participants - from 33 to 50 years old:

- 5 people between 51-68 years old

- 7 people between 40-50 years old

- 5 people between 33-39 years old

Participants by gender: 3 men and 14 women

Education background – university or technical school degrees of different professions.

Country of origin – Lithuania.

Participating SMEs represented the following sectors: textile, construction, trade, food production, production of art glass, hospitality, entertainment, travel and other service sectors.

Execution of the Training

The training was carried out according to the Curriculum ,,Waste Reduction and Recycling Management" developed by Vilniaus statybininkų rengimo centras (VSRC) in 2020 within the project "Management and Technologies of Water, Waste Water, Waste and Circular Economy (WWW&CE)" and prepared by Wirtschaftsförderungsinstitut (WIFI) Steiermark in August, 2021.

The training process was composed of three phases:

Classroom teaching

The training was held online due to the pandemic situation. The participants were introduced to the following topics: Waste quantification and monitoring, Waste management systems, Waste minimization, Waste reduction and recycling technologies, Technologies in waste management, Waste segregation and sorting, Collection and transportation of waste, Recycling, Processing, Turning waste into energy, Disposal, Technology innovations and waste reduction, Digital technologies. These modules were related to EU and local strategies, tools and models as well as possible eco-innovations in SMEs, etc. It was discussed how the SMEs can contribute to the environment through their products, services and business practices. The trainer took into account the individual needs and particularities of the participants.

Self-study with external support also was provided online mostly. During this part, the participants had the task to analyze waste reduction and recycling management issues in their companies, apply the knowledge acquired in the first part and find out what tools and solutions could be implemented, what benefits and risks it could bring. The participants had to prepare a presentation of the project work for the final seminar. The coacher provided constant consultations and support to participants in achieving goals of their individual project work.

Report and reflection

Participants observed what kind of barriers and enablers they found in their companies, what tools and applications would suit best to waste reduction and recycling management of the company, how they could adapt the tools and technology for the organization, etc.

Participants made brief reports and prepared presentations which were presented during the concluding seminar on 28th of January, 2022. Overview of the reports is given below.

Implementation reports of specific development projects within the companies

Sector-specific problems have been identified within the training and individual project work.

They assessed life cycle and flow of the materials used in their companies, worked on strategy and ways to improve rates of waste collection and recycling. However, many waste-related issues to be addressed are common to companies in all sectors therefore they are often highlighted in reports and presentations of companies belonging to different sectors of activities.

Food production and catering services

One of the main environmental issue in this sector is large amounts not only of food waste but also of packaging and other waste, especially plastic. This problem was significantly increased by the pandemic situation as catering companies could only provide take-away food services that require large amounts of single-use packaging. The companies strongly believe that waste amounts can be reduced in their sector if the following measures are introduced:

- reusable environment-friendly containers and food packaging instead of disposable ones;

- reduction of food waste generated by proper planning of production process;

- correct sorting of waste and composting green waste;

Companies recently have started collecting used oil and sending it for recycling and production of fuel. They also encourage local communities and household consumers to collect and deliver used fat/oil to them. Measures are planned to reduce pollution and hand over organic waste to an agricultural company that compostes and turns it into extremely valuable black soil.

The companies aim not only to make their business greener but also to educate the society by organising various events on reduction of food waste and zero-waste cooking.

Food businesses expect to benefit from EU financial support and implement waste reduction and recycling management measures and innovations in their companies.

Construction industry

Construction companies aim to adapt their projects to Sustainable Development parameters which become a significant competitive advantage and is appreciated by potential investors.

The construction industry has expanded its focus from issues of limiting energy consumption to site planning, waste management, materials selection and design. This branch of industry is the largest global consumer of resources and raw materials and produces an enormous amount of waste.

The problem of C&D (constructions and demolition) waste is common to all companies in the construction sector. The aim is to maximize the reuse of building materials in all construction stages and to minimize the residual C&D waste sent to landfills. The company participating in the training (Panevezio statybos trestas) has acquired waste sorting technology that effectively saves human labor and allows to separate of metal, plastic, concrete and other organic and non-organic impurities. Waste sorted in this way can be recycled and returned to construction process. However, not all sorted waste is recycled yet, thus the company will have to solve this problem in the future.

Five criteria are usually employed to assess the sustainability of buildings at the construction phase, including the project management, the responsible purchase of building materials, the use of legal timber materials, the construction waste and the protection against environmental contamination.

The training revealed that the main problems in this sector are changing the construction design and materials used as well as management of C&D waste. According to the rules on construction waste management such waste must be sorted out at the construction site, kept separately and then taken to specialized landfills. However, not all companies do this despite the risk of large fines and material liability for violations. New EU regulations regarding waste management is going into force in 2021-2024 and companies will have to follow them. When introducing any new process / technology businesses always estimate the future benefits, expenses, and the material and social payback.

Textile industry

The company LINAS is engaged in production of linen fabrics. Flax is practically no longer grown in Lithuania therefore the raw flax fibre now is being imported from China. From the very beginning of the production process, the company has been facing problems due to poor quality of Chinese raw material, which is not completely pure but

comes with a variety of synthetic additives. Linen fabrics are also woven with elastic threads, which give the fabric the properties desired by the user: less wrinkling, more elasticity. As a result, such fabric is difficult to recycle later because it is not purely natural. The company uses pieces of fabric discarded in the manufacturing process for production of various small items: table napkins, kitchen towels, etc. This helps to reduce the amount of waste. Besides, a part of unprocessed waste is given for owners of animal shelters, garages and other consumers.

Glass production

Glass manufacturing companies typically accumulate large amounts of glass breakage waste. Glass itself is composed of natural resources only and is fully recyclable. The breakage of clear glass waste is returned to the manufacturing process. The use of coloured glass waste is much more limited, it can be used by glass artists or in certain glass-art educational programs. The two sorts of glass must be strictly separated and not mixed in the glass melting furnace as even small amount of coloured glass will spoil the whole clear glass batch. Uncontaminated wood waste can also be used in the production of glass.

Production of plastic packaging

Plastic itself is not a bad material. Many plastic products can be used for many years and become unusable or become new items. It is very important to identify the type of plastic the item is made of and make sure it reaches the appropriate waste container when it is no longer used. The plastic recycling process itself is not very complicated: the collected waste is sorted, shredded, washed and transported to companies for production of new products. There are some difficulties in sorting the waste properly, separating the layers of different materials and various impurities. It is also important whether the waste consists of one type of plastic or different combinations of them. It determines the quality and features of the raw material that will be obtained for re-use. The biggest challenge is to recycle mixed plastic waste.

Therefore, the company faces the problem of choosing the materials used in the production of packaging so that the entire packaging is made of the same plastic that is suitable for recycling. Moreover, the company now has to find solutions to produce the same type of plastic packaging, to apply printing and painting technologies that are environmentally friendly. These technological changes require shareholders‘ decisions.

Travel services

The tour operator has drastically reduced the amount of office waste. Most documents are no longer printed, but virtual spaces are used. Travel tickets, vouchers, certificates and other documents are easily used on computers or phones. The company prints just few documents, except for contracts with customers. Also, only reusable tools are used in the office, and customers are educated on how to behave responsibly and protect the environment.

Companies in travel sector were among the most vulnerable during the pandemic. During individual consultations with the staff team the company's strategy and goals for the future were developed: cost saving through sustainable consumption, reorganization of work for office staff, implementation of digital innovations, reduction of paper use and printing, increased use of electronic communication instead of phone calls, refusal of plastic food containers and disposable coffee cups, etc. The company

policy is to encourage customers to choose the most economical and environment friendly ways of travel.

Other service providers

The training was also attended by very small companies with up to 5 employees. They have developed measures for implementation of green economy principles which will be implemented in the coming years. They do not require large financial resources but encourage proper sorting of waste, sustainable waste management, composting green waste, collecting rainwater and using it for cleaning and plant watering. The packaging can be reused several times, its lifetime prolonged and the amount of plastic waste decreased.

The consumer is the main driver of changes; thus, it is vital to be able to better understand and clarify consumer desires. More and more consumers declare that sustainability is important for them, they are willing to change their shopping habits to reduce negative environmental impact and they seek products that align with their values. Therefore it's now important for producers to offer items based on specific qualities tailored to meet consumers' demands, classified as eco-friendly, organic, parabens-free or similar products.

Main Findings and Conclusions

After completion of the course, the learners were equipped with necessary skills, knowledge, and competences to manage and minimize waste as well as to apply the most suitable recycling technologies.

Competences obtained:

1. Use of research results to solve waste reduction and recycling problems that have not yet been encountered in an environment that is continuously changing and presents even more new challenges, ability to see the big picture and the whole problems.

2. Ability to use logic and argumentation in solving various types of waste management problems, analysis of various problem-solving methods, assessment of positive and negative aspects for the environment.

3. The competency to control several different processes in the field of waste management simultaneously.

4. The ability to make decisions based on research results. Furthermore, to be able to manage different types of waste in a suitable way in order to select the most appropriate technology.

5. Cooperation and involvement of stakeholders in planning specific actions in the fields of waste management, technology selection, enforcement of the aspects of purpose-oriented water uses and water saving and support of it with recommended technical solutions.

6. Knowing of the content of National regulatory requirements applicable to the different waste management

7. Identifying, evaluating and comparing one's own and other's behaviours, thoughts, values and emotions in the preservation of materials and resources proper hazardous waste management.

8. Acting and behaving according to a set of reasons and facts to preserve materials, resources and products, proper waste management.

No exam was taken at the end of the training; participants were not awarded a certificate or diploma.

The participants agreed that general conditions, the overall content of the training course and theory/practice ratio were suitable. They gained new valuable insights, knowledge and skills during the training. Most of the participants said they would be able to use the gained knowledge in their professional life. They indicated the following training topics as the most relevant and useful: Legal requirements applicable to waste management; Advantages and disadvantages of waste management technologies, Turning waste into energy, etc.

The participants were happy they had a possibility not only to work on their own projects but also to discuss, exchange ideas and experiences with people from other companies. They learned different ways how principles of waste reduction and recycling management can be implemented in real life of SMEs and worked to find solutions suitable for their own companies.

The training could be continued by Panevezys Chamber of Commerce Industry and Crafts in the future for employees and managers of SMEs from various industrial sectors. When needed, the training could be modified according to individual needs of the participants.

2.2 Departament D'educació - Generalitat de Catalunya[11]

Introduction

- Contextualisation within the overall project:
  The training "Waste Reduction and Recycling Management" focuses on waste mitigation, along with waste treatment and recycling methods. The general objective is that the employees and potential employees acquire useful knowledge in the areas of waste reduction and recycling. Making the participants aware of the waste problems that they are currently facing; it is not just that it can positively affect their private behaviour. The participants also have the opportunity to cause a positive change in the waste management of the SMEs.
- How was the testing of the tool carried out, where and when:
  The testing has been 100% presential. The sessions were developed in the afternoon during the months of September and November. It is also important to mention that the chosen curriculum was the short one so that it could be completed in due time. The training was taught by two trainers so that each of them could offer their personal experience in terms of waste treatment and recycling methods.
- Significance of the tool:
  Even though most of the students in the course had some knowledge about recycling in their lives, the aim of the tool is to give participants skills and knowledge required to manage the business toward waste treatment and recycling methods. In this sense, they have been doing different challenges in order to find different situations where they can act to improve tomorrow, applying waste reduction, valuation or total elimination techniques at all times, both in the SME and in their daily lives. Global sustainability should be a culture embedded throughout society.

[11] Prepared by Gema Almagro, Departament D'educació - Generalitat de Catalunya

- Special features of the implementation:
  The curriculum was adapted and translated into Catalan. It was a blended type of training: 34 hours the training was contact hours with the trainer and the other 170 hours were made from home). They have made a presentation in a seminary of their challenge. At the end, they held a seminar that culminated in a presentation of the work carried out.

Admission and organisation of the testing

- Selection of participants, possible admission requirements
  The selection of the participants has been done between our students due to some of them are workers in different companies. They have to be representatives of pines and some experience as a qualified workers/ specialists in the environment.
- How were the participants approached and won?
  One way to win over participants was to involve them in learning. On the first day the trainer asked them what their doubts were and also what their needs were. During the following sessions, all these issues were dealt with and solved. Another aspect that could be highlighted is that most of the examples and exercises were based on what they could apply at the company. One thing that really helped (which will be explained more in detail later on) was that the trainer worked in the water sector for several years and they had experience and training in environment, so they could explain different experiences applicable on a day-to-day basis in SMEs.
- Organisation of the implementation (face-to-face or online)
  The contents and exercises have been prepared on an online platform (Moodle), but face-to-face hours have been respected.

- Brief notes on counsellors and teachers, their qualifications and experience
  Cristian Mesa Garcia is a Chemical Engineer and has a master's in technology and management of the Integral Water Cycle. She has been working as a teacher in VET schools for 2 years. He has also worked in water treatment companies since 2010, performing different functions: innovation, management and planning of projects and works, exploitation of purification and sewerage, among others.
  Juana Teresa Cervera Valero is an Industrial Technical Engineer, specializing in Industrial Chemistry. He has a postgraduate degree in Food Technology. For years he has worked in different sectors such as the chemical or food sector. The environmental sector stands out as responsible for a laboratory in a WWTP, performing functions such as determination of operational and quality parameters, preparation of reports, control of ISO 9001 and 14001 documentations, among others. She currently works as a teacher at the IES Esteve Terradas i illa de Cornellà Institute.
- Brief notes on accompanying advice, support for participants, etc.

  The trainer explained the participants a lot of different experiences in order to be able to those situations than can be applied in each of the companies where they work.

Participants profile and organisation of the training

- Participants by age, gender, educational background, profession, country of origin, etc.
  5 women and 19 men took the training. They all are, as it can be seen in the chart below, some of them students and some of them, also workers.

Execution of the testing

The assessment was achieved by carrying out dynamic activities in class, carrying out group work and, finally, exposing the work to a panel (formed by expert teachers in the field). In this way, it was possible to verify the degree of assimilation of the contents worked by the participants.

The trainers adapted some of the contents on the curriculum to make them more accessible to the reality of Catalan workers in a Catalan company. They took advantage of some materials from her Postgraduate Certificate in Education (for example, the topic on the selection and hosting of apprentices according to the criteria estabIiTheyd by the Department of Education of the Government of Catalonia). They also used the "Manual de tutores de empresa en la FP Dual" by the Bertelsmann Foundation and materials by other institutions such as the Consell General de Cambres de Catalunya (Chambers of Commerce Association) and the Alianza para la FP Dual (Dual Vocation Training Alliance). They introduced the topic of multiple intelligences and changed the individual learning styles and learning principles (project learning, problem-based learning, flipped classroom, etc.) As a whole, they have found the learning process of adults very interesting.

Strengths of the tool as seen by the participants

- The participants now know how to apply the Waste Reduction and Recycling Management and sustainability not only in SMEs but in their daily life, and they have reacted very positively. They have received good environmental awareness.
- Here are the literal words of some of the participants:
  "Thank you so much for the training and help. I think It will help us to carry out actions in accordance with the sustainability in all its areas in our day to day".
  "A very interesting training. It has solved many doubts about on various recycling techniques depending on the product and environmental awareness in waste reduction".

Weaknesses of the tool as seen by the participants

- The participants mention that they will not be able to transfer knowledge as accurately as the trainers.
- They have found it difficult to transmit all the knowledge received to the rest of the company's workers.
- The hours of the course are considered very fair to be able to go deeper into the subject.

Main Findings and Conclusions

- Summary assessment of implementation
  Considering that the course has been carried out in the first week of the beginning of the school year, the work carried out by the students has been very

satisfactory. The presentation made by the different groups has been highly valued both by the rest of the students and by the trainers.

- Strengths and advantages of tool
  The training has opened their eyes and has awakened their curiosity in a several aspects of Waste Reduction and Recycling Management and sustainability.
- Hints for future use, suggestions for possible improvements or further developments
  The development of the curriculum should be more flexible so that it could adapt better to the social and working reality of each country.
- Will the counselling with the tool be continued by the partner in the future? For which target groups?

- Yes, we hope it will be continued at the same format. It has been adapted to the Catalan need and it would be a pity if it was not used again. Once it has been adapted, the curriculum could be aimed at any professional sector just by changing the examples.

2.3 Latvian Chamber of Crafts[12]

Introduction

The "Waste Reduction and Recycling Management" training program, implemented by the Latvian Chamber of Crafts within the 3LoE, serves as a pivotal development initiative aimed at fostering sustainable practices within the construction and building crafts sector. Targeted at self-employed craftsmen, as well as employers and employees in small and medium enterprises (SMEs), this training addresses an urgent need to integrate waste management and recycling principles into daily operations, helping participants develop essential competencies for reducing environmental impact while enhancing business efficiency. As awareness of environmental sustainability grows, particularly within the building and construction crafts field, there is increasing pressure on businesses to adopt greener, more responsible practices. By equipping these professionals with skills in waste reduction, recycling, and resource management, this program ensures that craftsmen in Latvia can meet regulatory requirements, adapt to emerging sustainability standards, and contribute to a circular economy.

The primary objective of this training is to upskill qualified craftsmen by providing them with advanced knowledge and principles in waste reduction and recycling, which can be seamlessly integrated into daily operations. Upon completion of the course, participants will have acquired a comprehensive set of competencies designed to support effective waste management. They will possess practical skills for minimizing waste, a critical understanding of the most suitable recycling technologies, and the expertise needed to implement sustainable practices across their workflows. This not only positions participants to improve their environmental impact but also allows them to make informed decisions that align with both regulatory and economic demands.

[12] Prepared by Latvian Chamber of Crafts

The curriculum for this training focuses on key competences essential to managing waste in today's rapidly evolving environmental landscape. It promotes complex problem-solving skills, allowing participants to address novel waste management issues through the application of research and innovative solutions. Learners advance critical thinking abilities to analyze various waste management methods, using logic and structured argumentation to assess their potential environmental impacts.

Collaboration and stakeholder engagement are also critical areas addressed in this training. Participants develop coordination skills, allowing them to work closely with others in planning effective waste management solutions. This involves not only technology selection but also the enforcement of environmentally friendly practices, such as water-saving initiatives.

By understanding legal requirements, participants ensure compliance with Latvian national regulations in waste management, an essential component of sustainable business practices.

The training is also designed to cultivate the motivation to re-use resources, encouraging a commitment to preserving materials and leftovers.

In sum, the "Waste Reduction and Recycling Management" training program offers a thorough learning experience tailored to the unique needs of the building and construction crafts sector. By developing critical competencies and fostering an environmental mindset, this program empowers self-employed craftsmen and SME employees to lead their businesses in adopting sustainable practices, ultimately supporting the Baltic Sea region's transition toward greener operations and a more sustainable future. The Latvian Chamber of Crafts, through this initiative, not only enhances the skill set of its members in the field but also makes a contribution to the establishment of an environmentally responsible crafts sector.

Admission and organisation of the training

All participants taking part in the training were Latvian Chamber of Crafts members (self-employed persons or SME employees or employers).

The dissemination of information about the chance to participate in this course was done by phone and e-mail, as well as information on the Latvian Chamber of Crafts web page.

The training was attended by 15 participants.

The lecturer was chosen based upon previous cooperation and their experience with SMEs and knowledge of sustainable measures and practices within the craft SME field.

The training was developed by by: Vilniaus statybininkų rengimo centras in 2020 in the Project "Management and Technologies of Water, Wastewater, Waste and Circular

Economy (WWW&wa)" and prepared for the 3LoE project by Wirtschaftsförderungsinstitut (WIFI) Steiermark.

Some parts of the 3LoE project training WP4 A5.4 Waste and Wastewater Management and Energy Production were also integrated within the curriculum at the expressed interest of the trainees.

The training process was composed of three parts:

- contact lessons (36 hours):

Time duration (in hours)	Topic
2	**Waste quantification and monitoring.**
4	**Waste process studies.**
2	**European Union policies, directives, national legislation and local regulations related to waste.**
2	**Financial possibilities for SMEs: European Union, national, regional and local finance.**
6	**Waste management systems.**
2	**Waste minimization.**
2	**Technologies in waste management.**
2	**Waste segregation and sorting.**
2	**Collection and transportation of waste.**
2	**Recycling.**
2	**Processing.**
4	**Wastewater and sludge treatment and utilization.**
4	**Digital technologies, technology innovations and waste reduction.**

- 176 hours of individual learning, project work (includes coaching);
- final workshop (8 hours):

Time duration (in hours)	Topic
1	**Initial exchange and reflection.**

6	**Presentation of SME projects, steps for implementation.**
1	**Wrap-up discussions, conclusions and achievements of trainees, feed-back survey.**

Participants profile and organisation of the training

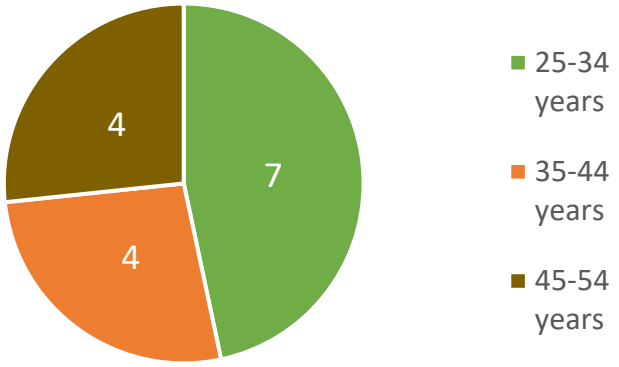
The training was held from September 11 to December 16, 2023.

The training was carried out in hybrid mode – in person and online.

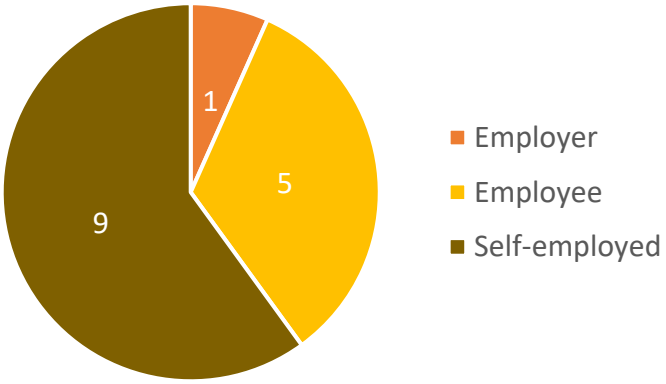
All of the participants of the Waste reduction and recycling management training were members of the Latvian Chamber of Crafts.

All 15 participants of the training were male.

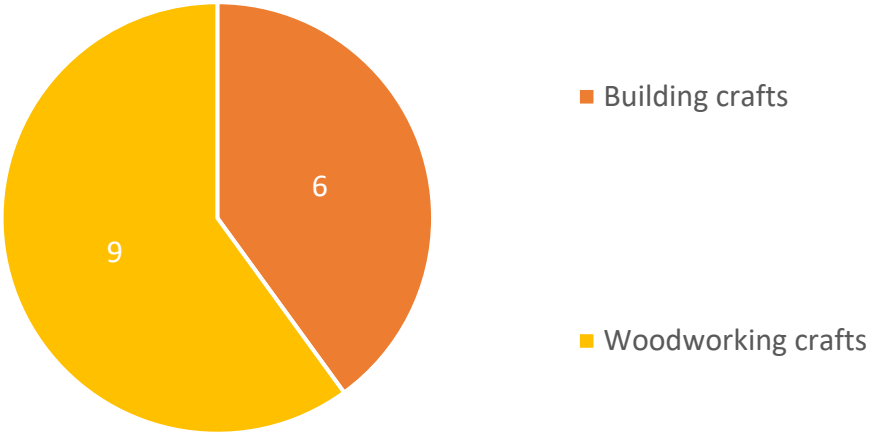
Age of participants:



Most training participants were self-employed. The other 6 participants were either employer or employees of SMEs:



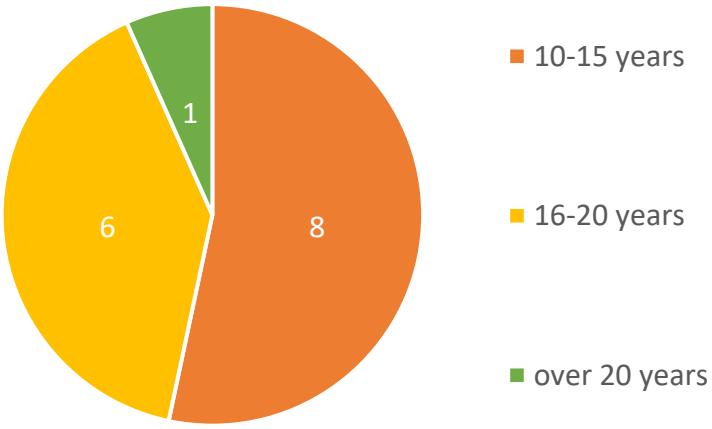
Following is the variety of crafts groups represented by the participants:



The represented crafts were:

- building crafts group – chimney sweeper, potter, heat technician, roofer, tiler,
- woodworking group – woodcarver, carpenter.

The work experience of the trainees ranged from 7 to 44 years:



Execution of the Training

Contact lessons (36 hours)

Waste Quantification and Monitoring (2 hours)

The module began with an in-depth analysis of various waste streams, where participants gained hands-on experience categorizing solid, e-waste, and hazardous waste types. They performed practical exercises in quantifying these waste types and discussed environmental impacts through case studies. Production calculation exercises allowed attendees to apply theoretical knowledge to real-world waste scenarios, assessing waste inflow and outflow and gauging their environmental impact.

Waste Process Studies (4 hours)

Participants engaged in a comprehensive study of municipal waste composition, analyzing waste composition from different sectors. This module incorporated life cycle assessment tasks where attendees examined the material flow and environmental impacts across product life cycles. Resource utilization and sustainable product design were discussed, and participants explored material flow analysis techniques to measure material inputs, outputs, and stock. The module encouraged collaboration, as small teams presented proposals for redesigning common practices within their field to reduce waste, promoting sustainability in everyday work.

European Union policies, directives, national legislation and local regulations related to waste (2 hours)

This policy-focused module provided a walkthrough of the key EU waste-related directives, such as the Circular Economy Action Plan. Case studies of national and local directives and their implementation allowed participants to see how policy translates into practice. Participants gained insight into the responsibilities of each regulatory level and learned to navigate legislative frameworks relevant to waste management.

Financial possibilities for SMEs: European Union, national, regional and local finance (2 hours)

Participants were introduced to European Union, national and local funding options available to SMEs in waste management. Case studies on successful projects demonstrated effective use of funds and the long-term benefits of such initiatives.

Waste Management Systems (6 hours)

This module covered the fundamentals of solid waste management, including collection, segregation, and disposal. Participants learned about the 3R principle (Reduce, Reuse, Recycle). Hazardous waste management and landfill requirements were separately highlighted.

Waste Minimization (2 hours)

Emphasis in this module was on strategies for reducing waste volumes at the source, exploring integrated process waste methods. Participants studied best practices in waste reuse and presented real-life case studies where industrial symbiosis had been successful. Practical exercises involved designing waste minimization plans, with scenarios including manufacturing waste, packaging reduction, and material repurposing. Case studies demonstrated how industries sharing resources and raw materials can drastically cut down initial waste volume, showcasing impactful examples of source reduction.

Technologies in Waste Management (2 hours)

Attendees were introduced to technologies that enhance recycling rates, improve safety, and decrease turnaround times. Practical part featured route planning simulations for waste management, enabling participants to test out technology-based

optimization approaches. Case studies on landfill modernization highlighted innovative practices that minimize environmental impact.

Waste Segregation and Sorting (2 hours)

Participants were introduced to both manual and automated sorting systems, learning the strengths and applications of each. Technology demonstrations and observing automated sorting techniques like optical sorting, Eddy current separation, and mechanical biological treatment (MTB) provided insights into how sorting improves efficiency.

Collection and Transportation of Waste (2 hours)

The module showcased various waste collection and transportation technologies, such as underground collection systems, GIS-based tracking, and GSM-enabled waste bin monitoring.

Recycling (2 hours)

This module presented recycling technologies, including de-inking for paper recycling and cullet remanufacturing for glass. Participants explored samples of biodegradable and degradable plastics, learning their properties, impact on nature and appropriate recycling methods. The session highlighted the environmental advantages and limitations of these recycling methods, with discussions focused on current industry challenges and solutions.

Processing (2 hours)

Participants learned processing techniques such as autoclaving, fluffing, melting, incineration, and vermicomposting. Through video demonstrations, they observed the transformation of waste into reusable materials or energy.

Wastewater and Sludge Treatment and Utilization (4 hours)

In this module, taken from the 3LoE project training WP4 A5.4 Waste and Wastewater Management and Energy Production participants were introduced to municipal and industrial wastewater and sludge treatment processes, including sedimentation, filtration, and wastewater reuse, energy recovery.

Digital Technologies, Technology Innovations, and Waste Reduction (4 hours)

Participants explored the role of digital innovations like virtual reality (VR), augmented reality (AR), artificial intelligence (AI), and machine learning in waste management. Participants previewed VR simulations that allow trainees to experience waste sorting and recycling processes virtually. Predictive analytics tools were also introduced, showing how AI and machine learning can forecast waste volumes and optimize collection. The module emphasized evaluating these technologies' advantages, helping participants understand how digital solutions can streamline waste management and enhance environmental outcomes.

Individual learning (176 hours)

In the practical portion of the module, participants applied their acquired knowledge to develop a waste reduction and recycling strategy for their own company. This project involved 176 hours of self-guided work spread over four months, with three structured coaching sessions to guide and refine their project work. During the first coaching session, participants met in workshop groups with their lecturer to establish a project topic relevant to their company's industry and specific waste challenges. Together, they outlined initial goals, ensuring the strategy would focus on both reducing waste volume at its source and exploring viable recycling options within the company's operations.

Midway through the independent study period, participants met individually with their lecturer for the second session, where they presented drafts and models of their developing strategies. The lecturer provided feedback on each strategy, suggesting improvements, discussing innovative approaches, and aligning goals with industry best practices. This session helped participants to refine their strategies based on expert advice.

After completing and submitting their written projects, a third coaching session evaluated the strategies' effectiveness, discussing practical applications, potential challenges, and long-term impact. Throughout the process, participants were encouraged to connect with peers through a group chat, online meetings or other online platforms, to share resources, contacts, and insights that could enhance each other's projects. This collaborative approach not only solidified individual learning but also fostered a network of professionals committed to sustainable waste management practices.

Final workshop (8 hours)

The one-day workshop served as a capstone to the Waste reduction and recycling management training, bringing together participants to analyse their project work, extract key benefits and opportunities for their companies, and facilitate further knowledge sharing and collaborative reflection. The day began with participants presenting summaries of their projects, highlighting successful waste reduction strategies and recycling initiatives they developed over the four months of self-study. These presentations focused on real-world applications, providing insight into the unique challenges of their SMEs or individual businesses of the self-employed participants and solutions participants encountered. This session was designed to promote open discussion, allowing peers to ask questions, exchange insights, and offer constructive feedback.

The framework of the presentations was set as follows:

1. Participants examined their organization's current waste and recycling practices, sharing initial observations and benchmarking their company's existing systems.

2. Participants identified tools, technologies, or policies already in place within their companies that could support new waste reduction efforts.
3. Participants listed additional resources or strategies required to enhance the effectiveness of waste reduction efforts.
4. Participants identified measurable indicators (such as reduction in waste volume or recycling rates) to track the success of their strategies.
5. Each participant outlined their developed step-by-step plan for rolling out waste reduction activities - setting timelines, responsibilities, and preliminary budgets.
6. Finally, participants discussed methods to assess outcomes and adapt their activities as necessary for continual improvement.

The workshop concluded with a forward-looking session, discussing the long-term viability of their waste reduction strategies. Evaluation of the day's seminar included a collective reflection on the practical application of their strategies and consideration of how they could further integrate waste reduction into their corporate culture. This collaborative environment fostered connections among participants, creating an ongoing network of support for implementing effective waste management solutions in their respective companies.

Main Findings and Conclusions

The training program on waste minimization and management, organized by the Latvian Chamber of Crafts, provided an invaluable opportunity for craftsmen to enhance their sustainability practices and operational efficiency. By focusing on key aspects such as waste quantification, recycling technologies, and the implementation of practical waste reduction strategies, the program aimed to empower participants to adopt environmentally friendly practices that align with modern industry standards while staying true to the local field standards.

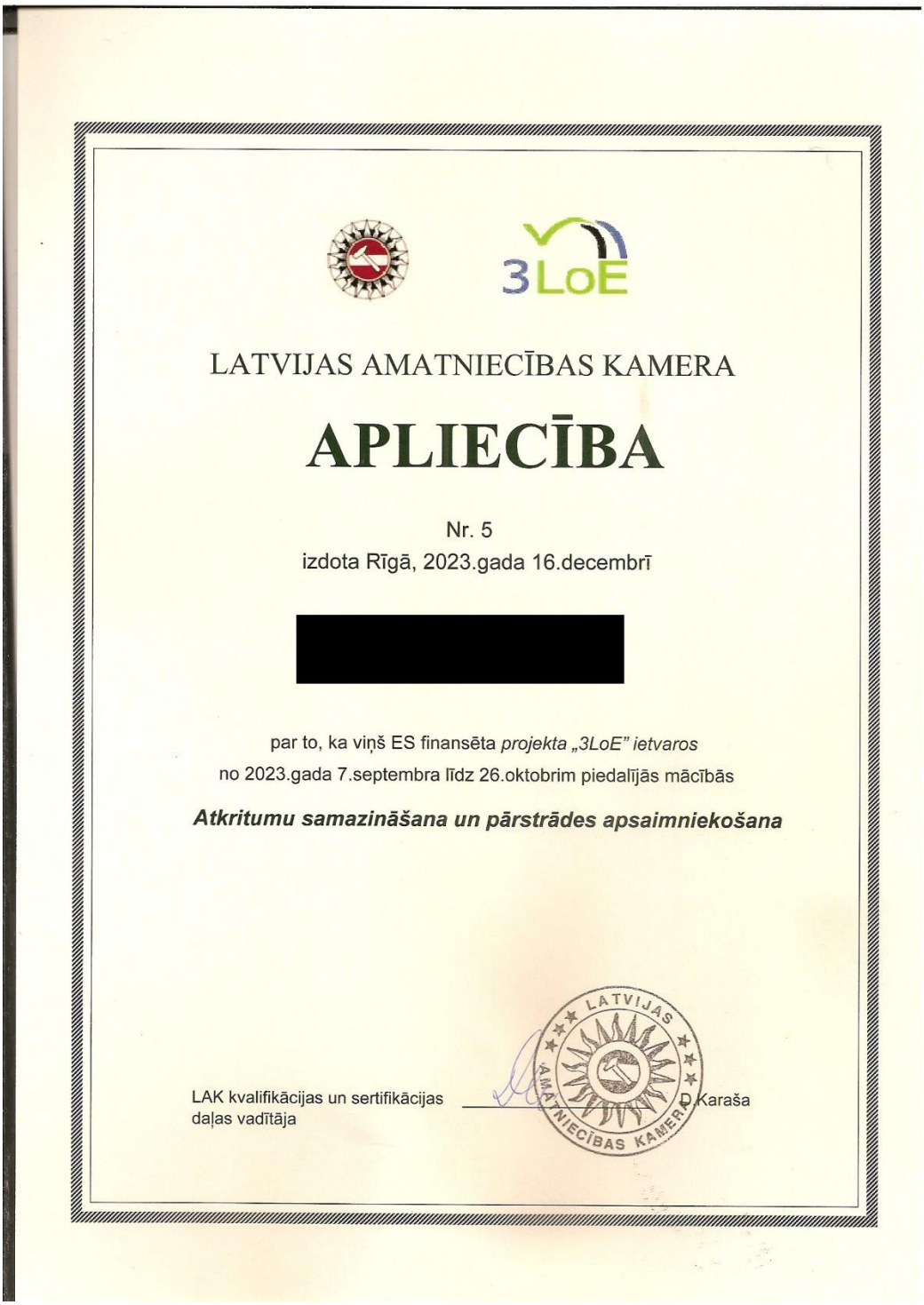
Participants noted that the comprehensive curriculum, which covered waste quantification, recycling technologies, and practical implementation strategies, equipped them with valuable knowledge applicable to their specific crafts. Craftsmen recognized that by adopting waste reduction practices, they could not only minimize their environmental impact but also enhance their economic efficiency.

Participants expressed a generally positive sentiment regarding the training, highlighting several advantages. They appreciated the practical examples ingrained in each module, which allowed them to apply theoretical knowledge to real-world situations. The structured coaching sessions during the individual study work were particularly valued, as they provided personalized guidance and facilitated meaningful discussions. Some participants noted potential challenges, such as regional limitations when implementing waste management measures, as well as need for additional resources or support to implement their strategies effectively. Despite these concerns, the overall feedback was overwhelmingly positive, with trainees emphasizing their desire to

expand on the presented topics and gain continued training opportunities to further enhance their skills in implementing various sustainable measures.

Attachment

Latvian Chamber of Crafts certificate for completing the "Waste reduction and recycling management" training program:



LATVIJAS AMATNIECĪBAS KAMERA

APLIECĪBA

Nr. 5

izdota Rīgā, 2023.gada 16.decembrī

[redacted]

par to, ka viņš ES finansēta *projekta „3LoE" ietvaros*

no 2023.gada 7.septembra līdz 26.oktobrim piedalījās mācībās

Atkritumu samazināšana un pārstrādes apsaimniekošana

LAK kvalifikācijas un sertifikācijas daļas vadītāja _____ D.Karaša

LATVIJAS AMATNIECĪBAS KAMERA

3 Implementation Training Wastewater treatment and recycling management

3.1 Panevezio Prekybos Pramones Ir Amatu Rumai[13]

Introduction

The training is classified at EQF level 4 in the national system of continuing vocational training.

The training is valuable as the acquired knowledge and skills are very useful in today's labour market. But the greatest benefit is that the acquired knowledge of wastewater treatment and recycling management will help SMEs to adapt to the changing world and to manage their businesses towards green economy. They will be able to implement new technologies, tools and methods in everyday activities of the companies.

Treating, recycling and reusing wastewater and sewage sludge have an import link to circular economy: renewable energy production and recycled nutrients save natural resources and help SMEs to achieve cost-effectiveness.

The training was conducted according to the KAIN method in three stages. The first phase was a 30-hour face-to-face training in November 2021. The second phase was individual work and self-study in companies for 180 hours, preparation of presentations on companies' problems and solutions. Individual work was guided by the advisor. The final third stage - presentations of companies' activities at the face-to-face conclusion workshop at the end of February 2022. The participants presented their experiences of classroom training, consultant-assisted individual work, search for problem solutions and establishing action plans for their companies.

Admission and organization of the training

Participation was on a voluntary basis. Invitation for companies to participate in training under the ongoing project was disseminated by emails. Interested companies were invited to participate in the training and a group of 17 participants was formed including business owners, top managers and employees of the companies. The training was attended by representatives of companies from various sectors: construction, textile, agriculture and food production, production of art glass, trade, advertising, travel and other services.

Number of participants: 17.

Number of lessons, amount of self-study learning: 30 hours (5 days) of lessons, 180 hours of individual learning as well as project work (includes 12 hours of coaching for every company) and 8 hours of final workshop and the assessment.

Implementation of the training was organized on part-time basis.

This course is based on the KAIN-method that creates a common knowledge base for participants with different backgrounds in training and consulting processes. It takes account of the individual experience of participants, shows possibilities to change/improve the situation of the participants on site for the pursuit of project goals and change measures, sharpens the knowledge of possible needs for change, and enables those involved participants to design the right measures and implement them correctly. The KAIN-method is characterized by:

[13] Prepared by: Panevezys Chamber of Commerce Industry and Crafts

1) achieving of a common knowledge base of participants with various pre-qualifications.

2) particular emphasis on individual experience of each course participant.

3) demonstration of design possibilities for changing or improving individual status of training participants in pursuing their project goals.

The following methods were used in training process:

- Lectures including lections, videos and discussions concerning the topics of videos and / or lections,

- Individual learning including reading of given articles, getting known with activities, responsibilities and rights of related organizations, assessments, e. g. designing a business plan of own business or employer,

- Practical learning on the job and realization of a corresponding project in the company with consulting support by the teacher/consultant,

- Concluding reports and presentations.

The training was conducted by lecturers/consultants, experienced in teaching and consulting services, their CV is provided to the Lead Partner. Besides, an experienced volunteer consultant from the local water treatment company took part in the teaching and consulting process.

The period of consultations and individual work continued for 12 weeks, (1-2 days per week for each company) in total, the participants were supported and advised by the consultant. During individual meetings in the companies and online meetings the consultant worked with a company team assigned to the project. During the meetings, the relevant problems of a specific company were analysed and possible solutions were suggested. The consultant encouraged the team to brainstorm, look for ideas and suggestions. Afterwards, the employees made their own decisions and prepared a presentation. Individual meetings were held upon necessity. The consultant performed distance monitoring and gave certain directions if needed.

Participants profile and organization of the training

Age of the training participants - from 33 to 50 years old:

- 6 people between 51-65 years old

- 6 people between 40-50 years old

- 5 people between 33-39 years old

Participants by gender: 3 men and 14 women

Education background – university or technical school degrees of different professions.

Country of origin – Lithuania.

Participating SMEs represented the following sectors: construction, textile, agriculture and food production, glass production, trade, entertainment, travel and other service sectors.

Execution of the Training

The training was carried out according to the Curriculum ,,Wastewater Treatment and Recycling Management“.

The training process was composed of three phases:

1. Classroom teaching

The training was held on face-to-face basis for 5 days. During this workshop the participants got to know models and instruments from project-related research for structuring and solving problems and learn to apply them. The goal was to create a common conceptual basis for the further procedure in the training.

The models and instruments presented as examples and design recommendations for practical use, the existing experiences of the participants were integrated in order to pursue the training objectives.

The topics included: wastewater treatment methods for municipal and industrial wastewater, different network for run-off water and nature based solutions, wastewater treatment plants outside the municipal network, sludge treatment and utilization, wastewater reuse, energy recovery and energy efficiency, operating wastewater treatment plants and pipelines, monitoring parameters, maintenance and renovation works, inspection methods for sewer pipes, financial possibilities for SMEs: European Union, national, regional and local finance, etc. The lessons also included group work and discussions on wastewater treatment and recycling management and the analysis of the best practices.

The training focused on EU and national legislation, local regulations, goals of sustainable development and the Circular Economy in the wastewater sector. Efficient collection and treatment of urban wastewater is essential to ensure the good status of EU water bodies. The wastewater sector can contribute to the circular economy through the re-use of treated wastewater and sewage sludge, renewable energy production and food processing.

The lecturers took into account the individual needs and particularities of the participants.

2. Self-study with external support was provided online mostly.

The participants had the task to analyze wastewater treatment and recycling management issues in their companies: the existing systems, possible new processes, tools and applications as well as benefits and risks they may include. By applying the knowledge acquired in the first part of the training and self-study the participants had to establish an action plan through which their company can manage wastewater treatment and recycling operations, to prepare a brief report and a presentation for the final workshop.

The advisor provided constant consultations and support to participants in achieving goals of their individual project work.

3. Report and reflection

Participants observed what kind of barriers and enablers they found in their companies, what tools and applications would benefit wastewater treatment and recycling management of the company best, how would they transfer the tools and technology into the organization, etc. They made brief reports and prepared presentations which were presented during the concluding workshop on 25 February 2022. Overview of the reports is given below.

Implementation reports of specific development projects within the companies

All participating companies use services of specialized Panevėžys regional water supply and wastewater treatment company. Manufacturing companies perform preliminary and primary wastewater treatment and only then discharge the already treated wastewater into the sewerage networks.

The participants of the training got acquainted with the equipment and cleaning process of Panevėžys wastewater treatment plant and could compare with other similar plants. Videos and teaching materials as well as best practices were analyzed within the training time.

Panevėžys water supply and wastewater treatment company need to focus more on development and innovations based on digital solutions:

-collection and utilization of relevant data from pumps, measuring wells, sensors etc.;

-ensuring water quality when monitoring overflow;

-use of existing as well as new data for the planning and management of installation;

-use of data in connection with the design of new wastewater solutions;

-collection and coordination of inquiries from citizens.

Wastewater treatment depends on where it comes from and quality of water. There are five basic processes: aeration, MIEX (special innovative pre-treatment process which stands for Magnetic Ion Exchange), clarification, filtration and disinfection in wastewater treatment operation.

Biological, mechanical and chemical treatment facilities operate in the plant. Mechanical and biological wastewater treatment plant also remove nitrogen and phosphorus contaminants. The simplest is mechanical wastewater treatment - insoluble pollutants are removed: large ones are separated by sieves, grids, small light ones are floated to the surface and skimmed, small heavy ones are precipitated. Chemical and biological wastewater treatment is based on the instability of most pollutants - they decompose rapidly during chemical and biological processes. Biological wastewater treatment enables the survival of microorganisms capable of converting unstable organic compounds into stable ones - carbon dioxide, nitrates, nitrites, phosphates (biological wastewater treatment), chemical treatment - dissolved pollutants are converted into insoluble compounds, and the precipitation of insoluble compounds is improved. Sewage treatment plants usually combine all 3 methods.

As industrial companies use water in their processes, this also results in effluents, which are usually polluted with phthalates, heavy metals and other difficult-to-clean pollutants. It is often practically and theoretically impossible to identify a pollutant. Therefore, training and educational activities are the most relevant things we need to do.

Sector-specific problems have been identified, but most of the issues to be addressed are the same to all companies. The second part of the training and the reports prepared by the companies (by sectors of activities) revealed the following problems and possible solutions.

Agriculture, food production and catering services

Companies in food and agricultural sectors use a lot of water not only in the production process but also for watering plants. In-company contaminated water treatment systems are in place and organic pollutants are removed at the city's wastewater treatment plant, where biological, mechanical and chemical treatment facilities are installed.

The companies have installed rainwater collection pipelines, the rainwater is used for irrigation of the plants growing on the company's territory. In 2022 the companies plan to expand water collection systems and use rainwater in the production process for washing seeds and vegetables. If sufficient EU financial support were available, food and agricultural businesses could adapt more innovative solutions from international experience.

A specific problem is the use of large amounts of water for cooking process. Measures to reduce amounts of water used and pre-treatment of contaminated water, in particular from intoxicants and other organic pollutants, were examined during individual sessions. Purification of wastewater is one of the most important areas of the circular economy. By 2030, food companies are planning to introduce innovative measures for greater treatment of contaminated water.

Construction industry

One of the major challenges in greening the construction sector is that as an industry, it is fragmented and disjointed. A single construction project can involve hundreds of different organizations in a supply chain. Besides, construction industry is the single largest global consumer of resources, raw materials and water.

Companies in the construction sector use water in both production and post-construction treatment processes. Therefore, the problem of water and sewage is very relevant. Companies carry out construction and installation work on various construction sites in very diverse locations, thus it is difficult to install water treatment equipment on each site. Nevertheless, the companies have invested in wastewater treatment and other ecological measures at their local production base, where they manufacture panel houses. But it is not enough, there is still a need to find the best way for cleaning water contaminated with varnishes, paints, solvents and other substances.

Advanced measures for treatment of water contaminated with toxic and / or persistent substances have to be introduced in construction industry. One of such methods can be the advanced oxidation water treatment method, based on synergistic interaction of the ultraviolet - ozone - catalyst and able to decontaminate all organic water pollutants. This environmentally friendly cleaning process with three active factors does not require additional chemicals and has low energy consumption due to the synergistic effect. Due to a more efficient contaminated water treatment process and lower energy consumption, the technology is superior to current ozonation or ultraviolet water treatment methods. The unit is tested for the treatment of water contaminated with various organic pollutants, as well as real industrial wastewater. Water can be treated to virtually zero pollution, completely eliminating the toxicity of contaminated water.

The training revealed that in this sector it is very important to reduce water consumption and to expand the scale of wastewater treatment.

Textile industry

The training showed several important problems and solutions for the textile industry. Negative impact of fast fashion on the environment is huge. Overconsumption has driven water consumption within the textile industry to become highly unsustainable,

as 200 tons of water are used to produce 1 ton of textile. Textile industry relies mainly on non-renewable resources. A large source of water pollution is fertilizers used for growing cotton or other fibers. Linas company also uses a lot of cotton fibers and mixes them with linen fibers in the production process. In general, most of the world's water consumption is related not only to cotton growing but also for other processes in textile production: cleaning the raw material, washing, bleaching, dyeing, printing and finishing. These finishing processes take place in every textile company, including Linas. Fast fashion industry requires bright colors but the process of dyeing uses a lot of water and chemicals. Textile dyeing is the second largest polluter of the world's waters, and this causes huge damage to the entire ecosystem. Unlike in some third countries, hazardous waste flows cannot enter natural water bodies without prior treatment before disposal in Lithuania. Company Linas has primary wastewater treatment technology, but it treats wastewater only partially and this is a problem. They need to install new more efficient wastewater treatment equipment by 2024 that will allow wastewater to be treated well enough on site.

Water treatment with different kind of pollutants is large-scale, because of many cleaning and removing steps involved: screening and straining, oil removal, homogenization, neutralization, physical-chemical treatment, biological purification.

Another issue is to increase the rate of reused water in the production process.

Production of glass

The company producing decorative glass has no difficulties with the use of water and sewage. They use little water in their production processes. Water is used only in the cooling processes of products and only in limited quantities, it does not become polluted and therefore there is no need for wastewater treatment on site.

Advertising companies

Advertising companies mainly use water for office purposes; therefore wastewater treatment is not a very sensitive issue. Companies strive to use water effectively. All water supply and sewerage facilities and environmentally friendly cleaning products work perfectly here.

Only during galvanizing process varnishes and solvents are mixed with water, they are neutralized with special substances to minimize environmental pollution. Before running into the city wastewater treatment system wastewater is primarily treated in the company.

Other service providers

The training was also attended by very small companies. They have developed measures for the implementation of the circular economy, which will be implemented in the coming years. These are measures that do not require large financial resources but encourage sustainable wastewater management, collecting rainwater and using it for flower watering.

Main Findings and Conclusions

Lithuania demonstrates very high compliance with the Drinking Water Directive

and the Urban Wastewater Treatment Directive. However, industrial wastewaters are very complex to be treated, especially in cases where the wastewater contains various physical and chemical compounds. Numerous legislative norms, national and local

regulations and guidelines make wastewater treatment and recycling management a complex challenge.

Companies have to develop their capabilities and processes to meet the constantly tightening environmental requirements as well as the other applicable goals of sustainability. This training will help the companies to adopt innovative solutions in this area.

Observations and feedback from the training lecturer as well as strengths and weaknesses of the training as seen by the participants were indicated in the evaluation questionnaires.

The participants agreed that general conditions, the overall content of the training course and theory/practice ratio were suitable. They gained new valuable insights, knowledge and skills during the training. Most of the participants said they would be able to use the gained knowledge in their professional life. They indicated the training topics on wastewater reuse, energy recovery and financial possibilities for SMEs were the most relevant and useful.

They learned ways how various measures of wastewater treatment and recycling can be implemented in real life of SMEs and worked to find solutions suitable for their own companies.

The participants were happy they had a possibility not only to work on their own projects but also to discuss, exchange ideas and experiences with people from other companies. The exchange between SMEs provided them with very valuable impulses on how to make their own projects even more successful.

The training could be continued by Panevezys Chamber of Commerce Industry and Crafts in the future for employees and managers of SMEs from various industrial sectors. When needed, the training could be modified according to individual needs of the participants.

3.2 Institut Pere Martell[14]

Introduction

The main objective of the course is to give participants the skills and knowledge necessary to manage wastewater and the management of treatment and recycling within the company.

- Knowledge of the operational environment of wastewater treatment and recycling management, promoting sustainability and responsibility.
- A common understanding of European and national legislation and regional regulations related to the treatment and management of wastewater recycling in SMEs.
- Ability to develop management processes for the treatment and recycling of wastewater, to carry out reforms, and to develop information systems that meet the requirements and strategies of the company.
- Skills to design appropriate wastewater treatment and recycling options in sparsely populated areas.

[14] Prepared by Prepared by: Aitor Lallana & David Millet, Institut Pere Martell

- Ability to develop work in a wastewater and recycling community within SMEs and with stakeholder groups.
- Ability to assist participants in innovating solutions as they and their companies find better ways to respond to challenges.

Content:

- Review of wastewater treatment and recycling management.
- Water policies of the European Union, guidelines, national legislation, and local regulations.
- Methods for municipal and industrial wastewater. Different network for storm water and nature-based solutions. Wastewater treatment plants outside the municipal network.
- Sludge treatment and its utilization.
- Reuse of wastewater, energy recovery, and energy efficiency.
- Operation of wastewater treatment plants and pipelines. Monitoring parameters. Maintenance and renovation work. Inspection methods for sewer pipes.
- Financial opportunities for SMEs: European Union, national, regional, and local funding.
- Capacity building: strategy, action plan, staff skills, and knowledge development.
- Introduction to self-study and project work.

The training was 100% face-to-face. The contents of the curriculum have been adapted to the current curriculum of a Higher Degree in water management. The sessions took place at the Pere Martell institute facilities, in the afternoon during the months of October to February. The training was delivered by three trainers so that each of them could offer their knowledge on the topic to be discussed. In addition to the theoretical content, a practical case was also proposed by the AGBAR company in the form of a challenge to be solved by the students and to make a presentation upon completion.

Although most of the students in the course had heard of wastewater treatment and recycling management, they had no knowledge of it. The goal is to provide students with wastewater treatment knowledge and applications that would enable them to implement energy saving improvements in both their personal and business activities.

The curriculum was adapted and translated into Catalan. It was a 100% face-to-face training. seven sessions of 5 hours each were held. The first four sessions were theoretical, providing all the knowledge about wastewater treatment, and the last three sessions consisted of presenting a challenge by the AGBAR company that the students had to solve in groups and then make the corresponding presentation.

Admission and organisation of the testing

Selection of participants, possible admission requirements

- Small and medium-sized enterprises and their entrepreneurs. It is recommended that participants have at least basic vocational training.
- Students in higher vocational training courses who are interested in the option of wastewater treatment and recycling within company actions.
- The training will also be adapted for students who are interested in wastewater treatment and recycling management.
- Others interested in wastewater treatment and recycling management options, for example, those who are planning their own business, can participate in the training.

One way to win over participants was to involve them in learning. On the first day the trainer asked them what their doubts were and also what their needs were. During the following sessions, all these issues were dealt with and solved. Another aspect that could be highlighted is that most of the examples and exercises were based on what they could apply at the company.

The contents and exercises have been developed in an online platform (Moodle[1]), but it was done 100% face-to-face.

The following trainers were active.

From Institut Pere Martell:

Jaume Santos is an engineer with more than 10 years of experience in the design of machines sector. He has been working as a vocational teacher in the specialty renewable energies since 2012. Currently, he has been working in the water treatment family since 2019, where he has taught uninterruptedly at the Energy CFGS Renewable, of which he is a pedagogical tutor and FCT-Dual tutor.

Elena Gavaldà, Degree - Chemical Engineering. Experience in monitoring and implement several projects for subsequent launch in the automotive sector. Since 2022 Teacher of Science and Technology.

Josep Toral Juanpere, Industrial Technical Engineer electrical specialty. More than 12 years of experience as a vocational teacher and 10 years at the Energy CFGS Renewable, of which he is a pedagogical tutor and FCT-Dual tutor.

From AGBAR:

Miguel Ángel Pérez Pascual, He is a Civil Engineer specialized in Roads, Canals, and Ports from the University of Madrid. He has spent over 27 years in various positions at AGBAR Group. Currently, he is the Operations Manager at Aguas de Alicante, Valencia.

Álvaro Mayor Tirado, master's degree in chemical engineering by Universitat Politècnica de Catalunya and Doctor of Philosophy - PhD, Chemical Engineering Processes. Researcher and project manager in Cetaqua since 2018 and actually responsible of content generation at School of water in AGBAR.

The trainer explained the participants a lot of different experiences in order to be able to those situations than can be applied in each of the companies where they work.

Execution of the testing

1 woman and 23 men took the training. They all are, as it can be seen in the chart below, some of them students and some of them, also workers.

The assessment has been achieved by conducting dynamic activities in class, carrying out small group exercises, and finally, by solving a challenge proposed by the AGBAR company and presenting the results obtained.

The company AGBAR actively participated in this challenge by explaining the project to be carried out to all the students and also by evaluating them during the presentation phase of the participants' conclusions.

Main Findings and Conclusions

The training received by the participating students has been highly valued. The challenge proposed has been very motivating and has encouraged the students to work cooperatively to reach a solution.

The training has opened their eyes and has awakened their curiosity in a several aspects of wastewater treatment.

The development of the curriculum should be more flexible so that it could adapt better to the social and working reality of each country.

We hope that this training can be integrated as much as possible into the contents of the corresponding degree program, thus enabling all students to be trained in the topics covered.

4 Implementation Training Water supply and water saving

4.1 Izba Rzemieslnicza Malej i Sredniej Przedsiebiorczosci[15]

Legal basis

- Act of April 27, 2001, Environmental Protection Law (Journal of Laws 2021, item 1973, as amended)
- Act of July 17, 2009, on the system for managing emissions of greenhouse gases and other substances (Journal of Laws of 2020, item 1077, as amended),
- Act of June 15, 2018, amending the Geological and Mining Law and certain other acts (Journal of Laws of 2018, item 1563),
- Act of May 15, 2015 on substances that deplete the ozone layer and on certain fluorinated greenhouse gases (Journal of Laws of 2020, item 2065),
- Act of October 3, 2008, on the provision of information on the environment and its protection, public participation in environmental protection and on environmental impact assessments (Journal of Laws of 2021, item 2373, as amended)
- Act of July 20, 2017, Water Law (Journal of Laws of 2017, item 1566)

Date and place of training

13.10.2024 – 31.10.2024

Vocational school in Maszewo

Prerequisites for participants

The course was addressed to students of the Branch School of the First Degree in Maszewo studying the professions of electrician and fitter of buildings and finishing works in construction, as well as adults, entrepreneurs and instructors of practical vocational training, who wanted to acquire knowledge and skills and improve professional qualifications in the field of water saving, thanks to new methods and technologies used in plumbing.

Learning objectives

The goal was to supplement the knowledge of the course participants on topics related to the conservation of environmental resources such as water, using modern methods and technologies in the construction and plumbing industry by:

- participation in theoretical and practical classes conducted by specialists.
- acquiring knowledge about the socially important topic of sustainable development in the construction sector and the plumbing industry in particular.
- gaining information on recent legal changes in the field of environmental protection.
- to expand knowledge of the interpretation of environmental regulations.
- acquiring the ability to practically apply the law in water protection documentation.

[15] Prepared by Izba Rzemieslnicza Malej i Sredniej Przedsiebiorczosci, Poland

- improving competence in the field of water protection.
- learning about trends in the area of water protection.
- learning about electrical methods and equipment used in water protection.

Course Framework

The course included 50 hours, 20 hours of theory and 30 hours of practice

1. health and safety in plumbing work

2. installation of indoor electrical components -.

3. use of PEX pipes

4. making connections of PEX pipes, welding

5. making connections of copper pipes

6 Ways to save water

7. making connections of PVC pipes

8. sewer pipe connection technologies

9. tools used in plumbing work

Target group

The course was attended by 10 people

All participants received Certificates of completion of the course issued by the organizer.

Supporting documents: teaching logbook, attendance lists, copies of certificates of course completion.

Description of learning outcomes

(1) Upon completion of the course, the participant acquired knowledge and skills on:

- Health and safety at plumbing work

- Installation of components of indoor electrical installations -.

- Application of PEX pipes

- Making connections of PEX pipes, welding

- Making connections of copper pipes

- How to save water

- Making connections of PVC pipes

- Technology of sewage pipe connections

- Tools used in plumbing work

(2) The course participants gained knowledge of the socially important issue of sustainability in the plumbing industry.

Method and form of completion

To complete the course required: attendance at theoretical and practical classes, 10 participants successfully completed the course.

4.2 Sociedad General De Aguas De Barcelona S.A.[16]

Introduction

The "Water Resource Management During Drought Periods" training program is an integral component of our broader initiative aimed at enhancing sustainable water management practices. This program equips participants with critical knowledge and skills to efficiently manage water resources, comply with regulatory frameworks, and implement innovative solutions for resilience. By focusing on practical applications and real-world success stories, the training aligns with our overarching goal of promoting environmental sustainability and effective resource utilization across diverse sectors.

It is delivered through a blended learning approach, combining online self-directed modules with an in-person session. The online component comprises three modules, allowing participants to learn at their own pace and convenience. The in-person session, designed to deepen understanding through expert-led discussions and practical applications, takes place in Barcelona. The program runs from May 20th to June 16th, with a total duration of 100 hours (4 ECTS).

By completing the seminar, the participant will obtain the following skills:

- Awareness of the importance of water supply and conservation.
- Knowledge of water supply and conservation technologies.
- Understanding of the national and international regulatory framework in the field of water supply and conservation.
- Awareness of the importance of working with a sustainable water management model.
- Skills in designing and planning sustainable water management measures tailored to different sectors.
- Ability to classify concepts related to network efficiency and non-revenue water.
- Ability to describe tools for calculating network efficiency control ratios.
- Ability to list the processes and mechanisms involved in wastewater regeneration.
- Ability to select the most appropriate regeneration technology for each case.

The training program "Water Resource Management During Drought Periods" is designed for a diverse group of participants, including:

[16] Prepared by Sociedad General De Aguas De Barcelona S.A., Spain

- Executives and technicians from small and medium-sized enterprises (SMEs) in any field.
- Professionals in the water management sector.
- Consultants who provide expertise in water resource management.
- Students interested in acquiring or expanding their knowledge in the field of water supply and conservation.

This training program employs a blended learning approach to facilitate competence acquisition. The methodology includes:

Self-Directed Learning: Participants engage in three online modules, allowing them to acquire knowledge and develop skills at their own pace. This flexible approach enables learners to manage their time effectively and integrate learning into their schedules.

Specialized Manuals and Evaluation Activities: Comprehensive manuals provide in-depth coverage of key topics, complemented by evaluation activities designed to measure learning outcomes. These activities help participants apply theoretical concepts to practical scenarios.

In-Person Session: An expert-led in-person session in Barcelona provides an opportunity to delve deeper into critical topics. This session includes discussions on innovative solutions and success stories, facilitating hands-on learning and real-world application.

Strategic Challenges: The course features a challenge-based evaluation system, where participants develop strategic solutions to real-world water management issues. This practical approach ensures that participants can apply their learning effectively.

Admission and organization of the trainings

School of Water. created by Agbar in 2012, is the benchmark in training, awareness, talent development and knowledge in the field of water and the environment.Our activity is aimed at training for companies, administrations and professionals in the water sector, as well as for the general public. Thus, we develop training programs, promote dual vocational training in the water sector, develop environmental education programs and design exhibition, museum and hydraulic heritage projects.The training programs, whether those in our catalog or those custom-designed for companies, cover all areas of the complete water cycle; they use methodologies that facilitate a unique learning experience and immediate applicability in all key positions of an organization. Our approach combines the academic and technical rigor provided by 165 years of experience in integrated water cycle management and collaboration with the best universities, technical schools and business schools.

Official College of Industrial Engineers from Catalonia (COEIC). It is the professional organization of the Industrial Engineers of Catalonia, committed to the professional development of engineers. It represents engineers in the industrial field,

defending the profession and its interests, and regulating its practice. COEIC promotes the progress of engineering and deploys activities of a technical, scientific and cultural nature.

In company participants were contacted through HHRR, external participants requested their participation via web "*Escuela del Agua*" .

The following trainers were active.
Lola Bravo:
Civil Engineer, Canals and Ports from the Polytechnic University of Catalonia and Master in Water Management from the Polytechnic University of Catalonia.
She has more than 15 years of experience in the Agbar Group in the Business Model Innovation Department, as a technician in the operations support department and as head of operations in LATAM. She is currently Director of Strategic Municipal Water Projects at Veolia Barcelona.
Ramón Ariño:
Industrial chemical engineer, currently responsible for the exploitation support department at Aigües de Barcelona.
Carlos Echevarría:
Water Treatment Engineer and Project Manager with over 7 years of experience at Cetaqua - Water Technology Centre. Currently serving as the Head of Water & Resource Recovery Technical Area, Carlos has led projects in water resources management, water production, and wastewater reclamation and reuse. He holds a PhD in Chemical Process Engineering, specializing in water reclamation and reuse, and is dedicated to innovative and sustainable water management solutions.

Participants and organization of the training

7 women and 13 men took the training. They all are working in a technical department or technical company and all are from Spain.

The in-person session took place on May 23rd from 9:00 AM to 2:00 PM at the College of Industrial Engineers of Catalonia (Via Laietana, 39, Ciutat Vella, 08003 Barcelona).

Section	Schedule	Speaker
Welcome	9:00-9:15	David Oller
Introduction to Drought Management	9:15-10:15	Lola Bravo
Reduction of Non-Revenue Water (NRW)	10:15-11:15	Ramón Ariño
Coffee Break	11:15-11:30	-
Reuse	11:30-12:30	Carlos Echevarría

Solutions for Water Resilience	12:30-13:30	Jose Luís Armenter and Marc Pons
Questions and Closing	13:30-14:00	-

The seminar was very interesting for the debate and moments of reflection that were generated in the classroom. It should be noted that the teachers were very experts in the subject and that the participants were very interested and specialized people. Very good academic level and a very participatory audience.

Main Findings and Conclusions

The majority of participants were satisfied or very satisfied with the training
They valorized in a positive way the expert knowledge of the teachers.
The atmosphere created by the teacher facilitated participation.

When we asked in an open form about the aspects to improve, the contributions has been:

- Make a round of Q&A after the presentations
- Provide slides prior to the class

When we asked in an open form about positive aspects, the contributions has been:

- The professionalism, experience and enthusiasm of the speakers
- The quality of the presentations and the breakfas
- The level of expertise of speakers

5 Implementation Training Cradle-to-Cradle in SME

5.1 T2I - Trasferimento Tecnologico e Innovazione Scarl[17]

From Cradle to Cradle

The course explored the concept of circular economy and sustainable models, with a particular focus on "Cradle to Cradle" (C2C) approach.
This innovative and sustainable method is aimed at redefining production processes.
The course, co-organized by UniSMART - Foundation of the University of Padova and t2i, was part of the European project Erasmus+ "Three-level Centers of Professional Excellence: Qualification, Entrepreneurship and Innovation in the Green Economy" (3LoE).
It offered a free and professional training path.
The "Cradle to Cradle" model considers every aspect of the production process, from design to realization, and emphasizes creating efficient processes with minimal waste.
Participants had the opportunity to explore the C2C approach and apply it to their own production contexts or projects through project work, supported and guided by researchers from the University of Padova. Upon successful completion, an attendance certificate was issued to participants who attended at least 70% of the scheduled hours.
The initiative involved the Circular Economy - Waste, Materials, and Sustainability Study Center (CEWMS), Quality Environment Study Center (CESQA), as well as professors and researchers from the Departments of Civil, Architectural and Environmental Engineering (ICEA), Industrial Engineering (DII), and Economics and Business Studies "Marco Fanno" (DSEA).

Circular Economy of Packaging: Reuse vs. Recycling

The theme of "Circular Economy of Packaging: Reuse vs. Recycling" was addressed during the initial workshop on Thursday, March 9, 2023, where the new European regulation on packaging was at the center of attention. The workshop aimed to compare best practices between users and recyclers to identify new strategies for addressing sector challenges synergistically among Companies, Universities, and the Territory.
In the first part of the workshop, the floor was given to the actors directly involved in the glass, paper, and plastic supply chains. Initially, there was a general overview of the current state of the regulations, followed by a roundtable discussion involving major representatives from industry associations. During this discussion, they deliberated on the constraints and opportunities related to their respective supply chains.
After the institutional greetings from Antonella Candiotto, President, and CEO of Galdi S.r.l., the following interventions took place:

- Attorney Federico Peres, adjunct professor of Environmental Law at the University of Padua, presented the current regulations regarding the management of packaging and packaging waste, along with the main changes proposed by the European Commission on November 30, 2022."
- Dr. Luca Passadore from Confindustria Veneto Est analyzed the potential impacts of the new regulation on the industrial system in the Veneto region.

[17] Prepared by UNISMART – University of Padua

- Prof. Maria Cristina Lavagnolo mediated a roundtable discussion involving Carlo Andriolo, CEO of Aliplast, Chiara Rossetto, CEO of Molino Rossetto, Lorenzo Poli, President of Assocarta, and Giovanni Scotti, President of Coreve. The discussion focused on the limits and opportunities arising from the adoption of the new European regulation, particularly concerning recycling and reusing materials for packaging, as well as exploring opportunities for collaboration between the University and Industry.

At the conclusion of the first part of the event, Prof. Eleonora Di Maria from the Department of Economic Sciences and Management (DSEA) at the University of Padua presented the "Open Call" of the European project BIOMAC. This project aims to develop business models in the field of bioeconomy and nanomaterials.

The second part of the event took place, during which participants engaged in discussions on specific themes at roundtable discussions chaired by various professors:
1. Roundtable on "Materials and Packaging: Management and Technological Aspects," chaired by Professors Michele Modesti and Maria Cristina Lavagnolo.
2. Roundtable on "Emission Management from Plants with a Focus on Sustainability and Circular Economy," chaired by Professor Alberto Pivato.
3. Roundtable on "Packaging: Innovation and Product Communication," chaired by Professors Enrico Rubaltelli and Eleonora Di Maria.
4. Roundtable on "Supporting Tools for Making New Choices in Circular and Sustainable Verification," chaired by Professor Alessandro Manzardo.
5. Roundtable on "Education and Deposit System for Waste Minimization," chaired by Professors Mauro Carraro and Silvia Gross.

Building Energy Communities

The global goal of ecological transition, recognized in the ONU 2030 Agenda, requires an acceleration in the shift from fossil fuel-based economies to clean, renewable, and distributed energy production. This transition is not merely technological; it also demands a reorganization of energy markets to ensure security, stability, and economic efficiency.
In this context, energy communities are emerging as key players in the transformation of energy production and consumption, aligning with Article 41, paragraph 3 of the Constitution, which emphasizes environmental and social benefits.
However, challenges remain due to the incomplete adoption of Dlgs. 199 and 210 of 2021 and uncertainties surrounding the regulatory framework for the sector.
To address these issues, the course engaged political and technical actors and presented interesting case studies relevant to the territory. It aimed to provide a comprehensive understanding of transforming consumers into producers, evaluating technical aspects and assessing non-profit community logics' social, economic, and environmental benefits, particularly in mitigating energy poverty and vulnerability.
The course facilitated ongoing discussions between science, technology, institutions, and businesses to promote growth and awareness of available tools and their application.
The event comprised three discussion tables:
Panel on “State of the art and future visions of energy communities”:
1. Involving the Economic Development and Energy Department of the Veneto Region,

2. the Province of Padova,
3. Municipality of Padova.

Panel on "The Challenge of Energy Communities: Regulations, Technology, and Innovation"
• Alberto Benato, DII University of Padua
• Chiara D'Alpaos, DICEA University of Padua
• Arturo Lorenzoni, DII University of Padua
• Bernardo Cortese, DiPIC University of Padua
• Fabio Bignucolo, DII University of Padua

Panel on "Energy Communities Facing the Challenge of Implementation"
• Alessandro Bove, DICEA University of Padua
• Germano Zanini, CEO of ForGreen Group
• Andrea Taffurelli, CTO & Co-Founder of Energy SpA
• Diego Ravaglia, Head of Product Presales, HeraComm
• Giovanni Scarazzati, President of ELO Energy

Project Work

Participants received support from University researchers and academic experts in developing their individual project work.
In detail:
• Eleonora Dal Lago, Department of Industrial Engineering
• Valentina Poli, Department of Civil, Environmental, and Architectural Engineering
• Karolina Crespi Gomes, Department of Economic Sciences

After participating (in person/online) in the workshops on "Circular Economy of Packaging: Reuse vs. Recycling" and "Building Energy Communities," the participants identified specific themes with the assistance of the researchers. These themes were further developed within the scope of their project work.
Through Zoom meetings, all the researchers provided support and guidance to the participants at the beginning, middle, and end of the project work development. They assisted the participants in defining their work, offering insights in both engineering and economic aspects.
Specific topics addressed were:
1. Feasibility study of a circular economy laboratory. After mapping the production system, sustainability projects were identified to be developed with companies (starting with sectors like ceramics, marble, and wood) following the "Cradle to Cradle" model, which considers every aspect of the production process. From design to implementation, including social impacts, this method aims to create efficient processes with minimal waste.
2. Circular economy and co-design in the construction sector following the "Cradle to Cradle" model.
3. Feasibility study for the creation of a physical/virtual space and a team of experts from various fields dedicated to training and raising awareness among youth and businesses. Additionally, offering consultancy services in both physical and remote formats.
4. New materials for sustainable packaging in the context of the circular economy.

SWOT Analysis of the Training Program

Strengths:

Weaknesses:
- High total course duration.
- Inability to attend all in-person training sessions due to work commitments.

- Being accompanied by university researchers/experts in the development of individual projects.
- Involvement of university professors for support.
- Ability to access educational materials asynchronously in case of inability to participate in person.

Opportunities:
- To follow up on what was established in the Project Work with the perspective of engaging experts encountered during the training course.
- Networking opportunities through the conducted workshops.

Threats:
- Difficulty in finding time to dedicate to the Project Work due to full-time commitments in the company.

5.2 Sistemi Formativi Confindustria SCPA[18]

Executive Summary

"Lean Management in the building sector" responds to the specific needs of a target group of companies in the sector.

The course aims to strengthen the managerial skills of companies (including SMEs) in order to overcome difficulties faced by the sector in Italy: after the crisis of 2008 from which it has never fully recovered, the sector has suffered more than others from the effects of the Covid 19 pandemic and the partial blockage of activities that followed. Investment in construction in the first half of 2020 fell by around -10% in real terms, compared to the previous year.

The economic resources made available by the European Union's 'Next Generation EU' program and the recent 'Decreto Rilancio' adopted by the Italian government represent a unique and one-off opportunity for an effective recovery of the sector. To seize this opportunity, companies, especially SMEs, need to develop the professional skills required to cope with the current economic phase and support the response to upcoming market challenges and changes.

In line with European and national investment programs, SFC - in collaboration with ANCE - has developed the Lean Management Program in the building sector.

The economic resources made available by the European Union's 'Next Generation EU' program and the recent 'Decreto Rilancio' adopted by the Italian government represent a unique and one-off opportunity for an effective recovery of the sector. To seize this opportunity, companies, especially SMEs, need to develop the professional skills required to cope with the current economic phase and support the response to upcoming green building challenges and market changes.

[18] Prepared by SFC Sistemi Formatici Confindustria in collaboration with ANCE Associazione Nazionale Costruttori Edili

In line with European and national investment programmes, SFC - in collaboration with ANCE - has developed the Lean Management Programme in the building sector.

Methodology for adaptation of curriculum to Italian training needs

SFC designed a training course on Lean Construction Management: an innovative methodology for organizing, scheduling, and managing construction sites according to the logic of 'Lean Organization', to reduce waste factors and improve processes sustainability."

The course has two levels of content: basic and advanced.

The main objectives of the course are:

- Transferring the basic knowledge to apply Lean thinking in companies and building worksites to reduce waste factors and impact on the three key areas of improvement:
    - project time reduction;
    - optimizing building operations on the worksite;
    - performance monitoring.
- Providing skills to manage worksite scheduling with pull planning; Understanding the mechanisms for levelling and balancing worksite activities; Managing weekly worksite meetings to effectively implement and make reliable weekly work schedules.

The building process activities impacted by Lean Management will be:

A1. Dealing with subcontractors; Reviewing design and procurement documentation; Organizing human and instrumental resources; Drawing up the necessary documents for the start of the construction site.

A2. Site accounting management; Monitoring of the logistical procurement process (materials, machinery, equipment); Assessment of the suitability of materials, supplies and equipment.

A3. Monitoring of work in progress; Drafting of technical documentation.

Expected output

The expected learning outcomes are:

RA1: To realize the executive program of works in compliance with the project and procurement documentation, organizing human and instrumental resources, coordinating the subcontractors and compiling the necessary documentation.

RA2: Monitor the logistics and procurement process, ascertaining the regularity of materials, stock levels and purchasing requirements, and updating constantly updating the administrative accounting documentation of the works.

RA3: Monitor the correct execution of the works by managing variances and compiling technical documentation relating to the activities carried out and the materials used.

Target

Employees in the production lines of building SMEs including production workers, sales/marketing employees, technical and production office manager, technical office employee, logistics and warehouse employee, technical support/maintenance area.

Structure of the Training Program

The Program is structured in 2 modules, for a total duration of 42 hours

Module 1: Lean Management fort he Building Sector – basic level (12h)		
Lean management – basic level	12h	Fundamentals of lean site planning: Success factors; Importance of visual management; Phase planning using the pull planning technique; 6-week planning; Weekly planning; Continuous improvement on site.
Module 2: Lean management in the building sector – Advanced level (30h)		
Lean management – advanced level	30h	Lean thinking as a business development strategy; Improvement of processes supporting the worksite: Machinery and maintenance management, Design management, Management and improvement of office processes, Management of operational staff training; Insight into individual processes by understanding where and how they 'slow down' creating waste and inefficiencies; Presentation of possible methods and approaches to 'make processes flow' and create value by increasing competitiveness.

Certification

At the conclusion of the course, a certificate of transparency of acquired skills is with reference to the INAPP Directory of Labor and Qualifications Atlas (Atlante del Lavoro e delle Qualificazioni).

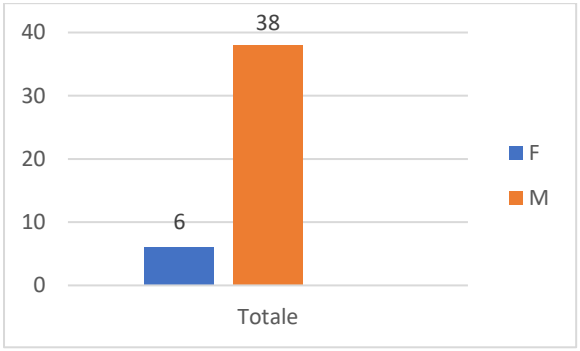
Participants and companies involved

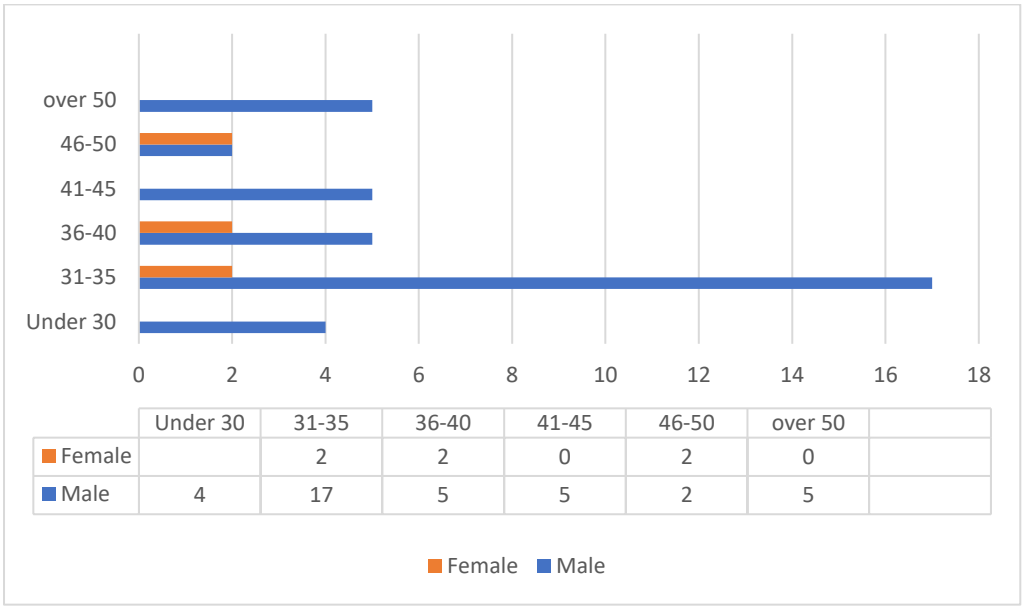
The pilot involved 44 participants, coming from 14 enterprises belonging to the building sector and operating in all the Italian regions.

1. Impresa di Costruzioni Albini e Castelli S.r.l.
2. DI VINCENZO DINO & C SPA
3. LEONARDO SRL
4. MIC S.R.L con socio unico
5. COSTRUZIONI E. DALLACASA S.r.l.

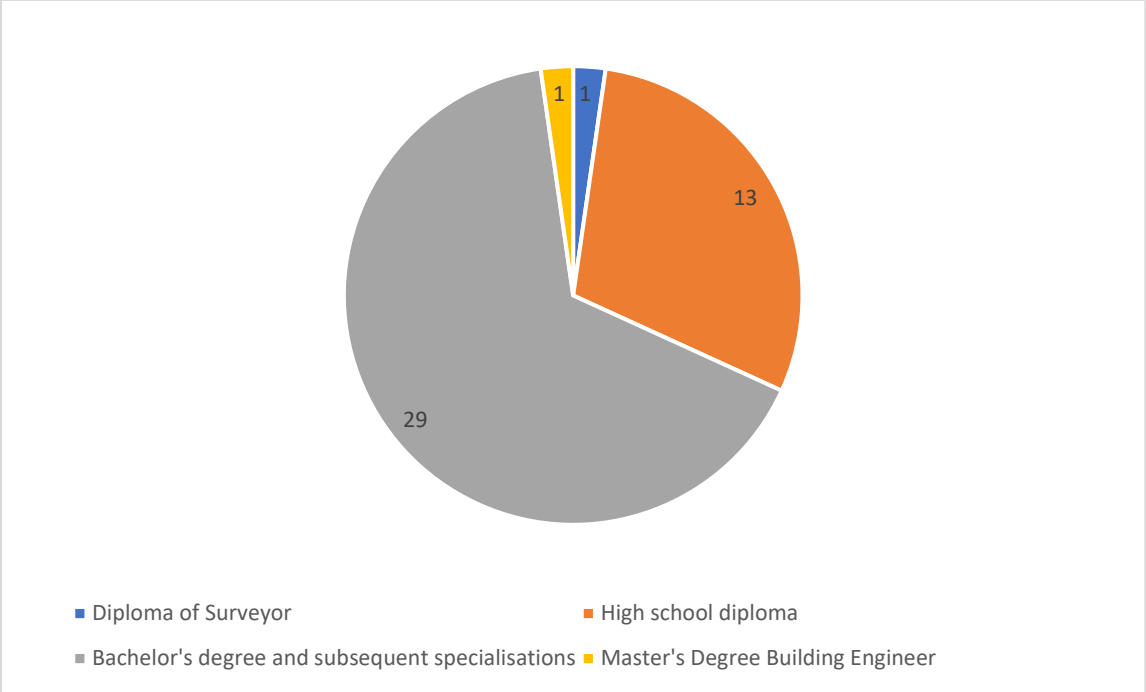
6. BATTISTELLA SPA
7. Saggini Massimo Srl
8. BUIA NEREO SRL
9. CARRON CAV. ANGELO SPA
10. Gis Design Srl
11. AMEC SRL
12. PRIMOS SRL
13. I.CO.P. SPA
14. PORTALUPI CARLO IMPRESA SPA

The gender difference between the participants is consistent with sectoral dynamics, with the presence of women in clerical functions. Most of the beneficiaries have a qualification equivalent to a university degree, confirming an increasing professionalism in the sector.





	Under 30	31-35	36-40	41-45	46-50	over 50	
Female		2	2	0	2	0	
Male	4	17	5	5	2	5	



Teachers

Expert specialized in construction engineer with a master's degree in Lean Management. He is a consultant and lecturer for companies in various sectors focusing on the implementation of organizational, production and control systems in line with the principles, methods and tools of Lean management. He is contract Lecturer at the University of Padua in Entrepreneurial Development and Innovation. He has gained experience as a lecturer for 8 years.

5.3 Latvijas Amatniecibas kamera[19]

Introduction

In today's dynamic and competitive market, craftsmen face challenges in meeting consumer demands while also ensuring sustainable practices. This is especially true for those operating within small and medium-sized enterprises (SMEs) or as self-employed craftsmen. The Latvian Chamber of Crafts recognizes these challenges and has taken the opportunity provided by the 3LoE project to introduce a transformative course on the Cradle to Cradle (C2C) concept, specifically designed to empower craftsmen with the knowledge of C2C principles and instruments, selection of safe materials and products, creating roadmaps for their own companies to become compliant with the C2C model and even gain the C2C certification.

The C2C approach is rooted in the principles of circular economy, where every product is designed with its entire lifecycle in mind, aiming for a 100% recycling rate. This course provides participants with a comprehensive understanding of how to implement

[19] Prepared by Latvian Chamber of Crafts

C2C principles in their specific crafts, ensuring that their products not only meet high quality standards but also contribute positively to the environment.

Given the unique characteristics and capabilities of each SME, the C2C approach must be tailored to individual needs rather than applying a one-size-fits-all solution. Participants must assess the specific requirements of their own enterprise during the training to develop a detailed and customized circular product design strategy. Important considerations include product type, skilled workforce capabilities, financial resources, market conditions, customer service.

Through personalized project work, done with the help of the lecturer's coaching and experience exchange with other participants, trainees are able to effectively plan how to integrate C2C principles and maximize their enterprise's potential.

In summary, the "Cradle to Cradle in SMEs" course is a valuable opportunity for Latvian craftsmen across various fields to gain insight into the C2C concept, C2C prototypes and implementation strategies, which is a novelty to the Latvian Chamber of Crafts.

Admission and organization of the training

All participants taking part in the training were Latvian Chamber of Crafts members (self-employed persons or SME employees, supervisors or employers).

The dissemination of information about the chance to participate in this course was done by phone and e-mail, as well as information on the Latvian Chamber of Crafts web page.

The training was attended by 15 participants.

The lecturer Nellija Livčāne was chosen based upon previous cooperation and her experience in the field of economy, knowledge on sustainability related topics and local regulations.

The training materials were supplemented with regional case studies, content from the Latvian translated version of the "Cradle to Cradle" book by William McDonough and Michael Braungart, and more general circular economy-related local strategies as the specific C2C model is not yet that popular in Latvia.

The training was based on the best practice curriculum developed by Hungarian Association of Craftsmen Corporation (IPOSZ) in 2020 in the Project "Management and Technologies of Water, Waste Water, Waste and Circular Economy (WWW&CE)" and prepared for the 3LoE project by Wirtschaftsförderungsinstitut (WIFI) Steiermark.

The training was composed of three parts:

Initial workshop (2 days):

Time duration (in hours)	Topic
Day 1	

0.5	Welcome, registration, training arrangements and material hand-out.
2	C2C concept, three C2C principles.
1	Biological and technical metabolism.
1	Methodology: EPEA Assessment (methodology of ingredients).
2.5	C2C Prototypes and Case Studies – local and international.
1	Final discussion, conclusions.
Day 2	
1.5	Products, processes, materials.
2	Brainstorming, discussion (potential C2C product innovation, preference list, know-how-trustee function of EPEA, roadmap, C2C instruments).
1.5	Advantages and opportunities for enterprises implementing C2C – local and international examples, discussion.
1	Definition of project work – participants in own SMEs.
1	Process of project work and framework of contractual agreements.
1	Final discussion, conclusions.

160 hours of individual learning, project work (includes coaching)

Final workshop (2 days)

Time duration (in hours)	Topic
Day 1	
3	Exchange of experience and reflections on individual learning phase.
1	C2C assessment and certification.
2	Communication and branding.
1	Further study of questions concerning the implementation of C2C model.
Day 2	
4	Outlining the steps to individual implementation in SMEs.
2	Roadmap after project, long-term strategy.
2	Wrap-up discussions, conclusions and achievements of trainees, feed-back survey.

Participants profile and organization of the training

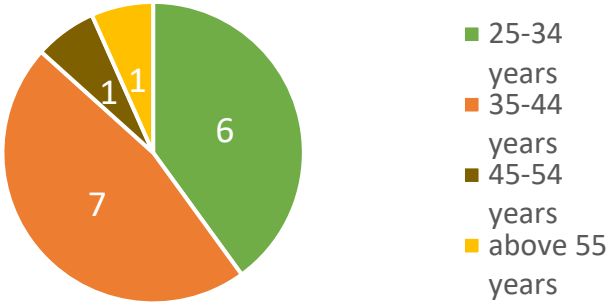
The training was held from October 17 to December 20, 2022.

The training was carried in hybrid mode – both online and in person.

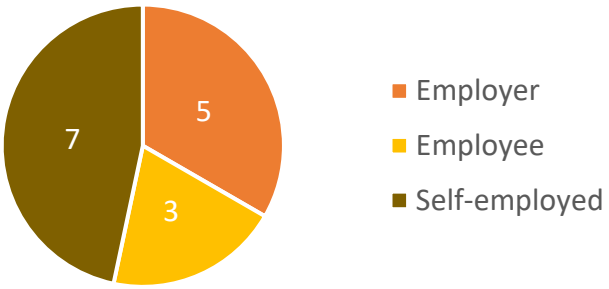
All of the participants of the Cradle to Cradle in SMEs training were members of the Latvian Chamber of Crafts.

There were 8 female participants and 7 male participants.

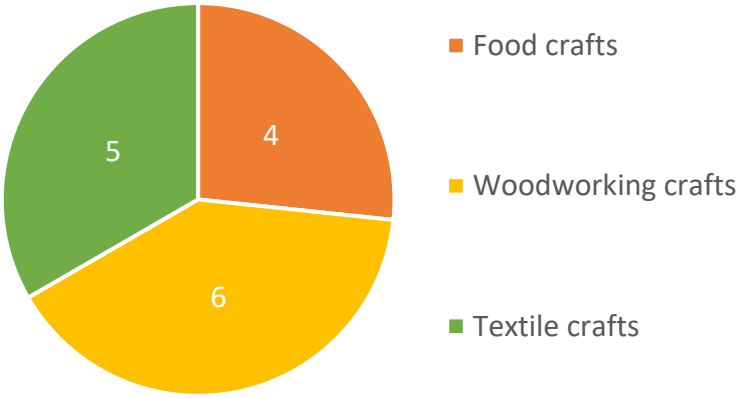
Age of participants:



Most training participants came from SMEs. Seven participants were self-employed craftsmen:



Following is the variety of crafts groups represented by the participants:

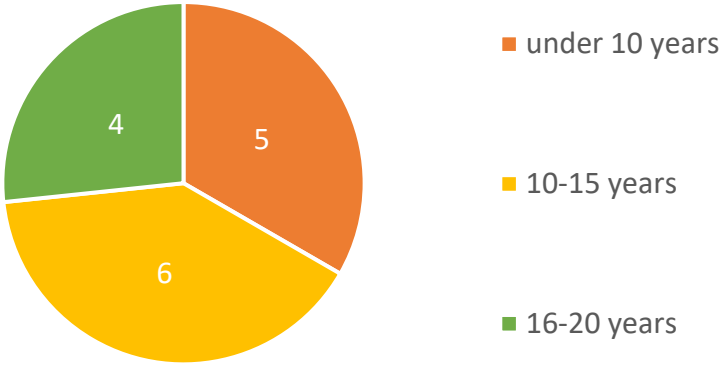


The represented crafts were:

- food crafts group – baker, cook,
- woodworking group – woodworker, woodcarver,

- textile group – tailor, weaver.

The work experience of the trainees ranged from 7 to 44 years:



Execution of the Training

Initial workshop (2 days)

Day 1

Welcome, Registration, Training Arrangements, and Material Hand-out

C2C concept, three C2C principles (2 hours)

The training kicked off with an introduction to the Cradle to Cradle concept, emphasizing its sustainable approach to production and design. The three fundamental C2C principles were explained:

- Nutrients remain nutrients
- Using renewable energy
- Supporting diversity

Biological and technical metabolism (1 hour)

Participants were introduced to the concepts of biological and technical metabolism. Biological metabolism refers to materials that can safely re-enter the environment after use, while technical metabolism covers materials designed to be recycled indefinitely without losing their value or quality.

Methodology: EPEA assessment (Methodology of ingredients) (1 hour)

The training covered the Environmental Protection Encouragement Agency (EPEA) Assessment methodology. This involves a detailed analysis of product ingredients to ensure they meet C2C standards, focusing on material health and safety.

C2C prototypes and case studies – local and international (2,5 hours)

A session was dedicated to showcasing various C2C prototypes and case studies from both local and international contexts. These examples illustrated successful C2C implementations, providing practical insights and inspiration for the participants.

Final discussion, conclusions (1 hour)

The day concluded with an open discussion, allowing participants to reflect on what they had learned, ask questions, and share their thoughts. Key takeaways and conclusions were summarized to solidify understanding.

Day 2

Products, processes, materials (1,5 hours)

Day two started with an in-depth look at products, processes, and materials through the lens of the C2C framework. Participants learned how to assess and redesign their products and processes to align with C2C principles.

Brainstorming and discussion (2 hours)

Participants engaged in brainstorming sessions and discussions focused on potential C2C product innovations. Topics included:

- Creating a preference list for sustainable materials and processes
- Understanding the know-how-trustee function of EPEA, which guides companies in the C2C certification process.
- Developing a roadmap for implementing C2C in their own work.
- Utilizing C2C instruments and tools effectively.

Advantages and opportunities for enterprises implementing C2C – local and international examples, discussion (1,5 hours)

The advantages and opportunities of adopting C2C principles were discussed, supported by examples from local and international enterprises. This session highlighted the competitive benefits and potential market advantages of sustainable practices.

Definition of project work – participants in own SMEs (1 hour)

Participants were guided in defining specific project work relevant to their own SMEs. This involved setting clear objectives, identifying key steps, and considering how C2C principles could be integrated into their unique contexts.

Process of project work and framework of contractual agreements (1 hour)

The framework for project work was outlined, including the process and necessary contractual agreements. Participants learned how to formalize their C2C projects, ensuring clear expectations and responsibilities.

Final discussion, conclusions (1 hour)

The training concluded with a final discussion, allowing participants to address any remaining questions and share their plans for implementing what they had learned. Conclusions were drawn to summarize the two days of training, reinforcing key concepts and next steps.

Self-study work

The self-study component of the Cradle to Cradle training spanned over 8 weeks and entailed participants conducting 160 hours of independent study and project work within their own enterprises.

This written work included proposing changes in the enterprise, such as goals achievable by following the Cradle to Cradle model, action plans with concrete milestones and a roadmap for a value based business model to follow afer the end of the training.

At the start of the individual study work each participant received contact information for all teaching staff and lecturers for any necessary questions. Contact information for all participants to facilitate independent exchange of experiences. Literature references and web addresses for self-study.

The process included coaching sessions with the lecturer and opportunities for peer exchange, as outlined below:

- To complete the written tasks, all trainees took part in three coaching sessions lead by the lecturer. The coaching sessions took place online. Trainees attended the sessions in groups of five:
  1. Initial meeting: This session was held to determine and agree on the topics for the written exercise, allowing participants to gain a more in-depth insight in setting up a C2C project in their specific craft field.
  2. Mid-study session: Conducted midway through the study period, this session involved discussion of the project, review of the participants' drafts and created value-based business models.
  3. Final meeting: By the last meeting, the written exercise was handed in and the final meeting was spent evaluating it.
- Additional individual consultations were held according to the trainees' wishes.
- Participants were encouraged to exchange experiences and resources, such as materials and contacts.

Final workshop (2 days)

Day 1

Exchange of experience and reflections on individual learning phase (3 hours)

The final workshop began with an introductory session where participants presented their project, shared key learnings, challenges, and successes from their self-study period. Following these presentations, participants engaged in discussions in rotating groups of 5 to reflect on common themes that had come up during their individual work. The discussions culminated with a board of sticky notes containing reflections about Cradle to Cradle model and its opportunities and challenges for the trainees' respective craft groups' in Latvia, which were later transferred to a digital format and sent out to the participants.

C2C Assessment and certification (1 hour)

Taking into account the trainees' project specifics, the lecturer provided an in-depth overview of the Cradle to Cradle certification criteria and process to achieving said criteria in different craft fields.

Communication and branding (2 hours)

In the afternoon, participants explored strategies for effectively communicating and branding their C2C initiatives. This module included an interactive workshop where participants developed communication strategies for their projects. They engaged in role-playing scenarios to practice responses to branding challenges and received feedback on their proposed communication plans from peers and the lecturer.

Further study of questions concerning the implementation of C2C model (1 hour)

The day concluded with a session focused on addressing any remaining questions and challenges related to implementing the C2C model.

Day 2

Outlining the steps to individual implementation in SMEs (4 hours)

On the second day, participants supplemented their value-based business plans with actionable steps for implementing C2C principles in their enterprises. The session started with a presentation by the lecturer outlining key steps and considerations for C2C implementation in SMEs. Then, using pointers from the digitalized sticky notes from the previous day, participants worked together with the lecturer to come up with solutions for the defined challenges and ways to use the found opportunities of the C2C model to their advantage.

Roadmap after project, long-term strategy (2 hours)

Participants then focused on creating long-term strategies for sustaining and expanding their C2C initiatives post-training. With the help of the lecturer, they identified resources and support networks available to them and discussed opportunities for ongoing collaboration and support among participants.

Wrap-up discussions, conclusions and achievements of trainees, feedback survey (2 hours)

The workshop concluded with a wrap-up session where participants shared their main takeaways and overall experiences. They completed a detailed feedback survey to provide insights on the workshop's effectiveness and areas for improvement. Course completion certificates were presented handed out to the participants (see attachments). The event ended with closing remarks from the lecturer and message from the Chamber.

Main Findings and Conclusions

The Cradle to Cradle in SMEs training program provided a comprehensive and immersive learning experience. Throughout the training, participants gained a thorough understanding of C2C principles, beginning with foundational concepts like biological and technical metabolism and progressing through practical methodologies such as the

EPEA Assessment. Case studies and prototypes from both local and international contexts enriched their learning, showcasing diverse applications and inspiring innovative thinking within their respective crafts.

The self-study phase, spanning 160 hours, proved instrumental as participants applied C2C principles to propose sustainable changes within their own enterprises. With the help of the lecturer, they developed value-based business models and post-training roadmaps tailored to their specific business contexts. This work not only deepened their understanding of C2C principles but also empowered them to take ownership of implementing sustainable practices in their specific situation.

During the final workshop, participants engaged in reflective discussions, exchanging experiences and insights gained from their individual learning journeys. Strategic considerations around communication, branding, and long-term implementation strategies were also focal points, ensuring participants were equipped to navigate sustainable initiatives in their professional environments.

As for the positive notes mentioned in the trainee surveys, notable advantages mentioned were the holistic approach to sustainability the training upheld, as well as the strategic approach to sustainable measure implementation in different fields. Through the development of action plans and roadmaps during the self-study phase, trainees gained practical insights into integrating C2C principles into their enterprises. The trainees noted that the final workshop was especially helpful, as it allowed room for discussion as well as further problem-solving related to the challenges discovered during the individual study work.

Networking and collaboration were also mentioned as key benefits. The training facilitated interactions among craftsmen from diverse sectors, fostering a community where participants could exchange knowledge and best practices. This collaborative environment not only enriched their learning experiences but also provided opportunities for joint projects and partnerships aimed at advancing sustainable practices collectively.

However, participants also faced some challenges. One major hurdle was the initial alignment of C2C principles with traditional craftsmanship techniques. Coming up with ways to potentially adapt established practices to meet stringent sustainability criteria required creativity and sometimes significant adjustments in processes and materials, posing a learning curve for many participants. Participants noted the need for dedicated time, effort, and financial resources to achieve and maintain certification standards.

Despite these challenges, participants recognized the training's long-term benefits in enhancing their craftsmanship, fostering sustainable innovation, and contributing to a more environmentally conscious marketplace. It was agreed that even though the C2C model may not yet be popular in Latvia, the values and ideas it involves can definitely be involved and promoted in everyday workings of SMEs.

Overall, the C2C training program provided valuable insights and practical tools for craftsmen within the Latvian Chamber of Crafts, empowering them to integrate

sustainable practices into their craftsmanship. It underscored the importance of continuous learning and collaboration in advancing towards a circular economy and sustainable future.

5.4 Chamber of Crafts Dresden[20]

Introduction

Cradle to Cradle = The circular economy is a closed system in which raw materials are used more efficiently and waste is minimised. The constant scarcity of energy, water and other raw materials, coupled with ever-increasing demand and the simultaneous rise in their prices, is forcing us to economize. This 'saving technology' automatically promotes our environmental awareness and increases the demand for energy and environmentally friendly technologies.

The construction industry is also increasingly focusing on sustainability. This seminar briefly describes the building materials of the past and shows solutions for various building materials of the present and future in connection with existing laws and regulations.

Period of the Implementation:

The one-day seminar took place full-time on 7 August 2024 from 9:00 to 16:15. The scope of the course is 8 teaching units of 45 minutes each.

Methods:

The training takes place in modern workshops with training walls for the practical presentation of the relevant materials and technologies.

The content is taught in a varied, subject-orientated and interactive way.

The seminar was divided into 4 blocks. Within 2 blocks, theoretical information, specialised knowledge and legalities were imparted. The other two blocks contained practical components, such as trying out different materials and measuring important structural values.

The mix of these blocks livened up the seminar and aroused interest in these future topics.

Seminar content:

In this course, participants will learn about the latest requirements and findings relating to materials in the construction industry after a joint clarification of terms such as 'circular economy', sustainability or environmental technologies and greenwashing. Among other things:

- Where are environmentally friendly materials already available?
- how can CO2 be reduced
- how can raw materials be reduced (conservation of resources)

[20] Prepared by Rosemarie Weiser, Handwerkskammer Dresden, Germany

- Health-friendly materials
- Cost savings for consumers
- Effects on the workplace situation
- Consideration of the CO2 or life cycle assessment when selecting the respective building materials
- Effects of harmful substances in the materials and the resulting consequences.
- Explanation of the significance of quality marks, labels or other certificates.

In the practical part of the course, the individual materials are presented, compared and their processing briefly tested. The thermal conductivities are determined by measurements and the future application possibilities are determined. The effects on the overall construction work will be discussed together.

The seminar is conducted in compliance with the applicable accident prevention regulations.

Special features of the realisation:

This special seminar is aimed at construction companies, architects and building owners. It can be extended to all other trades in the construction industry.

Approval and organisation of the training

Selection of participants/target group:

This seminar is primarily aimed at construction companies in all trades, potential clients, construction planners and architects and SME entrepreneurs. The seminar can be attended by both men and women.

Participants can register independently via the training centre's course portal at https://njumii.de. The motivation for participants to register is the desire to further their education in their position and for their own work. The costs of the training are usually borne by the company, as the possible transfer of new tasks or the more efficient performance of current tasks creates corresponding added value.

Participants receive comprehensive support at the Dresden Chamber of Crafts training centre. Customer support is the point of contact before the start of the course, e.g. with regard to costs, time frame, general conditions and admission requirements. After registration or at the start of the course, the course administration takes over the participant support. At the beginning of the course, they will provide comprehensive information on the general conditions in the centre and the course schedule. A welcome, information on break times, house rules and instructions are provided at the start of the course. The course administrator will also answer any questions that arise at the beginning or during the course.

The course comprises 1 working day in presence with 8 full-time teaching units. There is no special entry requirement in terms of specific vocational training.

Information on lecturers:

The instructor has a diploma as a Building Biology Measurement Technician IBN for mould and pollutants (Institute for Building Biology and Sustainability IBN in Rosenheim). He has been working for over 10 years as an independent building biologist, specialist consultant for ecological building and as an application engineer, among others at Pfennigbau GmbH & Co KG and Baunativ GmbH & Co KG.

Participant profile and organisation of the training:

Four male employees from two sectors (metal building technology and structural engineering) took part in the seminar. All participants had been working in their profession for several years and therefore had the necessary prior knowledge of certain materials.

Realisation of the training:

The course was organised in accordance with the following syllabus. The syllabus has the following content structure:

1. information on the 3 LoE project, as part of which the course was developed and organised.
2. Introduction and instruction on house rules, workshop regulations and occupational health and safety.
3. First block - Theoretical basics

- Initial situation, situation of current building materials
- Circular economy - what is it and what is its purpose?
- Why is the circular economy important?
- Circular economy in the construction industry, circular construction
- Requirements for building and coating materials for a functioning circular economy

4. second block Practice - illustration and presentation of materials

- Introduction: Properties and advantages of natural building materials and colors
- Natural insulation materials, building boards, dry construction, stones
- Natural plasters and masonry mortars and fills
- Natural colors

5. third block - basic knowledge of various building materials

- CO2 and life cycle assessment – information
- Pollutants in building materials and paints - practical examples
- Limit and guideline values for pollutants
- Quality marks, seals, labels, certificates, institutes – examples
- Greenwashing - example

6. Fourth block - Practical applications

- Measuring thermal conductivity
- Plaster examples with lime plaster, clay plaster on soft wood fiber, cork (interior insulation)
- Paint coating based on lime putty
- ETICS with lime plaster - thin-layer and thick-layer system

7. conclusion and open questions

8. summarising the most important findings of the course

The curriculum aims to enable participants to apply this learning content efficiently and responsibly in their day-to-day work.

No examination was taken. Participants received a personalised certificate of attendance at the End of the seminar (a sample is attached to the report).

The feedback from the participants on the questionnaires was predominantly very Positive. The participants were particularly positive about the practical exercises and the opportunity to try things out for themselves. Further seminars on this topic were requested.

Main results and conclusions

Benefit:

After completing the seminar, participants will be able to make a more sensitive choice of materials to be used and adapt technological workflows in line with the circular economy. They are sensitised to pay attention to raw material reductions, to design environmentally friendly and sustainable production and to keep an eye on the costs of the service. They act as contact persons for ecological construction within the company and can provide advice to customers in this regard.

The strengths of the training include the selected and applied practice-orientated mix of methods consisting of trainer input and subsequent practical exercises using examples relevant to the participants' jobs. Through specific examples and their practical implementation, participants are sensitised to further topics in this area and to implement them in the workplace.

Conclusion:

The ‘Cradle to Cradle, Circular Economy’ seminar is a valuable training programme for professionals interested in understanding and applying the latest resource-saving, sustainable technologies. With a strong focus on practical applications and a comprehensive curriculum, it provides participants with the tools they need to successfully break new ground in an increasingly sustainable world of work in a specific field of activity.

Due to the positive evaluation and the consistently high level of interest in this topic, a continuation of the seminar for other specialised materials and industries should be planned. Further topics relating to the problem of pollutants, dwindling resources and rising costs should provide the focus for further seminar developments.

6 Implementation Training Energy generation from wastewater and waste[21]

Introduction

The training program "Generation of Energy from Wastewater and Waste" is strategically positioned within the broader context of addressing global energy challenges through sustainable practices. In response to international initiatives promoting energy efficiency and renewable energy sources, this course aims to equip participants with essential knowledge and skills in energy generation from wastewater and waste.

The project underscores the critical role of small and medium-sized enterprises (SMEs) in adopting sustainable energy practices, aligning with national and European Union directives on environmental protection and energy sustainability. By focusing on practical applications and regulatory compliance in waste management and energy production, the training program supports participants in enhancing their professional competencies and organizational strategies.

Moreover, the inclusion of self-paced learning supplemented by expert-led sessions ensures flexibility and depth in understanding complex energy technologies and regulatory frameworks. This approach not only facilitates knowledge acquisition but also encourages participants to explore innovative solutions for sustainable energy generation within their respective organizations.

The training program "Generation of Energy from Wastewater and Waste" is structured as a comprehensive 80-hour course delivered through a blended learning approach. Participants engage primarily in self-paced learning, complemented by an intensive in-person session held in Madrid.

Modality: The course primarily employs self-paced learning, allowing participants to acquire knowledge autonomously and at their own pace. This modality is supplemented by an in-person meeting in Madrid, which provides a focused opportunity for participants to interact directly with experts and delve deeper into critical topics.

Where: The primary mode of learning takes place remotely, enabling participants to access specialized manuals and complete assessment activities from any location. The in-person session, scheduled for May 29, 2024, in Madrid, offers a valuable opportunity for face-to-face interaction and practical application of learned concepts.

When: The training spans over several weeks with specific module periods:

- Module 1: April 22, 2024, to May 12, 2024

[21] Prepared by Sociedad General De Aguas De Barcelona S.A., Spain

- Module 2: May 13, 2024, to May 26, 2024
- Module 3: May 27, 2024, to June 16, 2024

Additionally, the in-person meeting in Madrid on May 29, 2024, marks a crucial milestone in the training, fostering collaborative learning and deeper engagement among participants and experts.

By completing the seminar, the participant will obtain the following skills:

1. **Consulting and Energy Production Calculation:** Participants will develop expertise in consulting on and calculating energy production from wastewater and waste, including identifying potential uses for the energy produced.
2. **Environmental Requirements Knowledge:** Understanding of national and international environmental requirements related to energy generation from wastewater and waste, ensuring compliance and sustainable practices.
3. **Analysis of Energy Generation Potential:** Ability to analyze the energy generation potential of a company or organization, leveraging insights to optimize resource utilization and efficiency.
4. **Awareness of Sustainable Energy Importance:** Increased awareness of the importance of sustainable energy generation in mitigating anthropogenic climate change impacts, emphasizing the role of green energy in environmental stewardship.
5. **Opportunities for SMEs in Sustainable Energy:** Insight into sustainable energy opportunities specifically tailored for small and medium-sized enterprises (SMEs), encouraging proactive engagement and adoption of sustainable practices.
6. **Research and Knowledge Expansion:** Skills in conducting research and expanding knowledge within the field of green energy generation, enabling participants to stay abreast of emerging technologies and best practices.
7. **Design of Sustainable Energy Solutions:** Ability to design innovative solutions and technical methods related to sustainable energy generation, fostering creativity and practical application in real-world scenarios.
8. **Greenhouse Gas Emission Reduction Strategies:** Knowledge of fundamental principles and strategies for reducing greenhouse gas emissions through energy production, contributing to global efforts in climate change mitigation.
9. **Understanding of National and International Energy Management:** Familiarity with key concepts in national and international energy management pertaining to wastewater and waste, facilitating informed decision-making and compliance with regulatory frameworks.
10. **Waste Management Knowledge:** Acquisition of knowledge regarding different types of waste and their management strategies, essential for integrating waste-to-energy solutions into sustainable energy practices.

11. **Energy Generation Systems in Water Cycle Facilities:** Understanding of energy generation systems integrated within water cycle facilities, enhancing efficiency and sustainability in water resource management.

The participants in the onsite session were experts in the water sector, particularly skilled in the operation of water treatment and sanitation facilities, seeking to broaden their knowledge into waste management and energy areas within the integrated water cycle.

Self-paced Learning: Participants engage in self-directed learning, allowing them to acquire knowledge and skills at their own pace. This approach accommodates diverse learning styles and schedules, ensuring flexibility and personalized learning experiences.

Specialized Manuals and Resources: Participants utilize specialized manuals and supplementary resources provided throughout the seminar. These resources offer comprehensive insights into energy generation technologies, regulatory frameworks, and case studies relevant to sustainable energy practices.

Expert-led Session: The seminar includes an expert-led session designed to deepen participants' understanding of key concepts and practical applications. This session provides opportunities for interactive discussions, case analyses, and Q&A sessions with industry experts.

Practical Exercises and Assessments: Participants are actively involved in practical exercises and assessments that reinforce learning objectives. These activities are carefully designed to simulate real-world scenarios, allowing participants to apply theoretical knowledge to practical challenges.

Strategic Challenges: A strategic challenge forms a significant component of the assessment methodology. Participants are tasked with developing and presenting solutions to complex problems related to energy generation from wastewater and waste. This hands-on approach evaluates their ability to analyze, strategize, and innovate within the context of sustainable energy practices.

Post-Seminar Resources: Participants have access to post-seminar resources and support, including additional readings, webinars, and networking platforms. These resources encourage ongoing learning and professional development in sustainable energy practices beyond the seminar duration.

Admission and organization of the trainings

School of Water. created by Agbar in 2012, is the benchmark in training, awareness, talent development and knowledge in the field of water and the environment.Our activity is aimed at training for companies, administrations and professionals in the water sector, as well as for the general public. Thus, we develop training programs, promote dual vocational training in the water sector, develop environmental education programs and design exhibition, museum and hydraulic heritage projects.The training

programs, whether those in our catalog or those custom-designed for companies, cover all areas of the complete water cycle; they use methodologies that facilitate a unique learning experience and immediate applicability in all key positions of an organization. Our approach combines the academic and technical rigor provided by 165 years of experience in integrated water cycle management and collaboration with the best universities, technical schools and business schools.

Participants in the seminar were informed by HR for the internal participants and via web for the external participants.

The following trainers were active.

Álvaro Espeso

- Education: Bachelor's degree in Industrial Technology Engineering from the University of Valladolid.
- 5 years as an Energy Efficiency Engineer, conducting technical and economic feasibility studies in industrial and tertiary sector projects.
- Involved in European energy efficiency projects: CITyFiED and REMOURBAN.

Beatriz Castillo

- Education: Bachelor's degree in Environmental Sciences from the Autonomous University of Madrid, Master's in Environmental Engineering and Management from EOI, and a Postgraduate Diploma from IE.
- 24 years in the environmental sector, with extensive experience in environmental consulting and service provision companies.
- Held positions related to environmental management, particularly in waste management and environmental risk.
- Former Deputy Director at Ferrovial Services' Environmental Competence Center.
- Former Director General of Sustainability and Climate Change at the Madrid Regional Government's Ministry of Environment.
- Currently serves as Deputy Director of Waste Development at Veolia Spain.

Álvaro Dorao

- Education: Mining Engineer specializing in Energy and Fuels from UPM, and a Program for Management Development (PDD) from EOI.
- 22 years in the environmental sector, focusing on waste management.
- Worked in the private sector with companies like SACYR and Ferrovial, managing national and international projects.

- Currently holds the position of Director of Municipal Waste Development at Veolia.

Antonio Ponce

- Education: Master's in Environmental Engineering and Management from the Escuela de Organización Industrial, and a Bachelor's degree in Chemistry from the University of Alcalá.
- Currently works at Veolia, leading the implementation of a development plan for a subsidiary handling biosanitary waste.
- Involved in waste management and circular economy projects.
- Provides independent consultancy on sustainability assessment and legal compliance.
- Contributed to significant projects such as the decontamination of the Laguna Negra in Arganda del Rey.

Participants and organization of the training

8 women and 18 men took the training. They all are working in a technical department or technical company and all are from Spain.

PERIOD	MODULE	CREDIT
22/04/2024 to 12/05/2024	M1. Introduction to Energy Generation	- Introduction to Energy Generation
		- Types of Energy Sources
		- Fossil vs Renewable Energy
		- Energy Infrastructure in the European Union
		- Energy Strategy in the European Union: Policies, Goals, Actions, and Regulations
13/05/2024 to 26/05/2024	M2. Basic Concepts on Wastewater and Waste	- European and National Legislation on Waste Management
		- Types of Waste: Municipal, Bio-sanitary, and Hazardous
		- Mechanical Treatment (Processes/Technologies)
		- Biological Treatment (Processes/Technologies)
		- Thermal Treatment (Processes/Technologies)
		- Landfill Disposal

		- Bio-sanitary Waste Treatment
		- Common Hazardous Waste Treatments
27/05/2024 to 16/06/2024	M3. Energy Generation from Wastewater and Waste	- European Directive on the Use of Energy from Renewable Sources
		- Types of Energy Valorization Technologies for Waste and Wastewater
		- Thermal Treatment Technologies
		- Anaerobic Digestion Technologies
		- Energy Valorization of Waste by Using it as Alternative Fuel in Thermal Plants
		- Cogeneration Technologies
		- Biogas: Regulations and Generation Technologies
		- Biogas in the National Integrated Energy and Climate Plan (PNIEC)
		- Biogas Upgrading
		- Potential for Energy Valorization of Waste at the National Level
29/05/2024	In-person Meeting in Madrid	

The seminar was very interesting for the debate and moments of reflection that were generated in the classroom. It should be noted that the teachers were very experts in the subject and that the participants were very interested and specialized people. Very good academic level and a very participatory audience.

Main Findings and Conclusions

When we asked in an open form about the aspects to improve, the contributions has been:

Organize a Visit to a Waste Treatment Plant: participants expressed interest in organizing visits to waste treatment plants. Such site visits would provide practical insights and firsthand exposure to operational processes.

Organize More In-Person Sessions: There was a request for additional in-person sessions. Participants felt that more face-to-face interactions would deepen their understanding and allow for more detailed discussions.

Increase Depth on Certain Topics: Participants wanted more in-depth coverage of specific topics. They suggested extending the content on complex areas to gain a more thorough understanding of key issues in water management.

When we asked in an open form about positive aspects, the contributions has been:

Promotion of Group Participation and Doubt Resolution: The program effectively promoted group participation and facilitated the resolution of doubts, creating an interactive and engaging learning environment.

Comprehensive Overview: Participants appreciated the program for providing a comprehensive overview of water management strategies, offering a well-rounded understanding of the subject matter.

Well-Structured and Updated Course: The course was praised for its well-structured format and up-to-date content, ensuring that participants received relevant and current information.

Expert Speakers: The involvement of expert speakers was highly valued. Their knowledge and experience added significant depth to the training, enhancing the overall learning experience.

Networking and Experience Sharing: Opportunities for networking and sharing experiences among participants were highlighted as valuable aspects of the program, fostering professional connections and collaborative learning.

7 Evaluation Concept[22]

7.1 Introduction

The objective of the evaluation is to determine whether the goals of the program will be achieved in the implementations evaluated, and how the program has impact on student's career and opportunities.

The type of the evaluation follows standard course evaluation methods, i.e. formative, process and outcome evaluation, the latter only partial: The formative evaluation will provide feedback to the curriculum designers, developers and implementers to ensure that designed and implemented courses really meets the needs of the intended audience, i.e. assure or improve the quality of program. The planned duration of the course varies depending to the educational level and purposes. Each lesson lasts 45 minutes.

Methods used in lessons will be lectures, teaching talks, working in small groups, case studies and examples from real world. Material used during the teaching consists of e.g. information material (basics & backgrounds, thematic introductions etc.), presentations, questionnaires, question guides, checklists, analysis results, good practice examples and so on. Course should contain at least following issues: Basics/overview of essential tasks and contents of business-oriented and productivity-enhancing measures in circular economy and workplace innovation (in each of the courses) [23]

7.2 Evaluation Process

1. Evaluation will answer to the following questions:

a) Were the goals and objectives suitable for the audience?

b) Were the training methods and course materials appropriate for the audience?

c) Should the program or some part of it be developed further and if, how?

d)mprovides information will benefit the development of the program, facilities and timing.

2. The process of the evaluation will provide information about the training and lectures

- Process of the evaluation will be focused on procedures and actions used to produce results.
- Process evaluation takes place during the training delivery and at the end of the training.
- The co-organizer (Responsible for the course) will:
- monitors the training,
- describes the training process as a whole, and
- records the findings into the written report.
- The outcome of the evaluation tries to find out how the knowledge, attitudes, and behaviors of the audience developed.
- It takes a long time to find out the outcomes of the education and training, so in this stage only the main topics will be assessed. [24]

[22] Prepared by Rigas Stradina Universitate

[23] Dr Kari Lilja and Dr Sirpa Sandelin. ***Further vocational training***. Satakunta University of Applied Sciences.

[24] Ibid.

3. The evaluation process will be as follows:

- Questionnaires will be suggested by RSU and discussed with organizers of the training before the training starts.
- The survey monkey questionnaires will be applied.
- The co-organizer (responsible for the course) will suggest fulfilling the questionnaires available to the participants to be filled in before leaving the course and on-line.
- The purposes of the questionnaire and how the data will be used should be explained clearly to the participants. This will help to improve the response rate and encourage them to make comments that can be useful to improve future programs.
- The evaluation approach will be based on a combination of qualitative and quantitative methods.
- The Microsoft Excel package will be used to transcribe the feedbacks and interviews.
- Open questions will be categorized, and qualitative analysis of the groups will be done.

4. The evaluation procedure:

Semi-structured questionnaires will be suggested to the participants. Different topics [topic no. 1, topic no.2 etc.] should be proposed by the organizers of the training according to the program for the training or parts of the course.

It is recommended:

Co-organizer (Responsible for the course) fills in all required information:

- the Name of the school / institution.
- the Title of the evaluated course and the number of the workshop (1^{st} / 2^{nd}) in the beginning of the questionnaire to make sure that the identification data needed in the evaluation is correct.

Semi-structured questionnaires will be created for the leaders of the training/course - trainers / lecturers / teachers).

It is recommended:

Co-organizer (Responsible for the course) fills in all required information:

- the Name of the school / institution
- the Title of the evaluated course and the number of the workshop (1^{st} / 2^{nd}) in the beginning of the questionnaire before printing it to make sure that the identification data needed in the evaluation is correct.

Time for the survey (approx. 15 minutes) will be allocated in the end of each workshop.

In the beginning of the course the co-organizer (Responsible for the course) will inform participants about the evaluation and its importance for further development actions.

The co-organizer (Responsible for the course) will make the link to the questionnaires available to the participants to be filled in before leaving the workshop. The purposes of the questionnaire and how the data will be used should be explained clearly to the participants. This will help to improve the response rate and encourage them to make comments that can be useful to improve future programs.

Note: Survey for participants will be conducted twice, in the end of both workshops!

The participants complete the questionnaires and return them to the co-organizer.

The co-organizer distributes the lecturer□s questionnaire to each lecturer to be compiled immediately after his / her part of the course has been finished.

Note: If the lecturer teaches in both workshops, he / she completes the questionnaire twice!

In the end of the learning on the job -phase, representant of each enterprise involved in the training will be interviewed by the co-organizer. Guidelines for the interview will be found in appendix C. Interviews can be conducted face to face or via Skype, Microsoft Teams or e-mail, some examples to be given.

The co-organizer collects the questionnaires and answers of interviews and deliver them to the evaluator. If there are free speech answers in some other language than English, it is recommendable that the co-organizer translates them to English.

The evaluator compiles all feedback and summarizes written analysis on the evaluations.

The evaluation approach will be based on a combination of qualitative and quantitative methods. The Microsoft Excel package will be used to transcribe the feedback and interviews. Open questions will be categorized, and qualitative analysis of the groups will be done.

5. The final evaluation report will discuss the following issues

Did the curriculum reach the targets?

How well was the knowledge creation and sharing realized?

Did the participants assimilate knowledge and tools?

Was the venue and equipment appropriate for the training course?

What kind of further development will be needed, if any?

7.3 Questionnaires

Annex A Questionnaire for participants

of the Basic Digital Skills (Fundamental Digital Skills) course/ B Advanced Digital Skills[25]

Please mark with a cross where applicable

Gender	Female		Male	
Age	<50		>50	
Workplace	Education		Business	

[25] Work Package 4, Activity 4.4. Train the Trainer . Two-Stage Training in Advanced Digital Skills. DRAFT. Developed by Pomeranian University in Słupsk (Akademia Pomorska w Słupsku, PP6 APS) within the 3LoE Project

Please mark the scale that applies to your opinion on the following aspects of the training that you participated.

1. **Please indicate in which training course you participated**
    - **…….**
    - **…….**
    - **…….**
    - **…….**
2. **What is your background?**
    - I am a company owner/manager
    - I am a company employee
    - I am a student/trainee
    - Other (please indicate)
3. **Please rate the general conditions of the training course**
    - **The facilities (location, room, online tool etc.) for the training course were suitable**

Scale: 1= Strongly disagree, 2=Disagree, 3=Neither disagree nor agree, 4=Agree, 5=Strongly agree

- **The time frame and schedule for the training course were suitable**

Scale: 1= Strongly disagree, 2=Disagree, 3=Neither disagree nor agree, 4=Agree, 5=Strongly agree

- **Comments**

4. **Please rate the overall content of the training course**

Scale: 1= Strongly disagree, 2=Disagree, 3=Neither disagree nor agree, 4=Agree, 5=Strongly agree

In common					
The facilities (location, room etc. online tools) were suitable for training	1	2	3	4	5
The topics and issues covered were relevant and responded to the goals of training	1	2	3	4	5
The lecturers explained topics of the lessons, additional questions, experiences, and topical issues arisen during the course well	1	2	3	4	5
There was enough time scheduled for each topic	1	2	3	4	5

I gained valuable knowledge from lessons and examples presented by lecturers		1	2	3	4	5
I believe that can apply knowledge gained from lessons and use it in my future career		1	2	3	4	5
I can use new skills trained and knowledge gained in my future career, e.g. when consulting my clients		1	2	3	4	5
Comments concerning the common issues						
Lessons and Topics						
5. Please indicate three main topics below that were the most relevant and useful to you. Scale: 1= Strongly disagree, 2=Disagree, 3=Neither disagree nor agree, 4=Agree, 5=Strongly agree **Topic 1** Computer and computerization; fundamental terms and concepts (Fundamental Digital Skills) **Topic 2** Data Extraction (Fundamental Digital Skills) **Topic 3** Google Tools and cloud-based teaching. (Advances Digital Skills) **Topic 4** Synchronous teaching - video-conferencing tools(Advances Digital Skills) **Topic 5** Asynchronous teaching - Moodle and other tools (Advances Digital Skills) **Topic 6** Preparation of professional presentations (Advanced Digital Skills) **Topic 7** Consolidation: An online course: Case study (Advanced Digital Skills) **6. Please give some more insights on the individual training topics** Scale: 1= Strongly disagree, 2=Disagree, 3=Neither disagree nor agree, 4=Agree, 5=Strongly agree						
Topic 1 Welcome, registration, training	The presentation was clear and understandable The issues were relevant and topical	1 1	2 2	3 3	4 4	5 5

arrangements and materials	The information presented were up-to-date	1	2	3	4	5
Topic 2 Computer and computerization; fundamental terms and concepts	The presentation was clear and understandable The issues were relevant and topical The information presented were up-to-date	1 1 1	2 2 2	3 3 3	4 4 4	5 5 5
Topic 3 Data Extraction (Fundamental Digital Skills)	The presentation was clear and understandable The issues were relevant and topical The information presented were up-to-date	1 1 1	2 2 2	3 3 3	4 4 4	5 5 5
Topic 4 Synchronous teaching - video-conferencing tools(Advances Digital Skills)	The presentation was clear and understandable The issues were relevant and topical The information presented were up-to-date	1 1 1	2 2 2	3 3 3	4 4 4	5 5 5
Topic 5 Asynchronous teaching - Moodle and other tools (Advances Digital Skills	The presentation was clear and understandable The issues were relevant and topical The information presented were up-to-date	1 1 1	2 2 2	3 3 3	4 4 4	5 5 5
Topic 6 Preparation of professional presentations (Advanced Digital Skills)	The presentation was clear and understandable The issues were relevant and topical The information presented were up-to-date	1 1 1	2 2 2	3 3 3	4 4 4	5 5 5

Topic 7 Consolidation: An online course: Case study (Advanced Digital Skills)	The presentation was clear and understandable The issues were relevant and topical The information presented were up-to-date	1 1 1	2 2 2	3 3 3	4 4 4	5 5 5
Other, please indicate						
Free speech						
7. What was most interesting for you during the training course?						
8. What could have been done better? (E.g. was some topic missing or unnecessary)						
9. Would you recommend the course to someone you know? If not, why not?						
10. Was anything missing that you might need in your (future) profession life ?						
11. Was the proportion of topics and time frame of the training course content suitable or should some parts be increased/decreased?						
12. Is there any other feedback on the training course you would like to share						

Thank you for your answers! Please press "done" to submit the survey

Annex B Questionnaire for lecturers

of the Basic Digital Skills/ B Advanced Digital Skills course

Dear Lecturer,

Thank you for taking your time to evaluate a training course, that was developed and tested as part of the Erasmus+ project "3LOE". This survey is anonymous and will take 5-10 minutes.

1. **Please indicate which training course you were lecturing**
   - title of the course
   - title of the course
   - title of the course
   - title of the course
   - Other, please indicate

2. Please indicate how many years of experience in teaching you have

- **Less than 2 years**
- **Between 2 and 5 years**
- **More than 5 years**

3. Please rate the general conditions of the teaching during the training course

Scale: 1= Poor, 2=Satisfactory, 3= Good 4=Very good, 5=Excellent

- The facilities (location, room, online tool etc.) for the training course were...
- The time frame and schedule for the training course were...
- The curriculum provided was...
- The background knowledge of the training participants was...
- The motivation of the training participants was...

Comments

4. Please rate the overall content of the training course

Scale: 1= Poor, 2=Satisfactory, 3= Good 4=Very good, 5=Excellent

- The overall content of the training course was...
- The way the content responded to the needs and goals of the training participants was...
- The relevance of the training course content for the overall qualification was.

Comments:

4. **What could be been done better? (e.g. was some topic missing or unnecessary)**

5. **Is there any other feedback on the training course you would like to share?**

Thank you for your answers! Please press "done" to submit the survey.

1. Overall content of the course's topics

1 = Poor		Comments:
2= Satisfactory		

3= Good		
4= Very good		
5= Excellent		

2. To what extent the topics in curricula correspond to the needs and goals of the students (average)?

1 = Poor		Comments:
2= Satisfactory		
3= Good		
4= Very good		
5= Excellent		

3. How well the schedule of the lessons/topic thought was organised in relation to the contents and goals of the programme?

1 = Poor		Comments:
2= Satisfactory		
3= Good		
4= Very good		
5= Excellent		

4. Level of students' knowledge

1 = Poor		Comments:
2= Satisfactory		
3= Good		
4= Very good		

5= Excellent		

5. Motivation of students

1 = Poor		Comments:
2= Satisfactory		
3= Good		
4= Very good		
5= Excellent		

6. In your opinion, is the course's content relevant to requirements for the qualification?

1 = Poor		Comments:
2= Satisfactory		
3= Good		
4= Very good		
5= Excellent		

Thank you for your answers!

Annex C Questionnaire for interviews of enterprises

involved in the Basic Digital Skills/ B Advanced Digital Skills course

Date ___/___/2021___ Course_____Enterprise _____

The interviewer will ask the following questions from each enterprise's representative.

1. Schedule: Was the schedule of theory and practice in line with the company's needs? Are you satisfied with the schedule and order of topics?

2. Content: Did the training contain topics and issues needed in your business? Was something missing? If is, please write what in your opinion was missing?
3. Implemented project: Did the project, implemented during the learning at the job - phase, achieve the goals set to it? If not, what remained incomplete?
4. What could have been done differently? And what should not be changed?

Thank you for your answers!

8 Evaluation Reports[26]

8.1 Preparation and management of SMEs for work in the Green Economy

Introduction

The objective of the evaluation is to determine whether the goals of the program were achieved and does the teaching instrument has an impact on student's career and opportunities.

The type of the evaluation follows standard course evaluation methods, i.e. formative, process by analyzing feedback surveys (see annex no. 1-10) to ensure that designed and implemented training really met the needs of the training participants, i.e. assure or improve the quality of program.

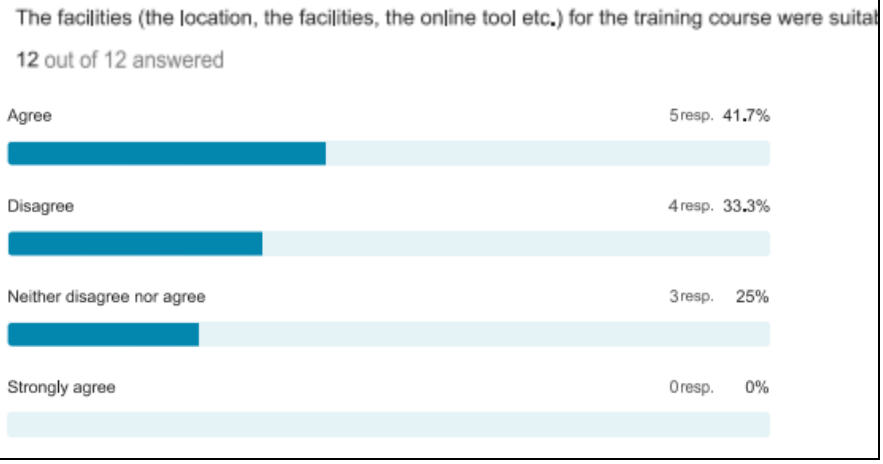
Feedback surveys were designed to collect data from training participants and teachers of the course. Respondents were asked to fill in online survey designed in typeform.com platforms. Feedback surveys were filled in just after the finalization of the training following the invitation of training organizers. The organizers of the training have clearly explained to respondents' purposes of the feedback survey and further usage of data collected. The participation in evaluation by filling in the online feedback survey was voluntary.

81 training participants have submitted their feedback. The gender representation: female 23%, male 77%. Age groups: 50 or younger – 75%, below 50 – 25%.

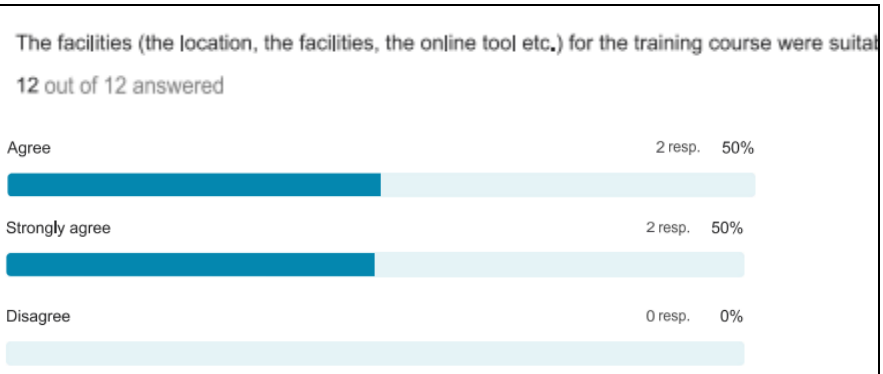
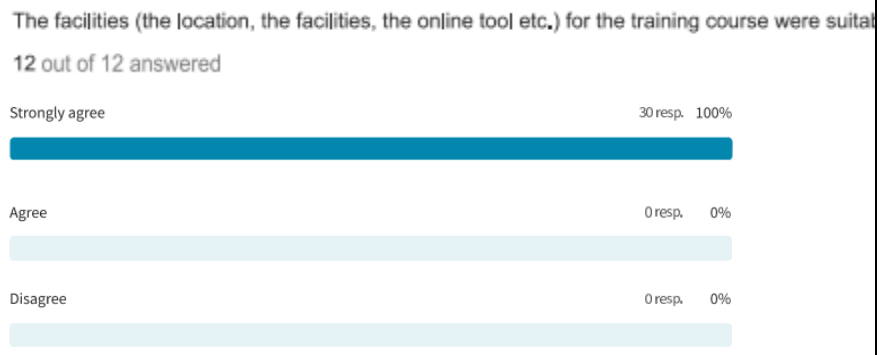
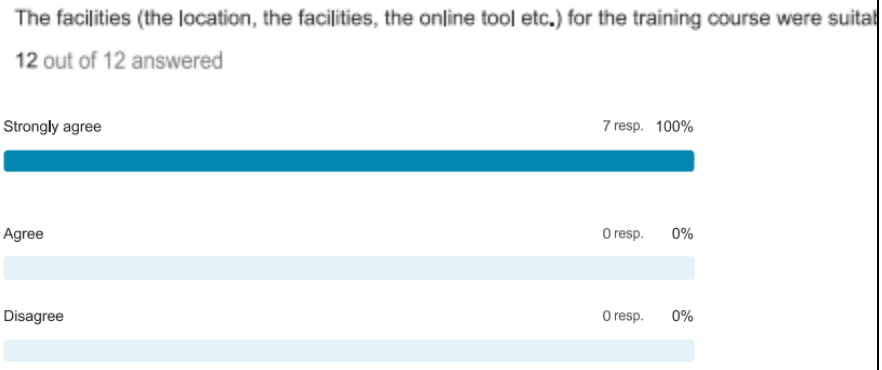
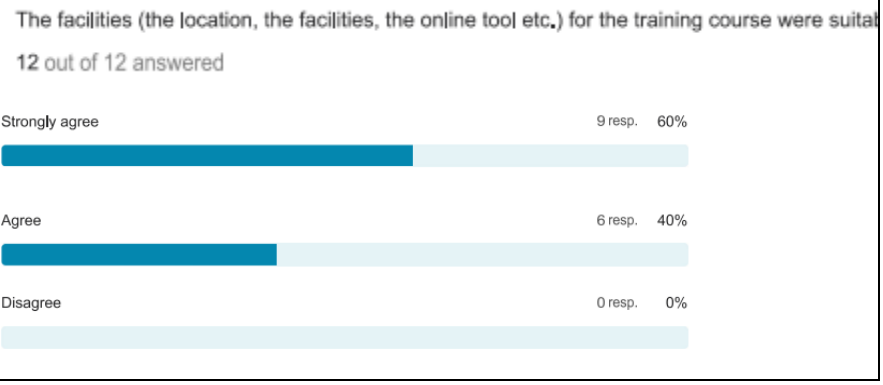
Results

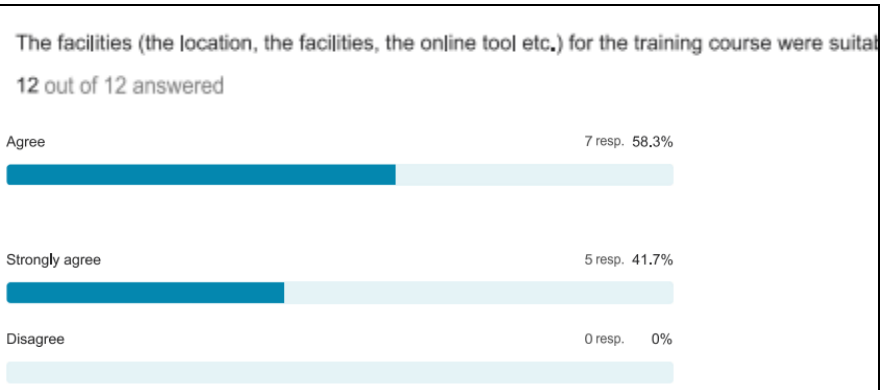
FEEDBACK FROM PARTICIPANTS

Evaluation of facilities represent in average satisfactory level:

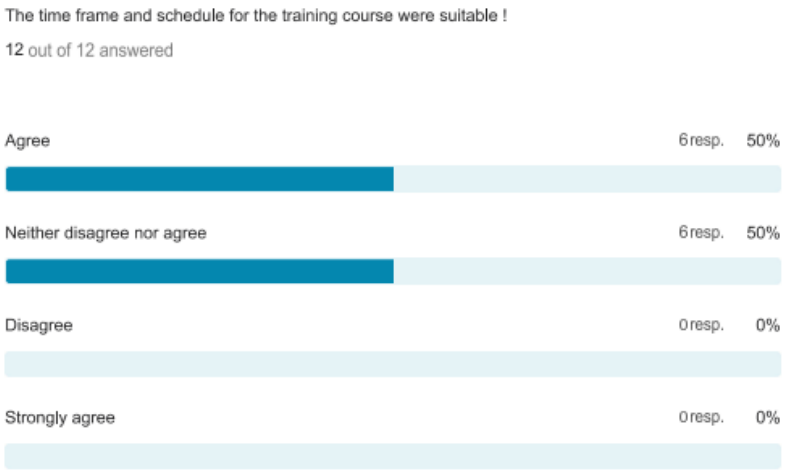
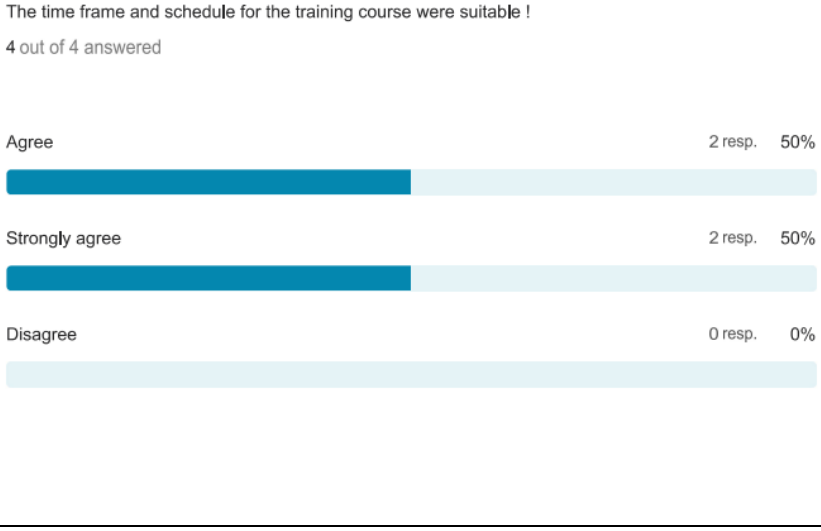
Group no.1 PP19&PP20	

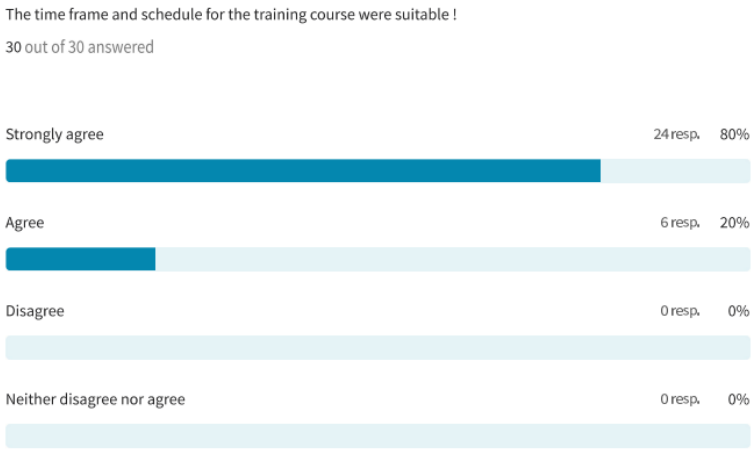
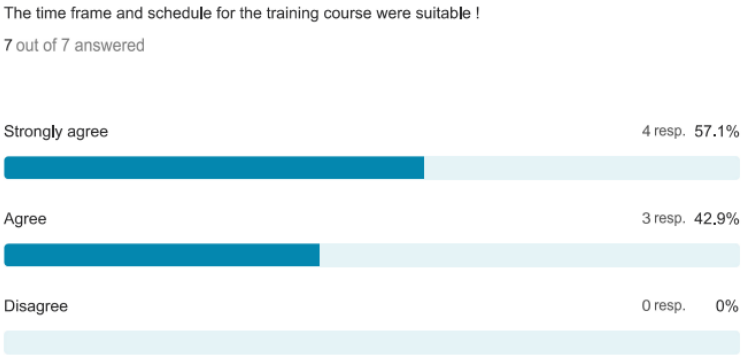
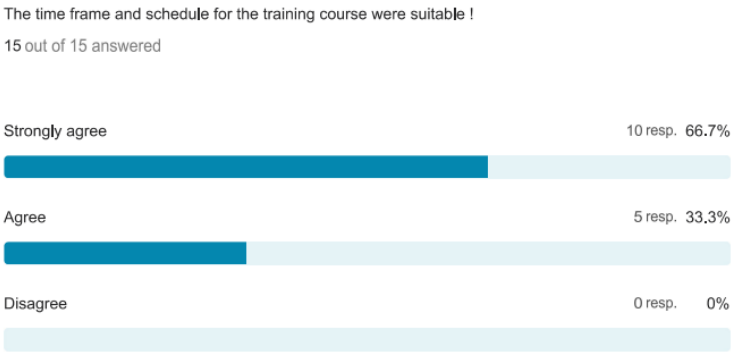
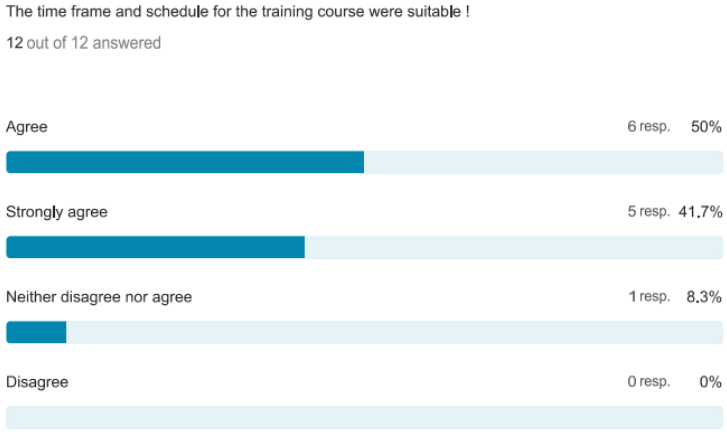
[26] Prepared by Riga Stradiņš University representatives Prof. Tatjana Muravska, Dr.adm. Sergejs Stacenko, Mg.iur, PhD cand. Liga Sileniece

Group no. 2 PP5	
Group no. 3 PP7	
Group no. 4 PP8	
Group no. 5 PP10	

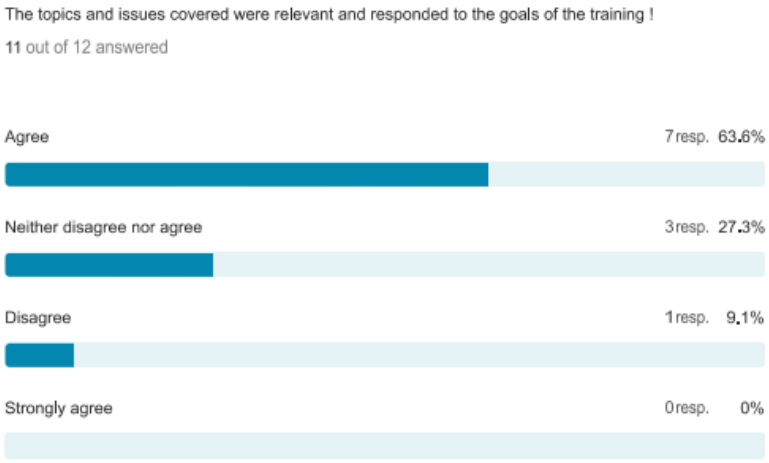
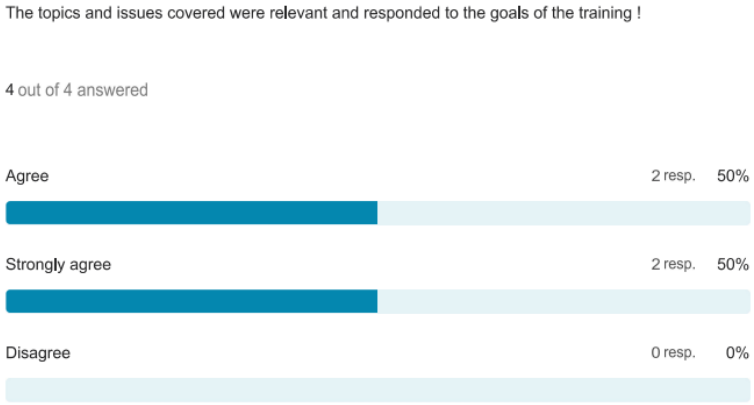
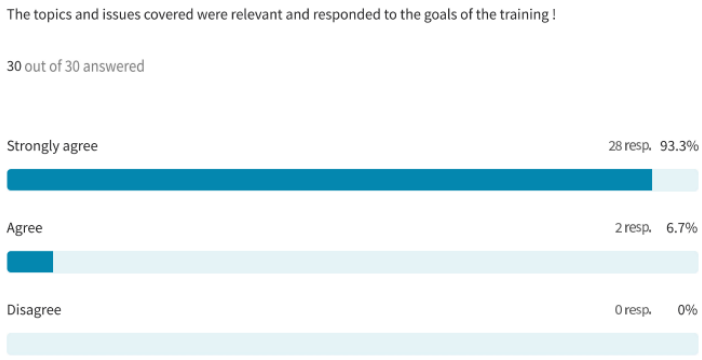
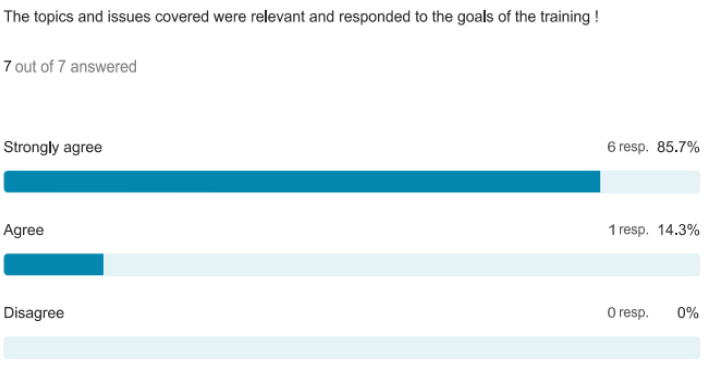
Group no. 6 PP16	

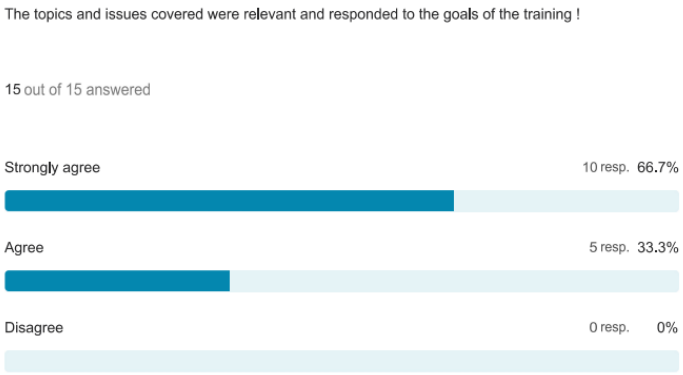
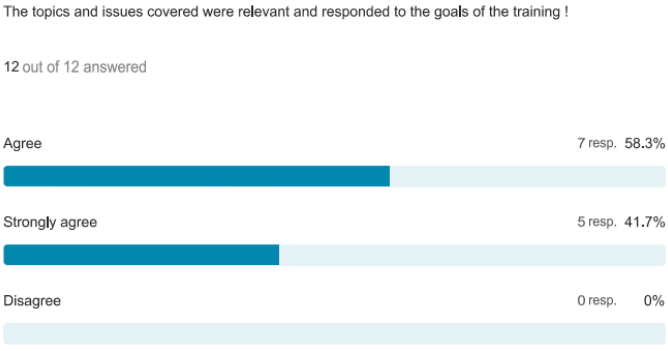
Evaluation of time frame and schedule represents in average satisfactory level:

Group no.1 PP19&PP20	
Group no. 2 PP5	

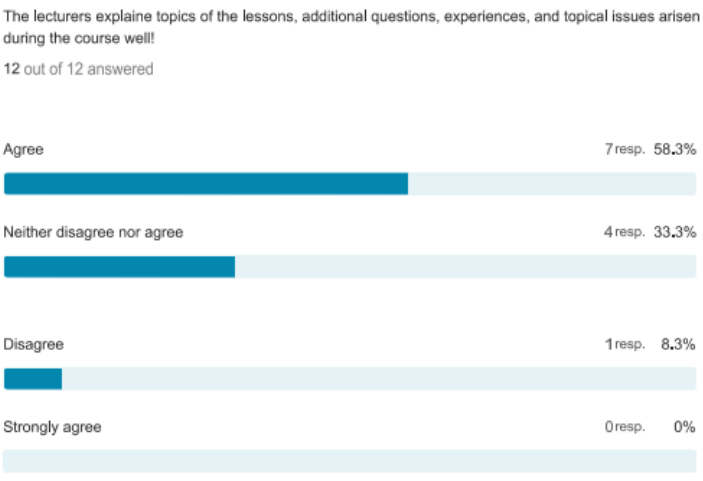
Group no. 3 PP7	
Group no. 4 PP8	
Group no. 5 PP10	
Group no. 6 PP16	

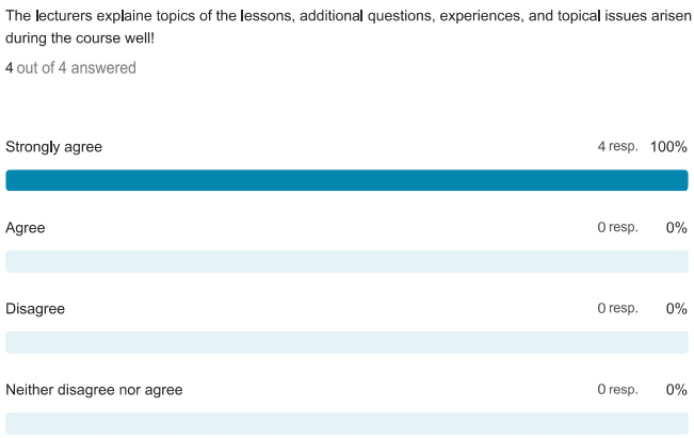
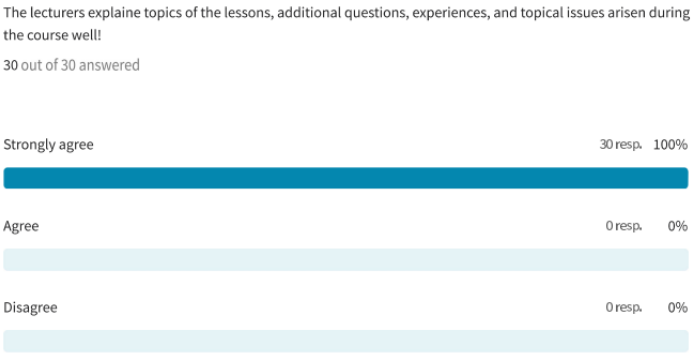
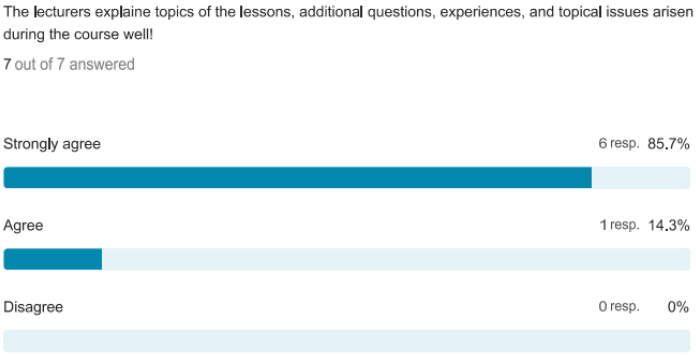
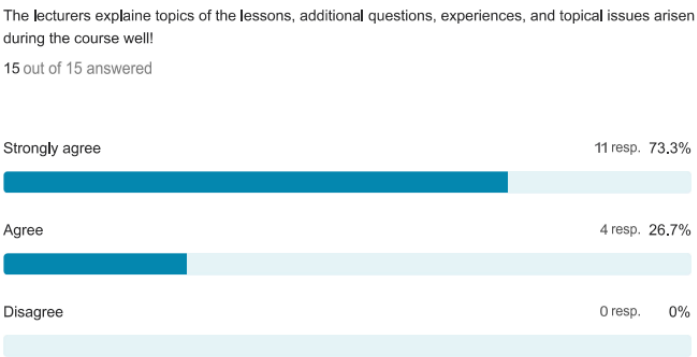
Evaluation of relevance of the topics and issues represents in average satisfactory level:

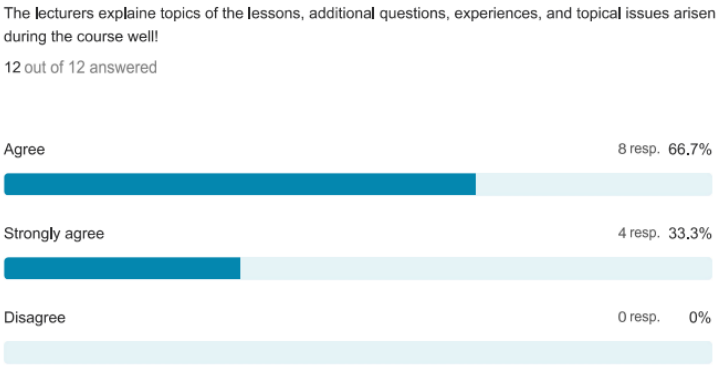
Group no.1 PP19&PP20	
Group no. 2 PP5	
Group no. 3 PP7	
Group no. 4 PP8	

Group no. 5 PP10	
Group no. 6 PP16	

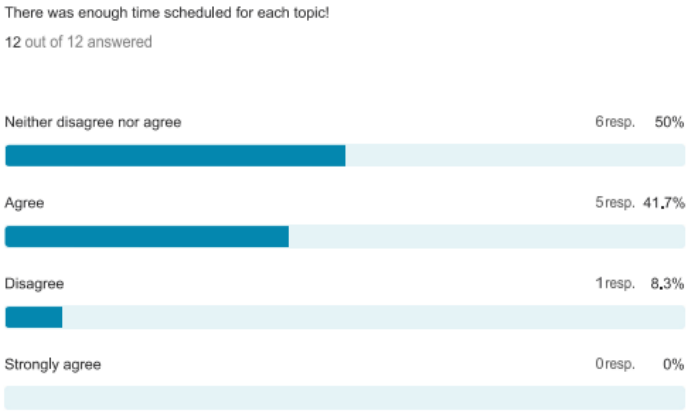
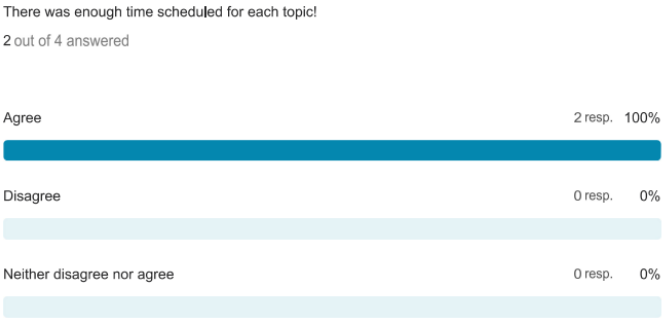
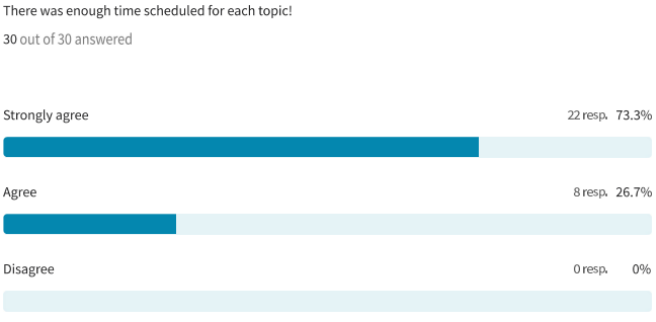
Evaluation of study content delivery process represents in average satisfactory level:

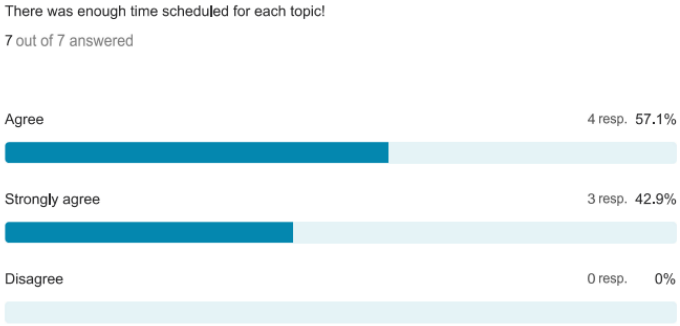
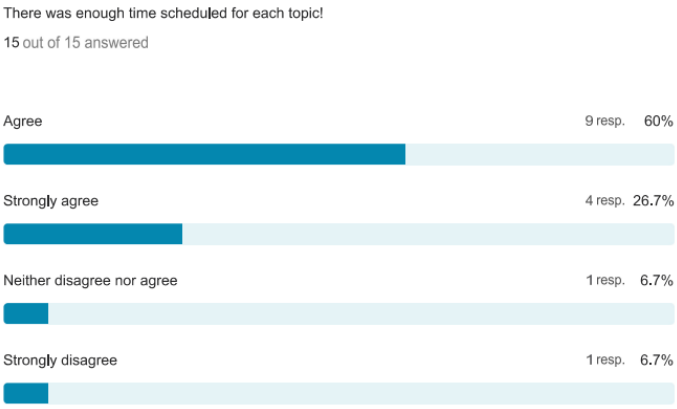
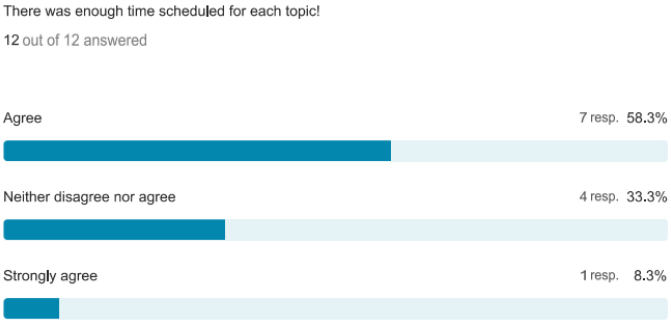
Group no.1 PP19&PP20	

Group no. 2 PP5	
Group no. 3 PP7	
Group no. 4 PP8	
Group no. 5 PP10	

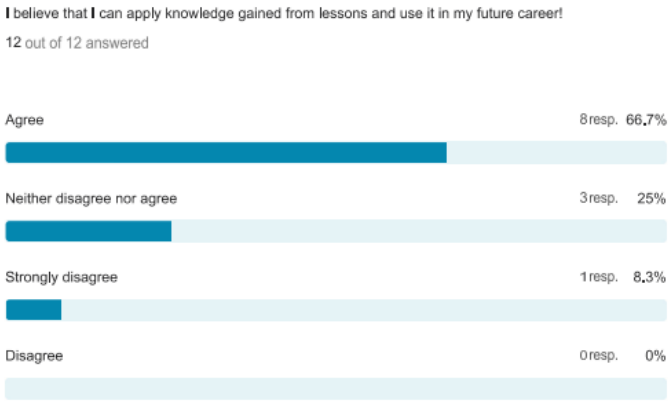
Group no. 6 PP16	

Evaluation of the time frame for topics differs among groups, but in average represents satisfactory level:

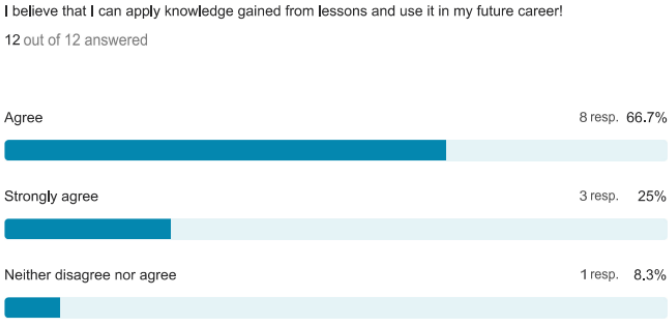
Group no.1 PP19&PP20	
Group no. 2 PP5	
Group no. 3 PP7	

Group no. 4 PP8	
Group no. 5 PP10	
Group no. 6 PP16	

Evaluation of the outcomes and impact on professional carrier growth differs among groups. Minor part of participants reported that they disagree with statement that gained knowledge will have impact on their future career.

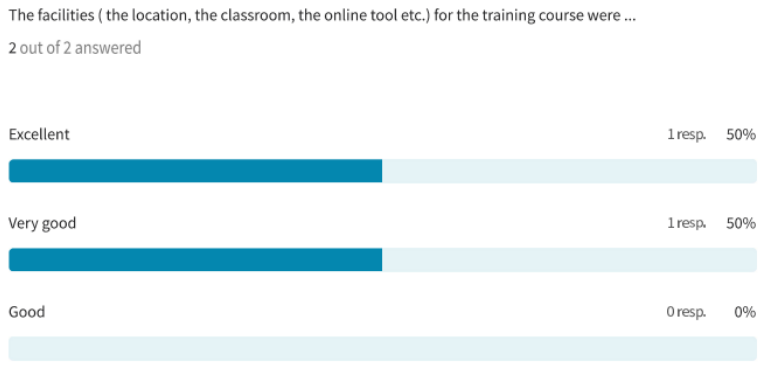
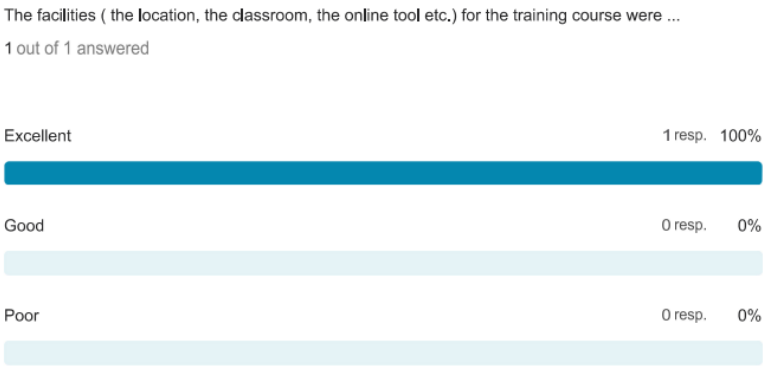
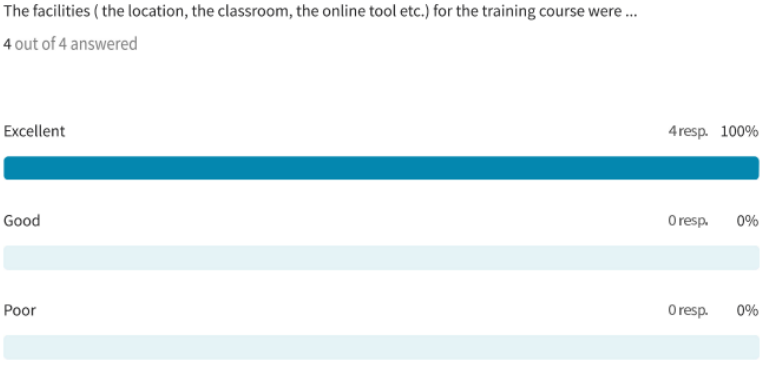
Group no.1 PP19&PP20	

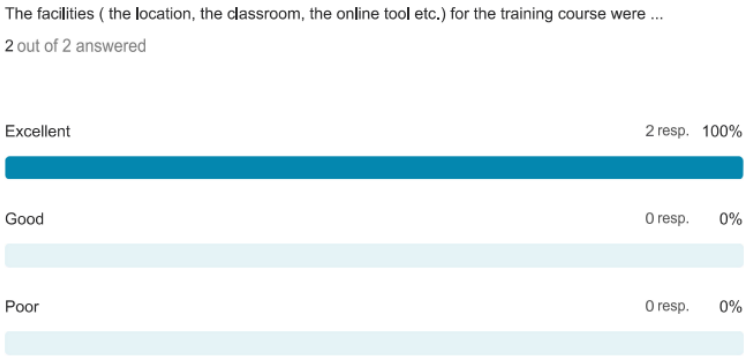
Group no. 2 PP5	I believe that I can apply knowledge gained from lessons and use it in my future career! 4 out of 4 answered Agree 3 resp. 75% Strongly agree 1 resp. 25% Disagree 0 resp. 0%
Group no. 3 PP7	I believe that I can apply knowledge gained from lessons and use it in my future career! 29 out of 30 answered Strongly agree 18 resp. 62.1% Agree 10 resp. 34.5% Neither disagree nor agree 1 resp. 3.4%
Group no. 4 PP8	I believe that I can apply knowledge gained from lessons and use it in my future career! 7 out of 7 answered Agree 5 resp. 71.4% Strongly agree 2 resp. 28.6% Disagree 0 resp. 0%
Group no. 5 PP10	I believe that I can apply knowledge gained from lessons and use it in my future career! 15 out of 15 answered Agree 8 resp. 53.3% Strongly agree 6 resp. 40% Neither disagree nor agree 1 resp. 6.7% Disagree 0 resp. 0%

Group no. 6 PP16	

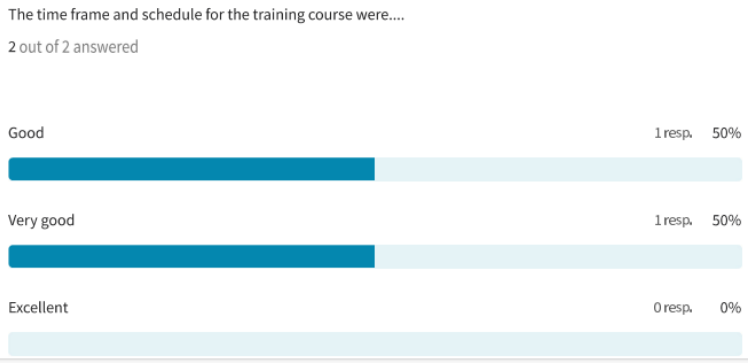
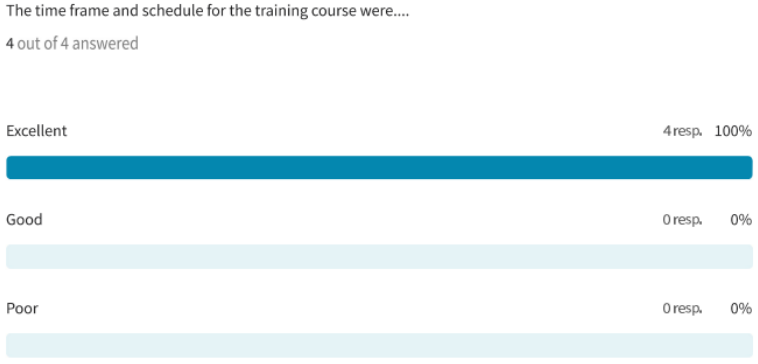
FEEDBACK FROM LECTUERS

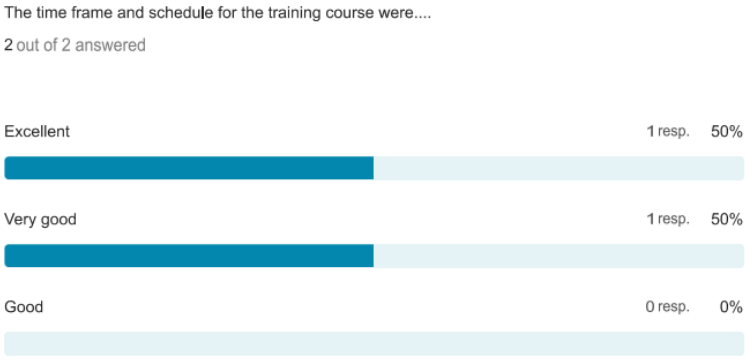
Facilities are evaluated as very good and excellent, what results in minor differences of evaluation of particular criteria.

Group no.1 PP19&PP20	
Group no. 2 PP5	
Group no. 3 PP7	

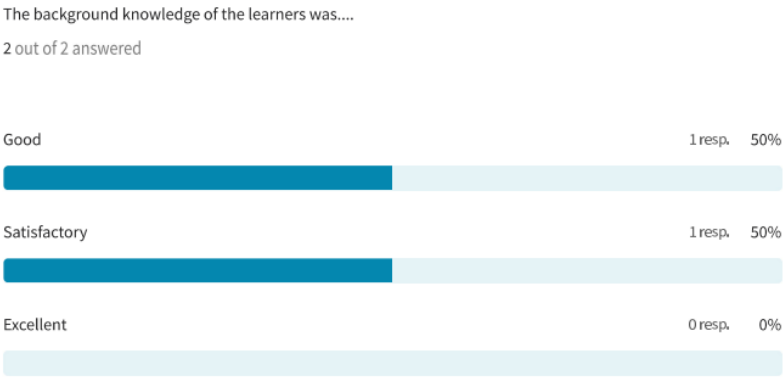
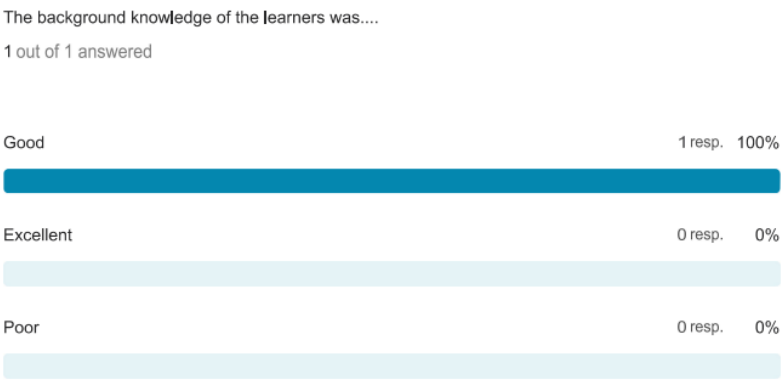
Group no. 5 PP10	

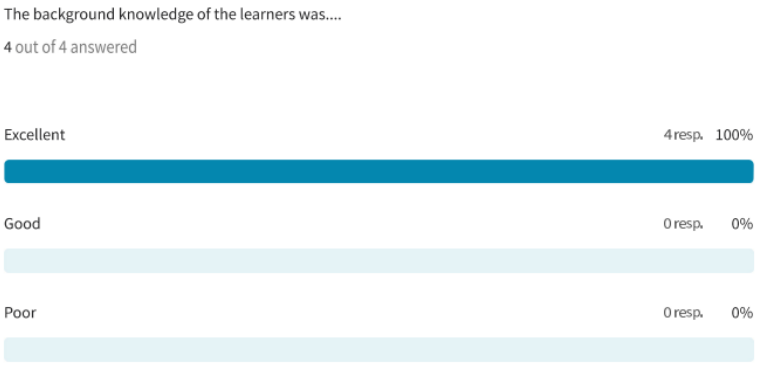
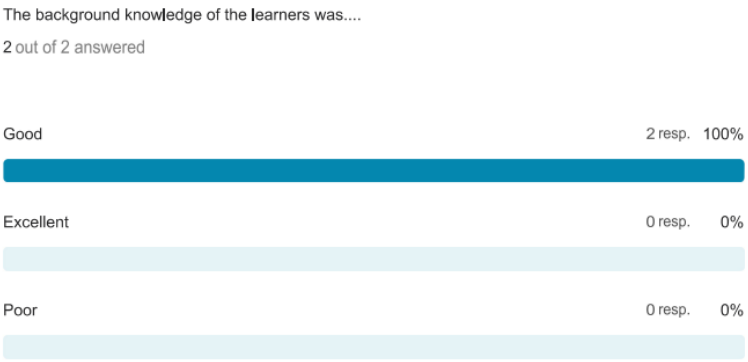
Time frame is evaluated as good, very good and excellent, what results in minor differences of evaluation of particular criteria.

Group no.1 PP19&PP20	
Group no. 2 PP5	
Group no. 3 PP7	

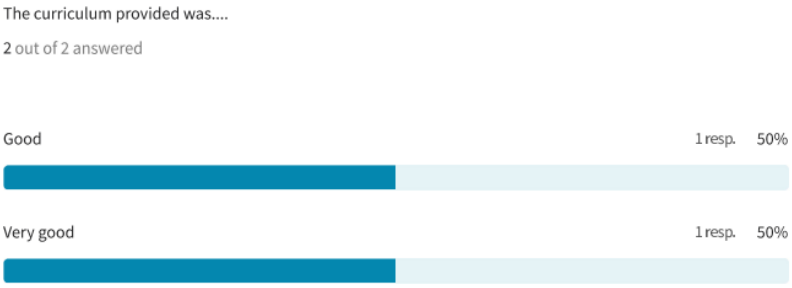
Group no. 5 PP10	

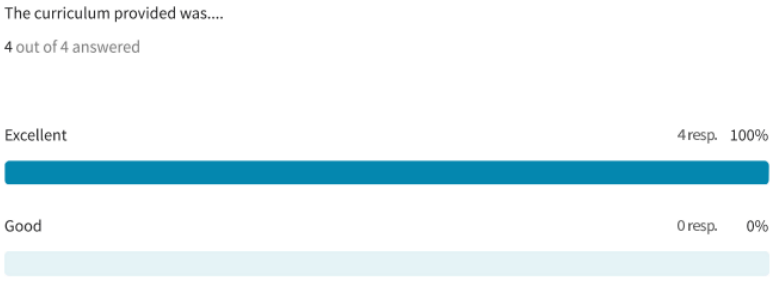
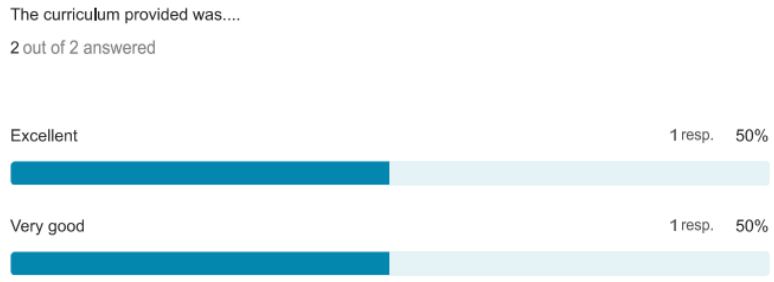
Background knowledge of learners was evaluated as “excellent”, “satisfactory”, “good”. Thus, in the context of learners` readiness to acquire new knowledge the design of the training instrument is appropriate for chosen target groups.

Group no.1 PP19&PP20	
Group no. 2 PP5	

Group no. 3 PP7	
Group no. 5 PP10	

The curriculum of the training instrument was evaluated as “excellent”, “very good” and “good”, what results in differences of evaluation of particular criteria.

Group no.1 PP19&PP20	
Group no. 2 PP5	

Group no. 3 PP7	
Group no. 5 PP10	

Conclusion

Based on the evaluation results it is concluded that the teaching instrument “Preparation and management of SMEs for work in the Green Economy” developed and tested by Project partners PP19, PP20, PP10, PP5, PP7, PP8, PP16 with in 3LoE Project - Three-level centres of professional excellence: Qualification, entrepreneurship and innovation in the Green Economy meets the relevance of achieving the goal of teaching instrument and overall has expected impact on professional development of training participants.

Feedback form training participants and teachers suggest that the curriculum meets the targets of the teaching instrument. The knowledge creation and sharing were realized appropriately, and participants have assimilated knowledge and tools. Evaluation of the outcomes and impact on professional carrier growth differs among groups.

8.2 Waste reduction and recycling management

Introduction

The objective of the evaluation is to determine whether the goals of the program were achieved and does the teaching instrument has an impact on student’s career and opportunities.

The type of the evaluation follows standard course evaluation methods, i.e. formative, process by analyzing feedback surveys to ensure that designed and implemented training really met the needs of the training participants, i.e. assure or improve the quality of program.

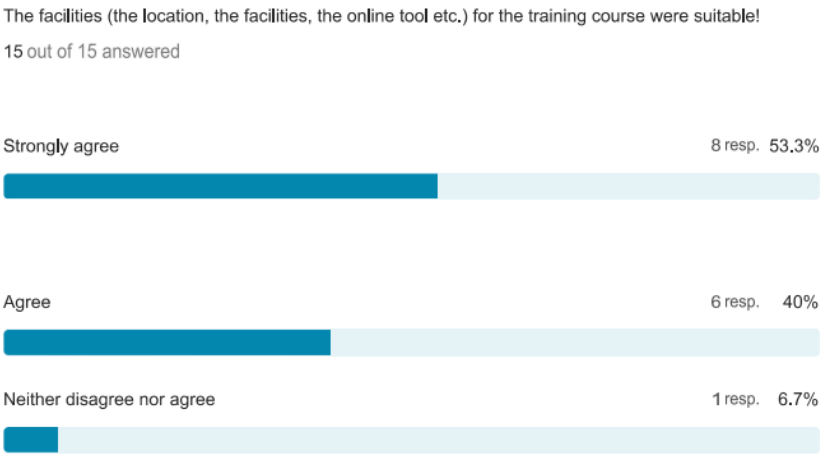
Feedback surveys were designed to collect data from training participants and teachers of the course. Respondents were asked to fill in online survey designed in typeform.com platforms. Feedback surveys were filled in just after the finalization of the training following the invitation of training organizers. The organizers of the training have clearly explained to respondents' purposes of the feedback survey and further usage of data collected. The participation in evaluation by filling in the online feedback survey was voluntary.

15 training participants have submitted their feedback. The gender representation: female 0 %, male 100 %. Age groups: 50 or younger – 100 %, below 50 – 0 %.

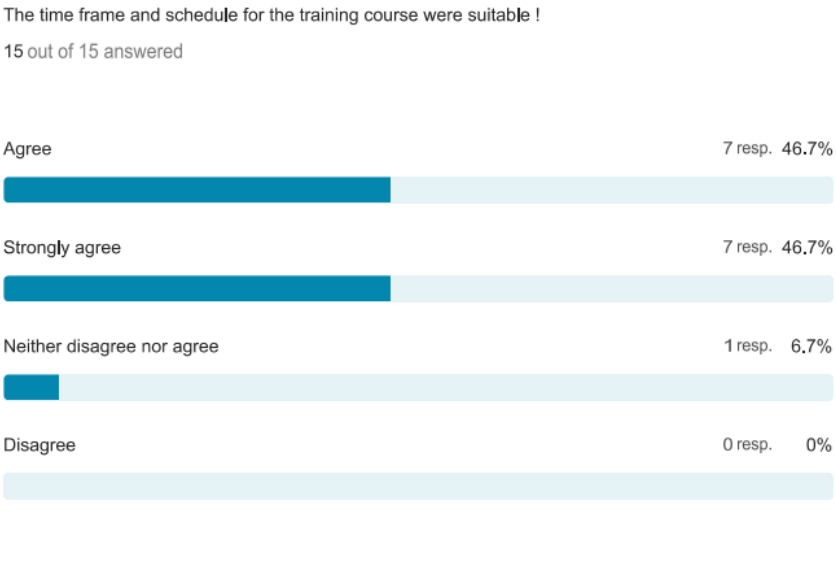
Results

FEEDBACK FROM PARTICIPANTS

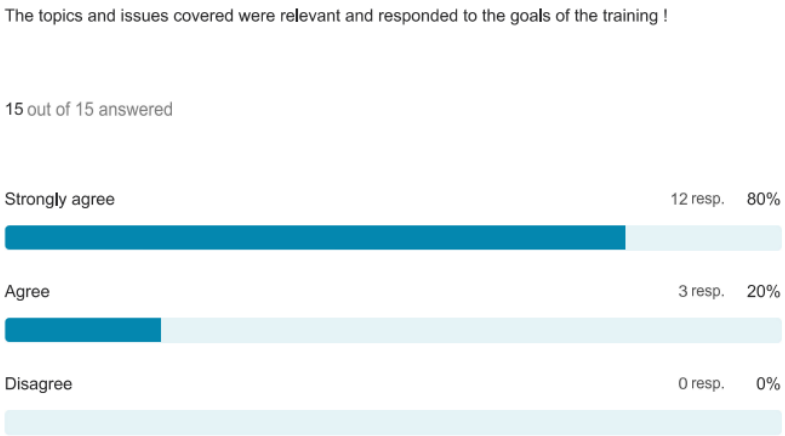
Evaluation of facilities represent satisfactory level:

PP10 LAK	

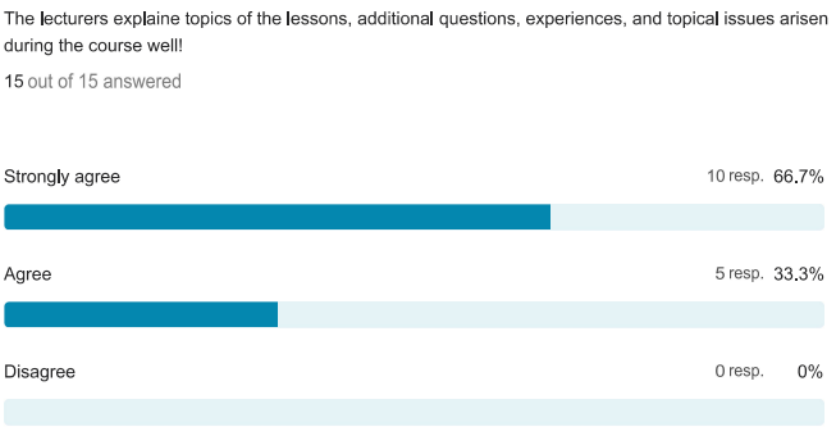
Evaluation of time frame and schedule represents satisfactory level.

PP10 LAK	

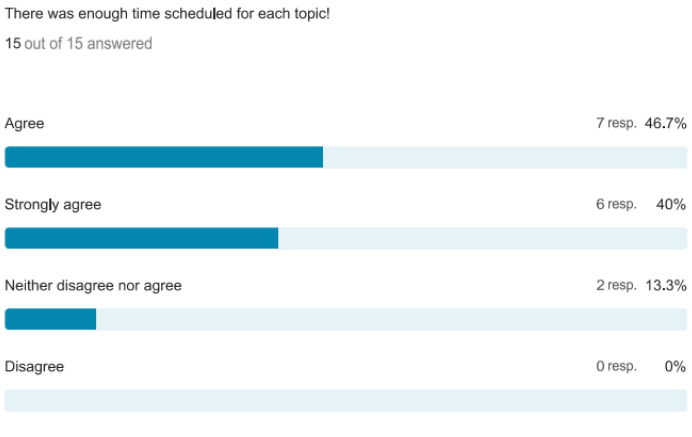
Evaluation of relevance of the topics and issues represents satisfactory level:

PP10 LAK	

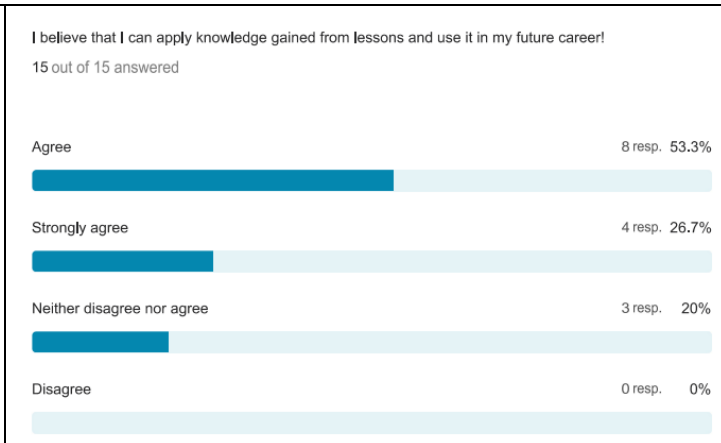
Evaluation of study content delivery process represents average satisfactory level:

PP10 LAK	

Evaluation of time allocation to each topic represents satisfactory level:

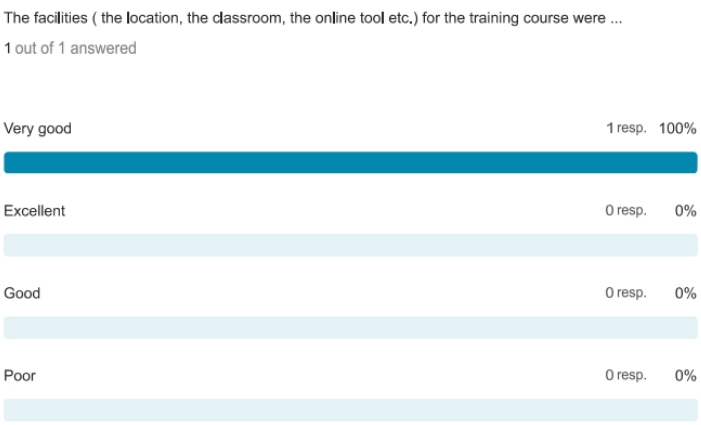
PP10 LAK	

Evaluation of the outcomes and impact on professional carrier growth represents in average satisfactory level:

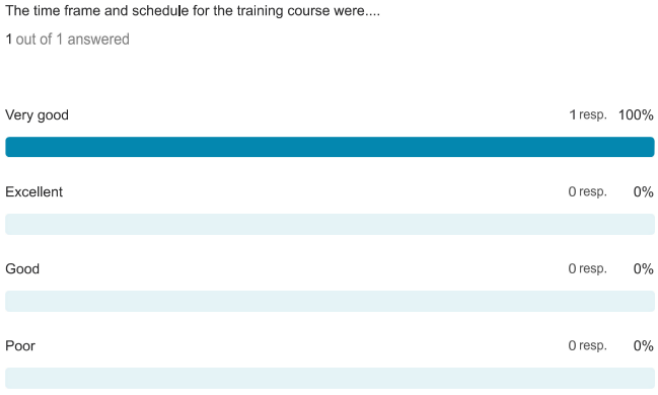
PP10 LAK	

FEEDBACK FROM LECTUERS

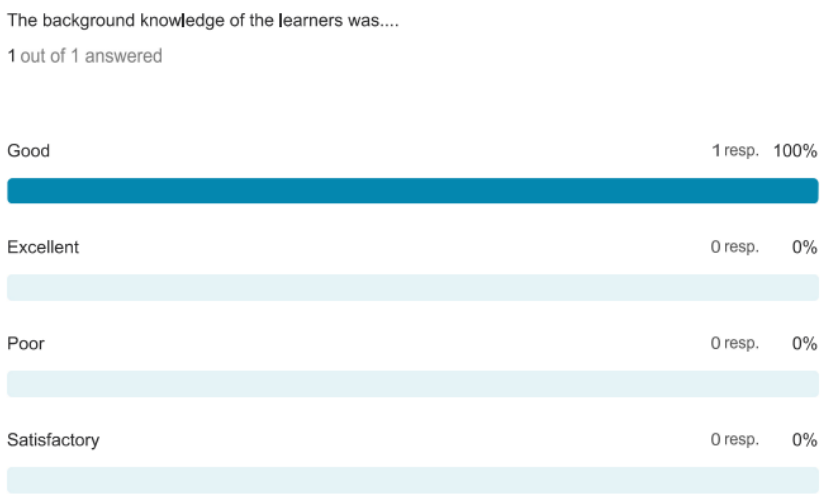
Facilities are evaluated as very good and meets evaluation criteria.

PP10 LAK	

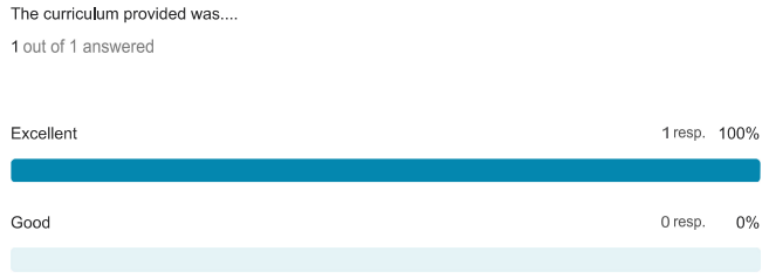
Time frame is evaluated as very good and meets evaluation criteria.

PP10 LAK	

Bacground knowledge of learners was evaluated as good and meets evaluation criteria.

PP18 DEGC, PP19 SRRA & PP20 IPM	

The curriculum of the training instrument was evaluated “excellent” and meets evaluation criteria.

PP18 DEGC, PP19 SRRA & PP20 IPM	

Conclusion

Based on the evaluation results it is concluded that the teaching instrument “Waste reduction and recycling management” developed and tested by Project partners PP10 LAK with in 3LoE Project - Three-level centres of professional excellence: Qualification, entrepreneurship and innovation in the Green Economy meets the relevance of achieving the goal of teaching instrument and overall has expected impact on professional development of training participants.

Feedback form training participants and teachers suggest that the curriculum meets the targets of the teaching instrument. The knowledge creation and sharing were realized appropriately, and participants have participants assimilated knowledge and tools. Evaluation of the outcomes and impact on professional carrier growth meets evaluation criteria.

8.3 Wastewater treatment and recycling management

Introduction

The objective of the evaluation is to determine whether the goals of the program were achieved and does the teaching instrument has an impact on student's career and opportunities.

The type of the evaluation follows standard course evaluation methods, i.e. formative, process by analyzing feedback surveys (see annex no. 1&2) to ensure that designed and implemented training really met the needs of the training participants, i.e. assure or improve the quality of program.

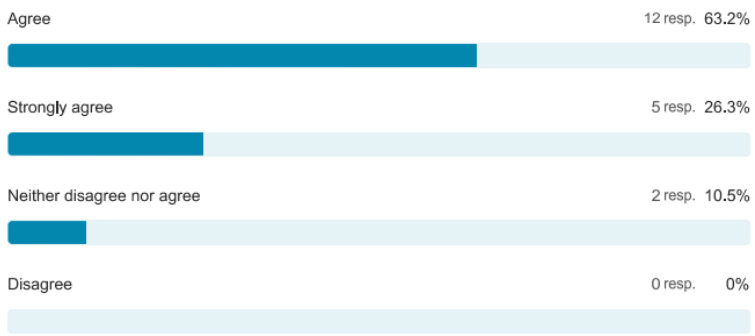
Feedback surveys were designed to collect data from training participants and teachers of the course. Respondents were asked to fill in online survey designed in typeform.com platforms. Feedback surveys were filled in just after the finalization of the training following the invitation of training organizers. The organizers of the training have clearly explained to respondents' purposes of the feedback survey and further usage of data collected. The participation in evaluation by filling in the online feedback survey was voluntary.

20 training participants have submitted their feedback. The gender representation: female 25%, male 75%. Age groups: 50 or younger – 75 %, below 50 – 25 %.

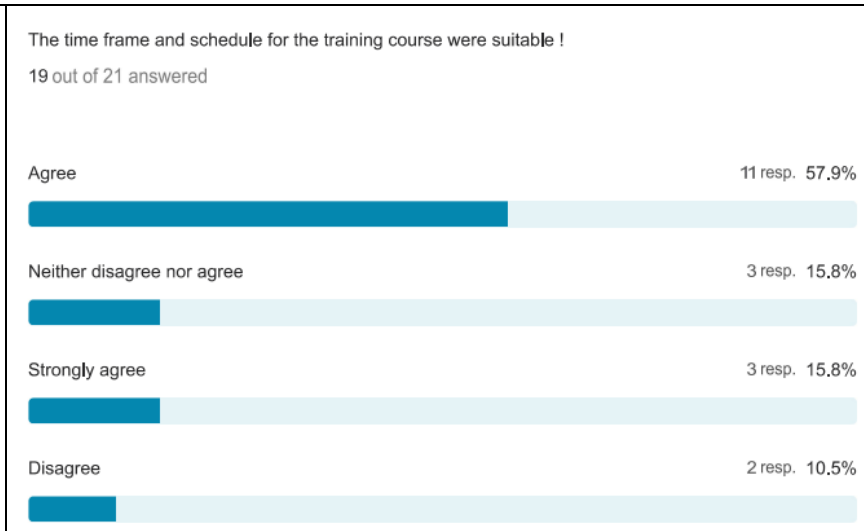
Results

FEEDBACK FROM PARTICIPANTS

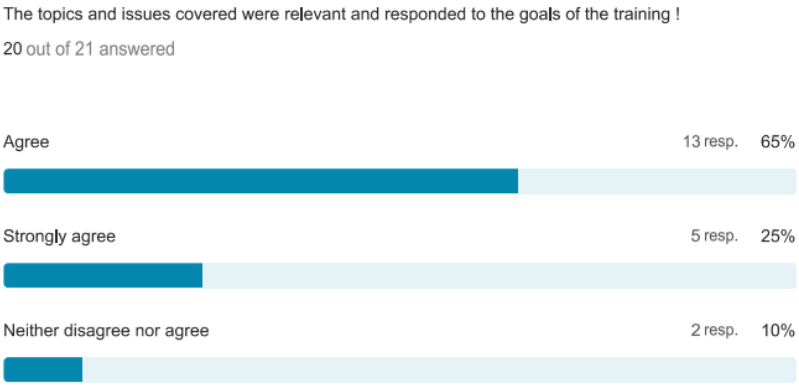
Evaluation of facilities represent satisfactory level:

PP18 DEGC, PP19 SRRA & PP20 IPM	

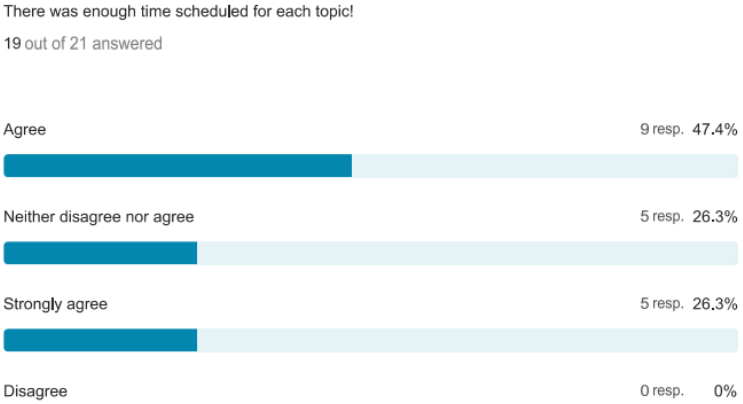
Evaluation of time frame and schedule represents satisfactory level, but due to minor disagreements with the statement is subject for revision:

PP18 DEGC, PP19 SRRA & PP20 IPM	

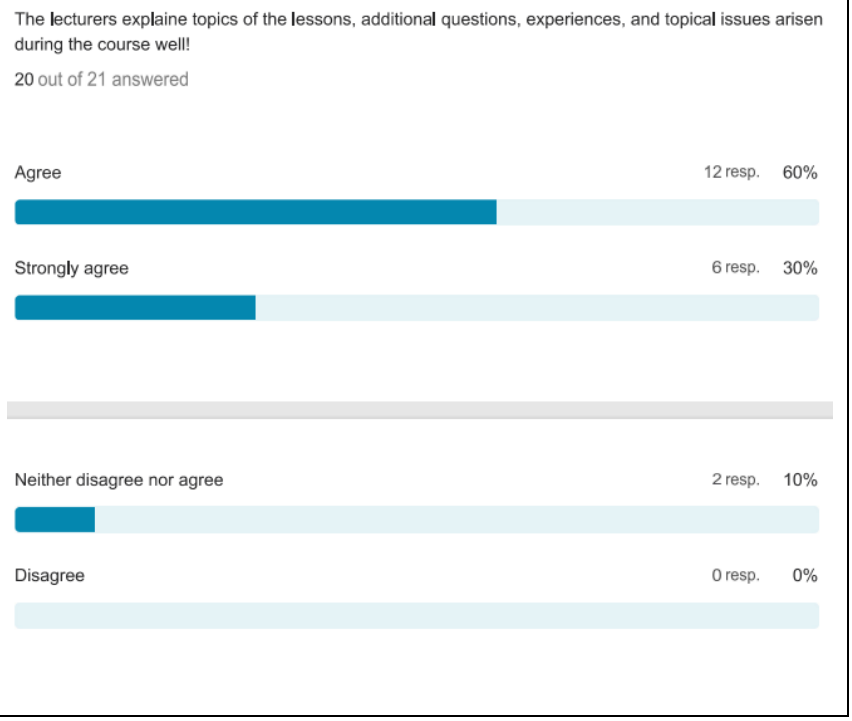
Evaluation of relevance of the topics and issues represents satisfactory level:

PP18 DEGC, PP19 SRRA & PP20 IPM	

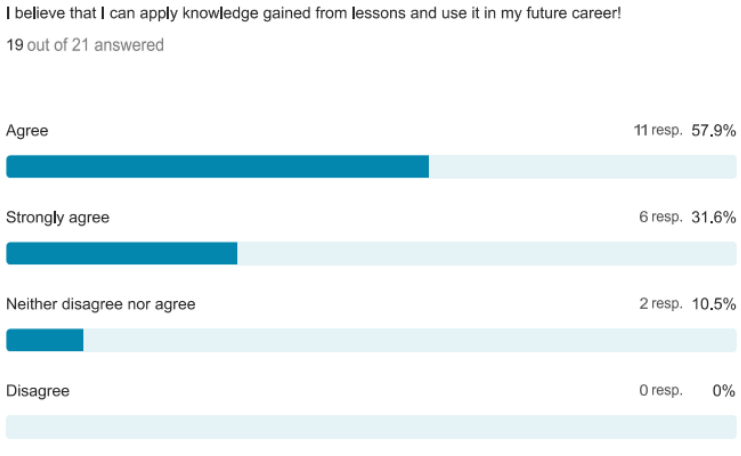
Evaluation of time allocation to each topic represents satisfactory level:

PP18 DEGC, PP19 SRRA & PP20 IPM	

Evaluation of study content delivery process represents average satisfactory level:

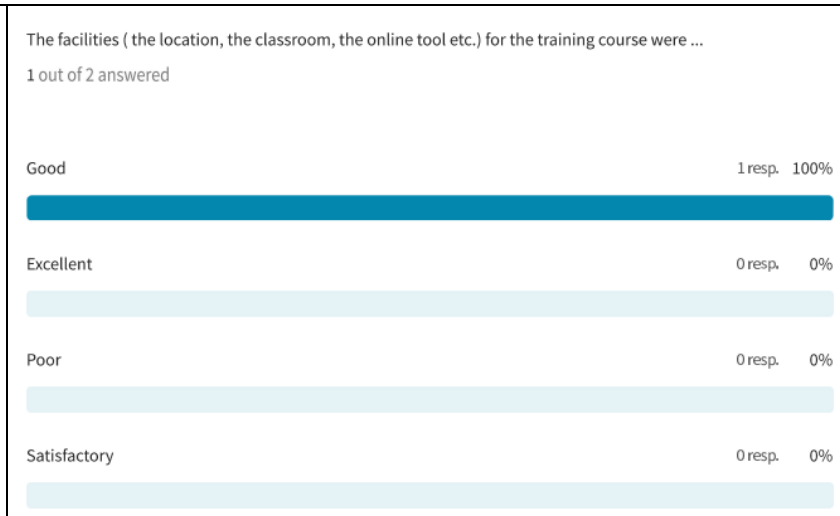
PP18 DEGC, PP19 SRRA & PP20 IPM	

Evaluation of the outcomes and impact on professional carrier growth represents in average satisfactory level:

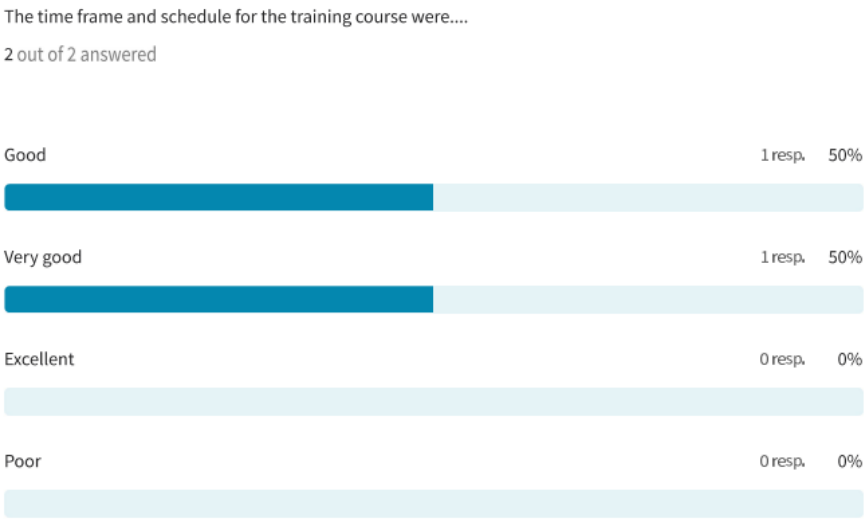
PP18 DEGC, PP19 SRRA & PP20 IPM	

FEEDBACK FROM LECTUERS

Facilities are evaluated as good and meets evaluation criteria.

PP18 DEGC, PP19 SRRA & PP20 IPM	

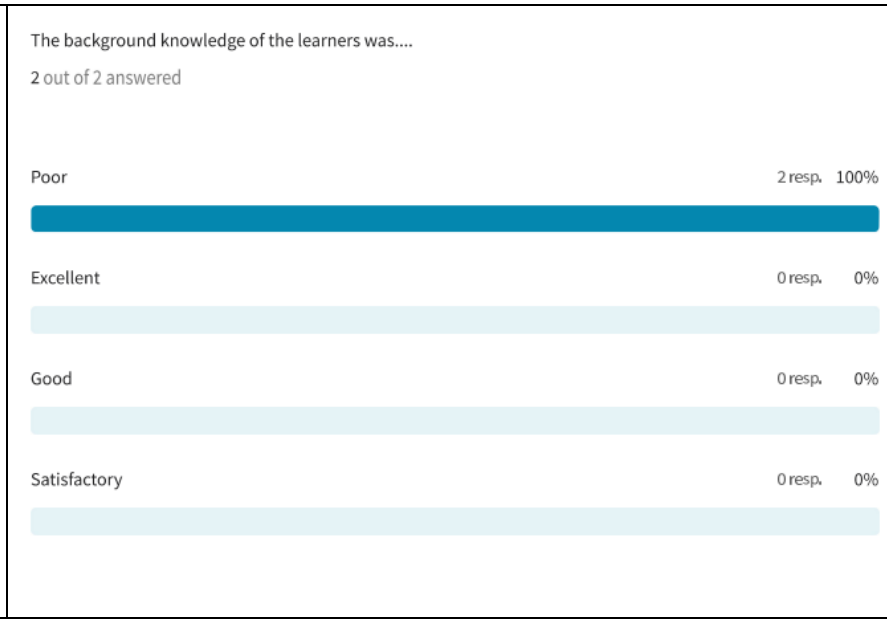
Time frame is evaluated as good and meets evaluation criteria.

PP18 DEGC, PP19 SRRA & PP20 IPM	

The curiculum of the training instrumet was evaluated “good” and meets evaluation criteria.

PP18 DEGC, PP19 SRRA & PP20 IPM	

Background knowledge of learners was evaluated as satisfactory and meets evaluation criteria.

PP18 DEGC, PP19 SRRA & PP20 IPM	

Conclusion

Based on the evaluation results it is concluded that the teaching instrument "Wastewater treatment and recycling management" developed and tested by Project partners PP18 DEGC, PP19 SRRA & PP20 IPM with in 3LoE Project - Three-level centres of professional excellence: Qualification, entrepreneurship and innovation in the Green Economy meets the relevance of achieving the goal of teaching instrument and overall has expected impact on professional development of training participants.

Feedback form training participants and teachers suggest that the curriculum meets the targets of the teaching instrument. The knowledge creation and sharing were realized appropriately, and participants have participants assimilated knowledge and tools. Evaluation of the outcomes and impact on professional carrier growth meets evaluation criteria. The venue and equipment were appropriate for the training course. Evaluation of time frame and schedule represents satisfactory level, but due to minor disagreements with the statement is subject for revision.

8.4 Water supply and saving

Introduction

The objective of the evaluation is to determine whether the goals of the program were achieved and does the teaching instrument has an impact on student's career and opportunities.

The type of the evaluation follows standard course evaluation methods, i.e. formative, process by analyzing feedback surveys to ensure that designed and implemented

training really met the needs of the training participants, i.e. assure or improve the quality of program.

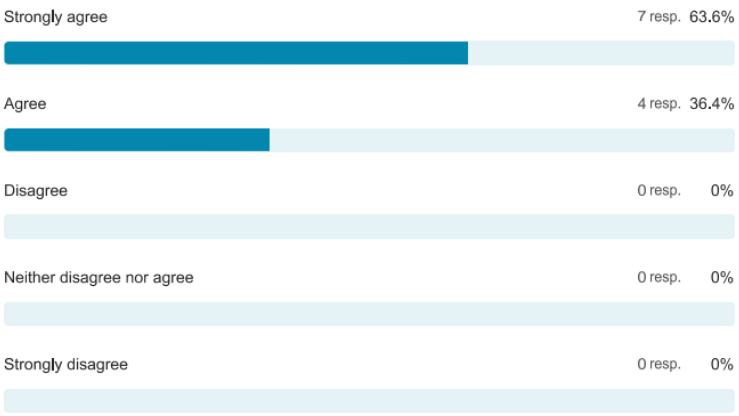
Feedback surveys were designed to collect data from training participants and teachers of the course. Respondents were asked to fill in online survey designed in typeform.com platforms. Feedback surveys were filled in just after the finalization of the training following the invitation of training organizers. The organizers of the training have clearly explained to respondents' purposes of the feedback survey and further usage of data collected. The participation in evaluation by filling in the online feedback survey was voluntary.

11 training participants have submitted their feedback. The gender representation: female 37%, male 63 %. Age groups: 50 or younger – 100 %, below 50 – 0%.

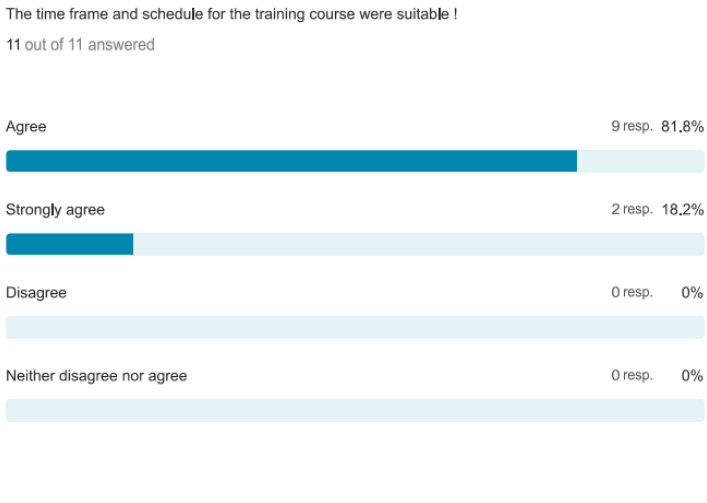
Results

FEEDBACK FROM PARTICIPANTS

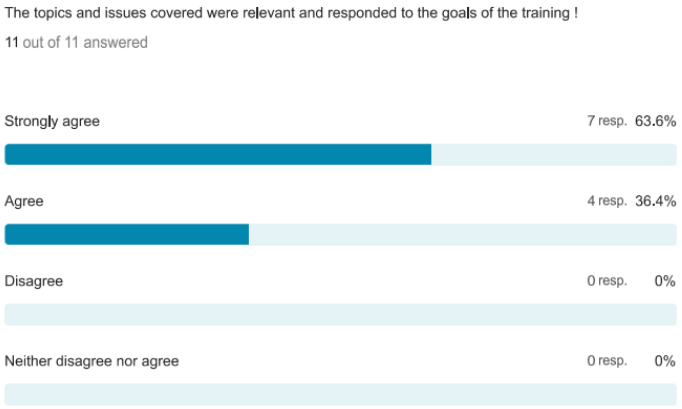
Evaluation of facilities represent satisfactory level:

PP18 DEGC, PP19 SRRA & PP20 IPM	

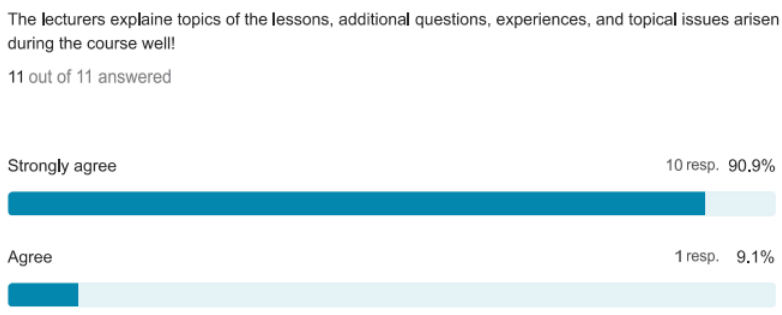
Evaluation of time frame and schedule represents satisfactory level:

PP18 DEGC, PP19 SRRA & PP20 IPM	

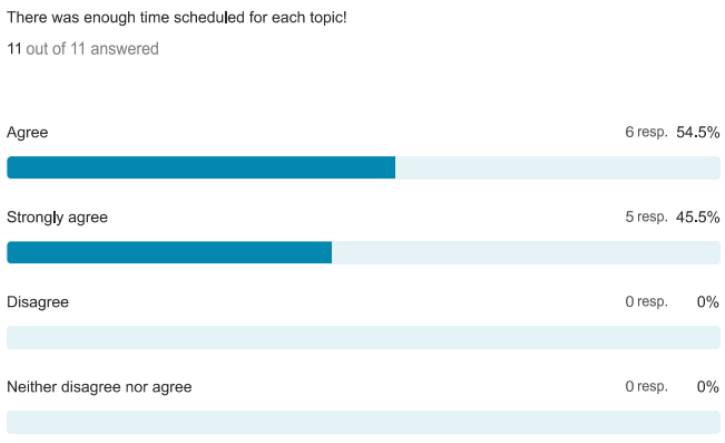
Evaluation of relevance of the topics and issues represents satisfactory level:

PP18 DEGC, PP19 SRRA & PP20 IPM	

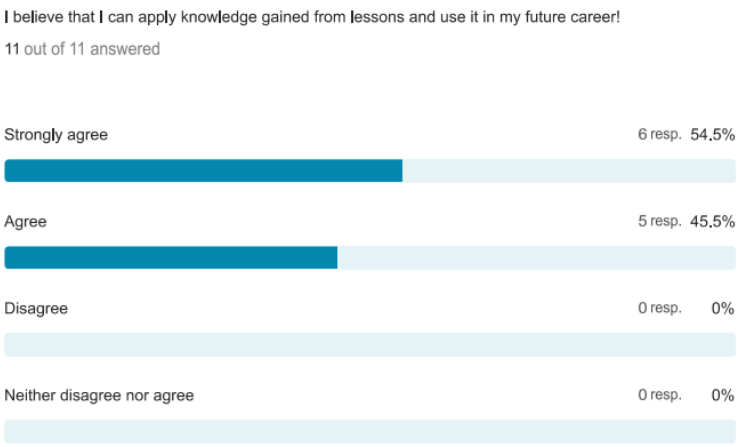
Evaluation of study content delivery process represents average satisfactory level:

PP18 DEGC, PP19 SRRA & PP20 IPM	

Evaluation of time allocation to each topic represents satisfactory level:

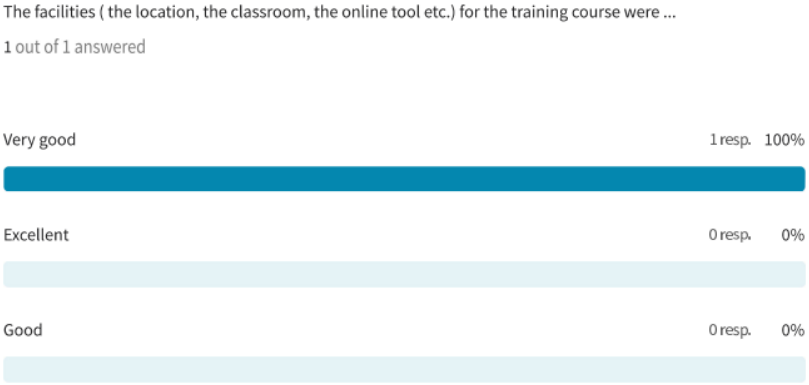
PP18 DEGC, PP19 SRRA & PP20 IPM	

Evaluation of the outcomes and impact on professional carrier growth represents in average satisfactory level:

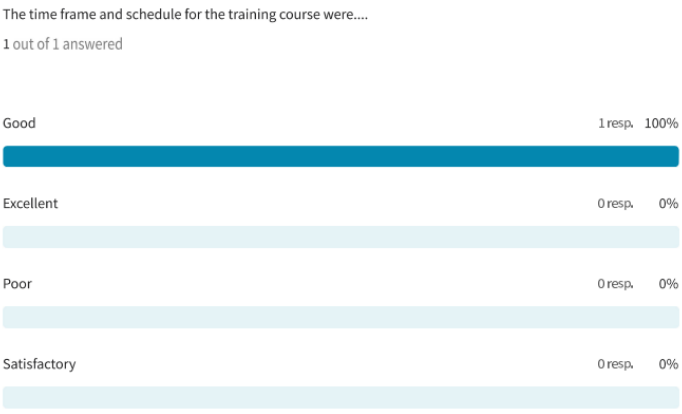
PP18 DEGC, PP19 SRRA & PP20 IPM	

FEEDBACK FROM LECTUERS

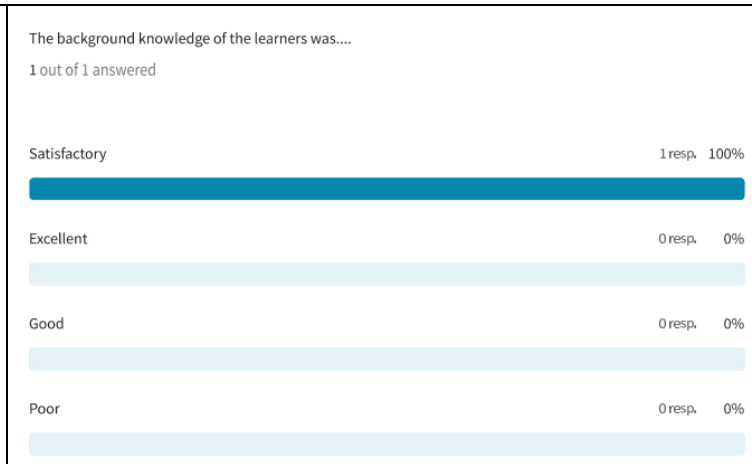
Facilities are evaluated as good and very good and meets evaluation criteria.

PP18 DEGC, PP19 SRRA & PP20 IPM	

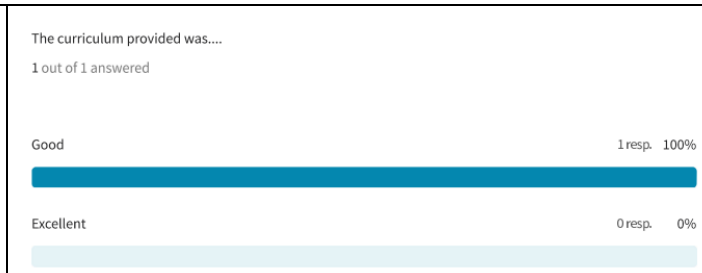
Time frame is evaluated as good and meets evaluation criteria.

PP18 DEGC, PP19 SRRA & PP20 IPM	

Background knowledge of learners was evaluated as satisfactory and meets evaluation criteria.

PP18 DEGC, PP19 SRRA & PP20 IPM	

The curriculum of the training instrument was evaluated “good” and meets evaluation criteria.

PP18 DEGC, PP19 SRRA & PP20 IPM	

Conclusion

Based on the evaluation results it is concluded that the teaching instrument “Water supply and saving” developed and tested by Project partners PP18 DEGC, PP19 SRRA & PP20 IPM with in 3LoE Project - Three-level centres of professional excellence: Qualification, entrepreneurship and innovation in the Green Economy meets the relevance of achieving the goal of teaching instrument and overall has expected impact on professional development of training participants.

Feedback form training participants and teachers suggest that the curriculum meets the targets of the teaching instrument. The knowledge creation and sharing were realized appropriately, and participants have participants assimilated knowledge and tools. Evaluation of the outcomes and impact on professional carrier growth meets evaluation criteria. The venue and equipment were appropriate for the training course.

8.5 Cardle to Cardle in SMEs

Introduction

The objective of the evaluation is to determine whether the goals of the program were achieved and does the teaching instrument has an impact on student’s career and opportunities.

The type of the evaluation follows standard course evaluation methods, i.e. formative, process by analyzing feedback surveys to ensure that designed and implemented

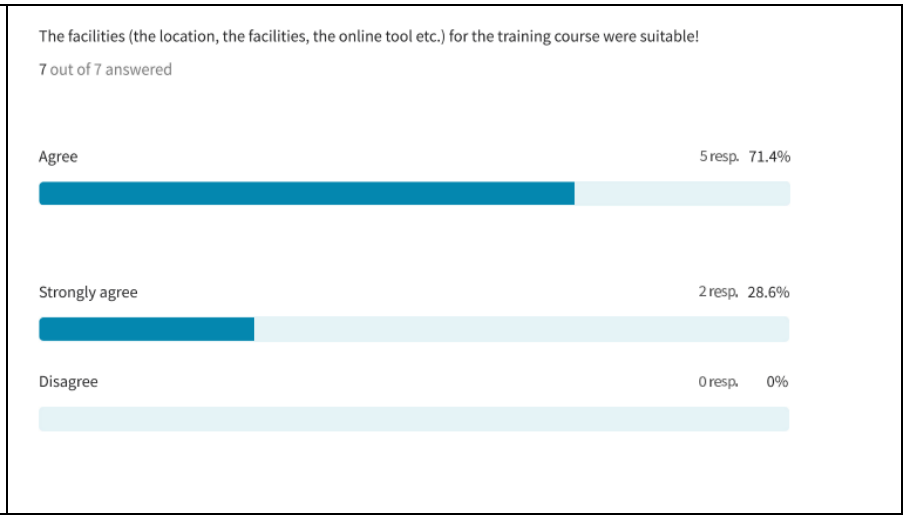
training really met the needs of the training participants, i.e. assure or improve the quality of program.

Feedback surveys were designed to collect data from training participants and teachers of the course. Respondents were asked to fill in online survey designed in typeform.com platforms. Feedback surveys were filled in just after the finalization of the training following the invitation of training organizers. The organizers of the training have clearly explained to respondents' purposes of the feedback survey and further usage of data collected. The participation in evaluation by filling in the online feedback survey was voluntary. 7 training participants have submitted their feedback. The gender representation: female 43%, male 57 %. Age groups: 50 or younger – 71 %, below 50 – 29%.

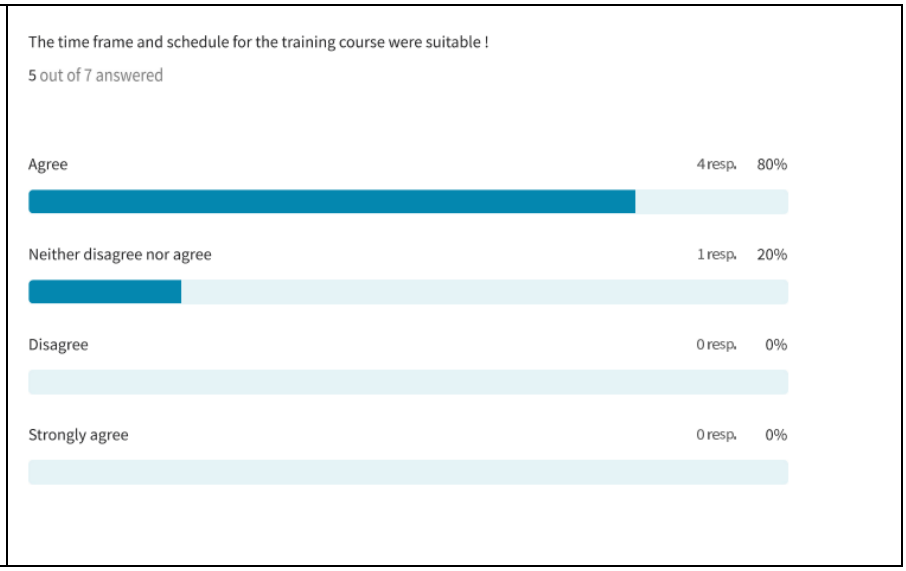
Results

FEEDBACK FROM PARTICIPANTS

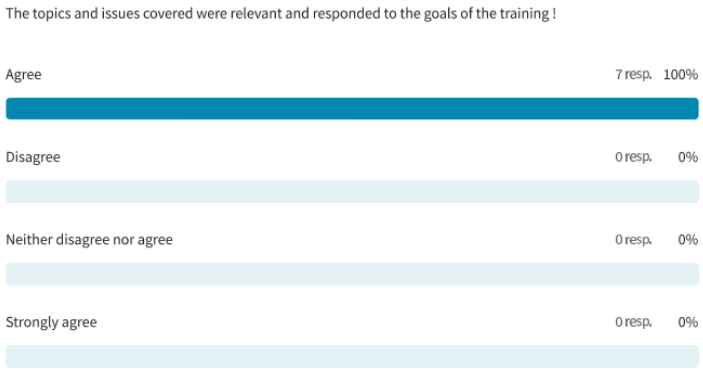
Evaluation of facilities represent satisfactory level:

PP16 T2I	

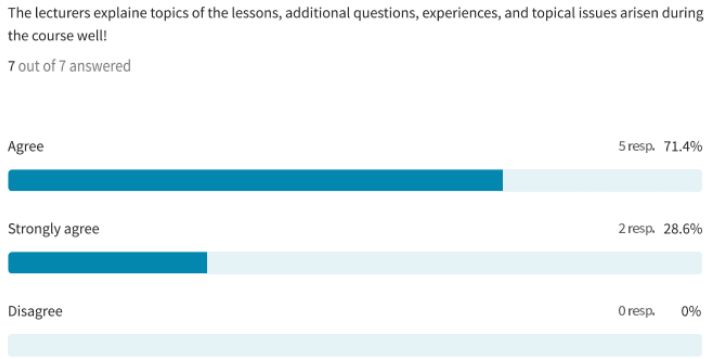
Evaluation of time frame and schedule represents satisfactory level:

PP16 T2I	

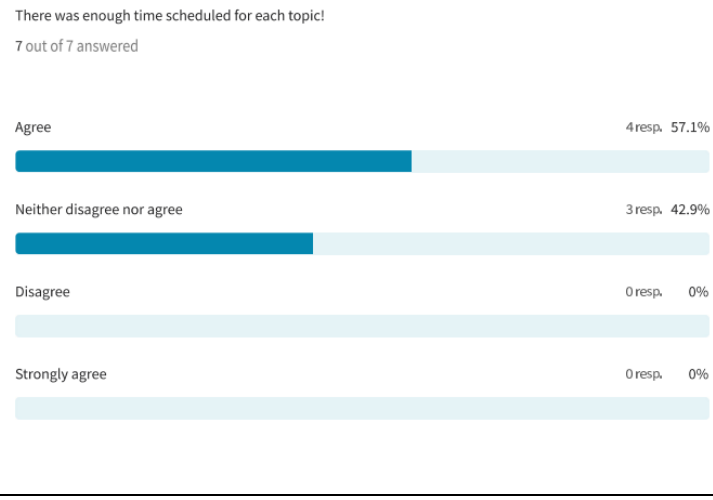
Evaluation of relevance of the topics and issues represents satisfactory level:

PP16 T2I	

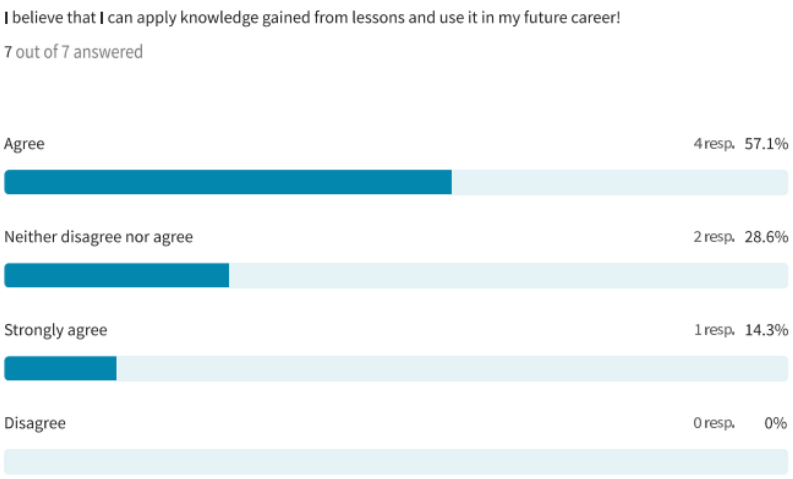
Evaluation of study content delivery process represents average satisfactory level:

PP16 T2I	

Evaluation of time allocation to each topic represents satisfactory level:

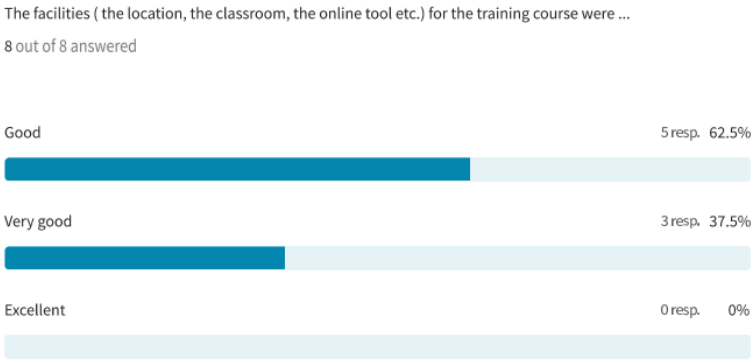
PP16 T2I	

Evaluation of the outcomes and impact on professional carrier growth represents in average satisfactory level:

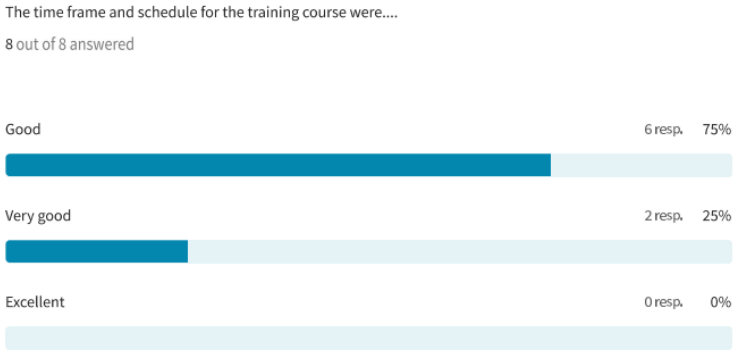
PP16 T2I	

FEEDBACK FROM LECTUERS

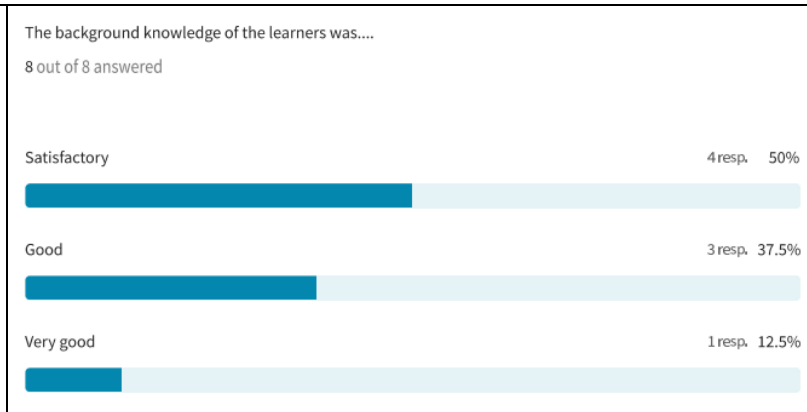
Facilities are evaluated as good and very good and meets evaluation criteria.

PP16 T2I	

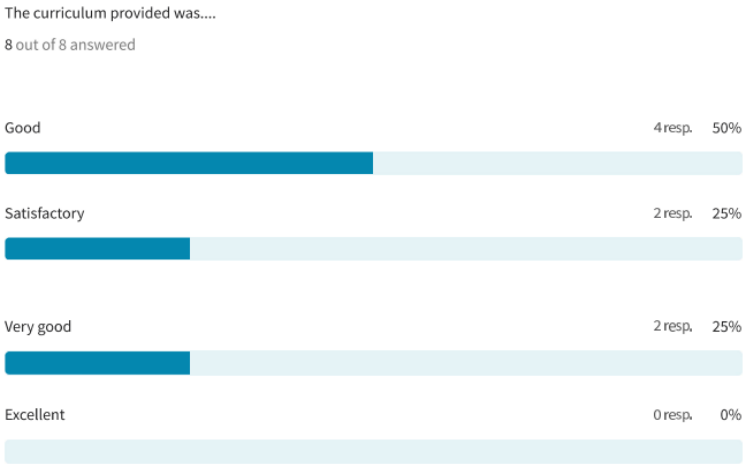
Time frame is evaluated as good and very good and meets evaluation criteria.

PP16 T2I	

Background knowledge of learners was evaluated as good, very good, satisfactory and meets evaluation criteria.

PP16 T2I	

The curriculum of the training instrument was evaluated “very good” and meets evaluation criteria.

PP16 T2I	

Conclusion

Based on the evaluation results it is concluded that the teaching instrument “Cardle to Cardle in SMEs” developed and tested by Project partners PP16 T2I with in 3LoE Project - Three-level centres of professional excellence: Qualification, entrepreneurship and innovation in the Green Economy meets the relevance of achieving the goal of teaching instrument and overall has expected impact on professional development of training participants.

Feedback form training participants and teachers suggest that the curriculum meets the targets of the teaching instrument. The knowledge creation and sharing were realized appropriately, and participants have participants assimilated knowledge and tools. Evaluation of the outcomes and impact on professional carrier growth meets evaluation criteria. The venue and equipment were appropriate for the training course.