



GSS-VET

Geothermal & Solar skills

VOCATIONAL EDUCATION AND TRAINING

WP8 / D 8.3

Impact report

Erasmus + Sector Skills Alliances 575891-EPP-1-2016- 1-EL-EPPKA2-SSA



Funded by the
Erasmus+ Programme
of the European Union

PROJECT IMPACT REPORT

D_8.3



GSS-VET

Geothermal and solar systems - Vocational education and training



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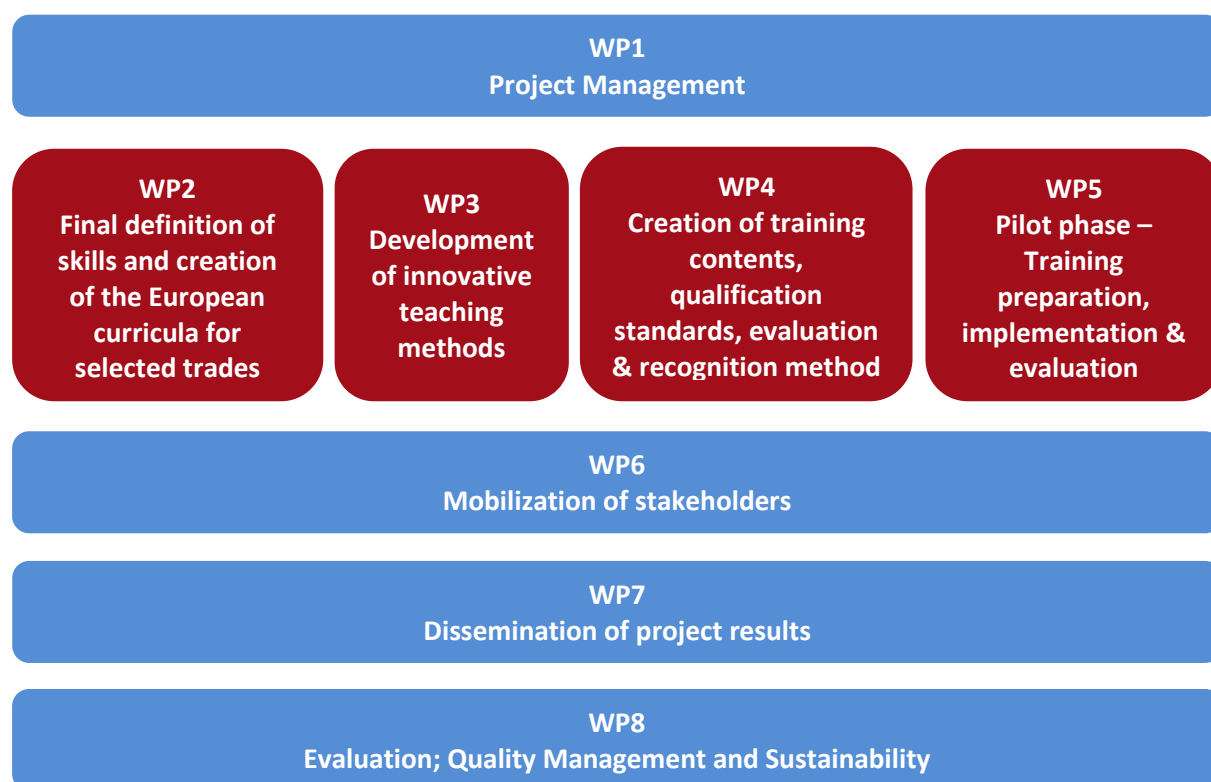
1. INTRODUCTION

The current document has as purpose to assess, to measure and to identify the impact of GSS VET project within each partner's Organization, each country that partners operate in and throughout the European Union. It also depicts the specific impact qualitative and quantitative indicators which have been used in order to:

- measure the impact of the participating organizations, the trainers, the trainees, and other public and private entities that are directly related with RES systems, energy savings in buildings and other facilities
- measure the efficiency of the training platform, the quality of the training material and the quality of the training process and the pedagogical methods that were applied for the different target groups (trainers, trainees, stakeholders) and
- estimate and predict the future impact of the project on society, economy, and environmental sustainability.

2. DESCRIPTION OF THE PROJECT

The project is structured around 8 Work Packages (WPs):



The aim of Work Package 1 was to efficiently manage and coordinate the GSSVET project, observing key success factors such as budget, quality and timeline. In order to maintain the quality and ensure the integrity of the project, the coordination and project management went through the whole lifespan of the project. It provided a framework for the GSS - VET project decision-making process and facilitated the coordination and implementation of each Workpackage. The management supported the communication between all actors, not only among the work-package leaders and the contributors but also between the consortium and the European Commission. A management and communication platform (Basecamp) was used and provided extensive and quality project documentation. Expert groups were created for the coordination of the methodological and pedagogical compliance of the project's results. Control was measured by package leader's work reports, as much as with the comparison of the achieved results and the previously written expected ones. Finally, seven international meetings were organized in order to evaluate the progress of the project and/or discuss the major tasks of the on-going and up-coming work packages.

The aim of Work Package 2 was to define the final list of skills needed that are not currently met by existing training courses for plumbers and electricians willing to work in geothermal and solar installations. Based on this final list, three curricula (one for each trade) were developed. The working methodology for achieving the aims included activities that were implemented in two phases. Phase one included, a Small-scale qualitative research for need analysis in skills to identify the target group's training needs, labor skill ones, as much as regional characteristics of each participating country and a background research on existing training programs in geothermal & solar installations in order to finally update the Skills catalogue. Phase two, was about the Curriculum development having to do with the determination of Curriculum Focal Points and Relative Weight of Curricular Elements, the Course Module Design and a final Review assuring that learning objectives have been constructed for all modules.

The aim of Work Package 3 was to elaborate an innovative ad hoc teaching methodology that allowed consortium's working teams develop the training program based on the identified current educational needs and the European curricula requirements in WP2 analysis. Project consortium investigated the best innovative teaching practices and feed the definition of needs, dynamics and strategies of learning supported by new technologies and pedagogical methodologies.

Work Package 4 is the heart of the project. At this point, different training contents were created for knowledge, job related and transversal skills, according to previously defined skills and teaching methods. Additionally, an evaluation and certification framework for each learning outcome, according to ECVET recommendations, and to the ISO/IEC 17024 standard was created. Furthermore, a fully featured e-learning solution (synchronous and asynchronous) was developed, in order to facilitate and support the entire training process, as much as qualification standards that define indicators in order to validate learning outcomes and specific assessment methods and mechanisms conforming to the requirements of ISO/IEC 17024 and ECVET recommendations, ensuring the quality and the recognition by relevant interested stakeholders.

In work package 5 the curricula as well as the innovative teaching methods and training content, which were developed previous work packages, were implemented in a pilot phase. The VET providers organized workshops and seminars for the training of trainers, the training of learners and accompanied the work-based periods. The whole implementation process complied with the EQAVET Quality Assurance reference framework and the certification one with ECVET.



Work Package 6 aimed at mobilizing and involving local companies, training providers and local authorities in each partner country. The mobilization of stakeholders resulted in internships-trainee- and training the trainers' opportunities in each partner country and reduced the current skills gap and led to the further development of electricians and plumbers. A database of relevant stakeholders for each partner country was also created.

Work Package 7 ensured the visibility of the project's objectives, activities, and results. It provided a sound communication between partners and the relevant stakeholders. Key information was communicated to relevant professionals from the construction industry, the training world, and the renewable energy actors. Dissemination materials were designed and spread out, offering new alternatives in VET and LLL to the relevant audience. Dissemination activities were an integral part of most project activities. Partners focused specifically on reaching the relevant target groups and the interested stakeholders. The main dissemination activities at local level were realized by the local language sub-site, local communication campaigns, participation to national and local events, production of leaflets, posters, newspapers and brochures incl. in national language.

The aim of Work Package 8 was to provide a systematic method through which the quality of the project was monitored, the quality objectives were achieved, appropriate corrective actions were applied when necessary, assuring that specific goals regarding not only the quality of the project but also its environmental, social and sustainable goals were achieved in all the stages of the project. Through the work implemented during WP8, Quality Management Procedures that the project team followed, assured and controlled the quality of all processes and deliverables produced during the project life span. This documentation also provided guidelines for adequate implementation and thereby assured that certain quality standards in the performance of the relative tasks were fulfilled. The work of WP8 was continuously connected to WP1 (Project Management) to assure the correct implementation of the entire project

3. PROJECT'S OBJECTIVE

The overall objective of the GSS-VET project is to address the gap in the continuing education of plumbers and electricians in geothermal and solar installation skills by creating and implementing a demand driven training for:

- meet the growing demand for new skills from the above-mentioned professionals in today's building industry.
- to enable unemployed people with appropriate technical training, as well as active workers, to develop and improve their skills in the fields of geothermal and solar installations.

It includes the objective of strengthening the exchange of knowledge and practice between education and training institutions and the labour market. The specific objectives of the project per partner's country are:

- To train technicians/installers working in the green industry / renewable energy companies and sectors to cover the personnel shortages they are experiencing (Geothermal, PV and Solar Thermal).
- To apply new methods and advanced training materials in the continuous professional training of the above-mentioned professionals, specialists in the installation, repair and maintenance of photovoltaic, solar thermal and geothermal systems.



- To disseminate among users and VET providers of continuing training the benefits of the e-learning platform developed in the framework of the project and which makes possible the self-training in the fields of solar and geothermal installations, as well as its evaluation. Furthermore, to enable them to implement the platform and the curricular in their portfolio to reach a country-wide spread of the training in future.
- Disseminate information throughout the Europe about the GSS-VET project and the importance of the green and renewable energy professions for the development of the sectors concerned in a general framework of energy sustainability at national and EU level.

4. STATUTORY AND REGULATORY REQUIREMENTS

The statutory and regulatory requirements which have been used by each participant in order to assess, to measure and to identify the project's impact are listed below:

- Project grant agreement (signed from the Agency on 18/11/2016) and the project amendments (signed from the agency on 10/5/2017, 12/6/2018, 7/8/2019).
- Erasmus+ Programme Guide, version 2 (2020): 26-2-2020
- The EU strategy for sustainable growth "Europe 2020"
- Privacy Statement for processing of personal data related to grant award and management procedures
- http://ec.europa.eu/dgs/communication/services/visual_identity/pdf/use-emblem_en.pdf
- https://ec.europa.eu/esco/portal/qualification?fbclid=IwAR36G1rqCPT03hPqeEHp0zqSRxsYUyhk8wM_qlm0IVBeTZyUQc-toQ_AuEc&resetLanguage=true&newLanguage=en
- https://ec.europa.eu/programmes/erasmus-plus/programme-guide/annexes/annex-ii_en
- https://ec.europa.eu/info/departments/communication_en
- Green Skills and Environmental Awareness in Vocational Education and Training, No 24 Research Paper, 2012
- Skills for Green Jobs, 2018 update. European Synthesis Report, CEDEFOP, ISSN: 2363-216X
- Directive 2010/31/EU on the Energy Performance of Buildings

5. METHODOLOGY

The impact assessment is an essential part of GSS VET project as it evaluates project's achievements and generates recommendations for future improvements. Quantitative and qualitative indicators were used to measure progress towards goals.

As qualitative indicators were used the following:

- Satisfaction questionnaires
- Preliminary training
- Online training
- Face-to-face meetings
- Feedback from GSS VET presentation workshops, conferences and other events
- Analysis of the results of the questionnaires
- Summarizing the minutes of the discussions

As quantitatively indicators were used the below:

- Number of trained trainers for the training courses



- Number of trained trainers from other VET providers
- Number of installers courses given
- Number of trained installers
- Number of certified installers
- Number of involved other VET providers
- Number of companies involved Companies in the internships
- Number of involved stakeholders who have participated in events

6. IMPACT ON PARTNERS' ORGANIZATION

6.1 GREECE

Greek Partners:

1. HELLENIC MEDITERRANEAN UNIVERSITY (HMU)
2. HELLENIC ASSOCIATION OF PHOTOVOLTAIC COMPANIES (HELAPCO)
3. EUROPEAN CENTER IN TRAINING FOR EMPLOYMENT (ECTE)
4. TÜV AUSTRIA HELLAS

Hellenic Mediterranean University (HMU) is a public Higher Education Institute that provides both undergraduate and postgraduate programs as well as Vocational Education and Training in the fields of Engineering and Informatics, Business Administration and Economics, Agriculture, Health and Welfare. It employs approximately 150 faculty members, 250 administrative and technical staff members and more than 14500 students.

6.1.1 Hellenic Mediterranean University (HMU)

The effect of the GSSVET project on HMU activities is as follows:

- The University obtained more experience in coordination of EU projects and internal evaluation procedures.
- Laboratories related with Renewable Energy Sources (RES), Electrical Engineering and use of ICT tools had the chance to work on the development of innovative training material and the exploitation of non-conventional teaching methodologies in the learning process.
- It promoted through online announcements ([announcement1](#), [announcement2](#)) the benefits of the RES exploitation and the offered opportunity for all technicians who work on solar-thermal, photovoltaic and geothermal systems to update their skills and meet the current and future demands in their profession.
- It offered the capability to the Vocational Educational Center of the University to test new teaching methodologies and upgrade its existing facilities (computer room, video projector, microphones, etc.).
- It performed a short training session for trainers that already have prior experience in adults' training.
- It performed two short training sessions of trainees to test the quality of the training material and the performance of the training platform.

Also a benefit for the HMU was the promotion of this activity through a conference announcement ([demsee2018 announcement](#)) to address to the academic community the characteristics of online



training of technical subjects and the benefits it offers for training of adults – workers who do not have the flexibility to attend courses in fixed hours in a classroom or a laboratory. After the end of the project 2 more conference publications are prepared to be submitted in 30th Annual Conference of the European Association for Education in Electrical and Information Engineering (EAEIE) that is scheduled to take place on September 2020 in Prague.

6.1.2 Hellenic Association of Photovoltaic Companies (HELAPCO)

HELAPCO is a sectoral organization working on solar and photovoltaic installations. It represents all major PV companies of Greece that are active in the production, trading, installation, and maintenance of such systems.

The effect of the GSS VET project on HELAPCO activities is as follows:

All PV companies in Greece (and especially small and medium enterprises that consist 99% of all enterprises in the specific field) had the option directly (through the workshop for stakeholders that took place in Athens on 13-14/2/2020) and indirectly through announcements, newsletters, social media posts ([announcement1](#), [announcement2](#)) to get to know this program and the chance it offers for training and skills' upgrade for all workers in the field (with much or little working experience) by using an online training platform (so they do not need to attend the training process in a fixed program).

6.1.3 The European Center in Training for Employment (ECTE)

The ECTE is based in Rethymnon of Crete in Greece, is certified by ministry of education as an Vocational educational center for continuous education, as well as a guidance for employment center. The educational programs that ECTE develops and implements are targeting in the adaptation of the working force to the transformations of the technological, socio-economic and physical environment, the promotion of regional development, the improvement of the existing and the acquisition of new qualifications, and the exchange of experience and know-how in national and international level.

The main activity areas are the planning and elaboration of projects for the development of human resources, which integrate innovation and European dimension, are based on dynamic partnerships and pursue synergy and quality in results. The activity sectors are:

- Implementation of training programs.
- Curricula and Training material development in line with ECVET procedures
- Professional profiles development and validation
- Elaboration of researches and studies (training need analysis, market researches) related to the needs of the labour market
- Planning and development of international European projects related with the local development, employment and social cohesion.

The department for Educational methodologies is providing training to professional among others to these engaged in RES and sustainability sector. Department's institutional tasks are: curricula development in accordance to ECVET procedures, Research, Education, Knowledge transfer, Internationalization.



Closely collaborating with a network of 350 companies in Crete region, ECTE is providing work-based learning and in particular apprenticeships and shadow working – for both its national and international participants of training programs. Especially through the Mobility projects implemented so far more than 5.000 international participants have been benefited.

ECTE Research Department engages in creating material and educational tools and methodologies, addressing training needs and up-skilling, especially in the fields of the introduction of digital and innovative education practices.

Staff of ECTE is 25 persons contracted in permanent and non-permanent basis. The number of learners is 400 per year.

The GSS VET project outputs had a positive impact on ECTE's staff, project management procedures and on training services which are listed below:

6.1.3.1 Impact on implementation of international strategic Projects.

Use of the the **D-8.4: Certification pathway** and of the **D-2.9: Curriculum development**, in implementation of many training projects ECTE is engaged with or will be in future.

- **DTRaIN** project: based on the Validation and certification of competences to be acquired by professionals in agro food companies using Design Thinking strategic analysis approach. <http://dtrain.eu/>.
- **GARDENISER** project: Social economy Creation of a professional profile for an "Urban gardens' coordinator" <https://www.gardeniser.eu/el>
- **EUROMOB** project: Mobility of professionals (EQF 4,5,6) in European countries. Validation and certification of skills, knowledge, and competences acquired, under the ECVET procedure <https://euromob.eu>.
- **RESTAT** project: Identify and validate skills for tourism workers regarding accessible tourism in rural areas of Crete <https://restatproject.eu/>.
- **EDUCERE** project: use of **D-2.9: Curriculum development** to create a curriculum in line with ECVET procedures, for professionals in the justice sector, to guide young offenders <https://tinyurl.com/yycwbybgv>.
- **EUROMOB** project: Certification os Skills acquired in a international work placement <https://euromob.eu/>

Quantitative indicator

Six transnational European projects listed above

6.1.3.2 Impact on implementation of national training

The **D-8.4: Certification pathway**, and a combination of the **D-4.3: Certification scheme** and **D-4.4 Validation and recognition method**, is used in ECTE as a predominant procedure applied to all national training programs provided by ECTE, to lead to a certification of learning outcomes of learners.



Qualitative indicator

Internal quality procedure ECTE

6.1.3.3 Impact on provision of international mobility programmes' services

Use of the **D-2.9: Curriculum development, and** of Quality assurance (EQAVET) procedures and indicators described in the GSS VET **D-5.1 Framework for Training implementation (EQAVET)**. ECTE has started applying EQAVET recommendations for quality assurance, and ECVET procedure, for all international Erasmus mobility programs for VET learners.

Quantitative indicator

81 international mobility programs, 650 learners

Qualitative indicator

ECTE internal quality assurance procedure

6.1.3.4 Impact on the educational methodologies used

The **D-3.2 Innovative educational methods**, formulated in WP3 of the GSSVET project, namely the ubiquitous environment is in use by ECTE in delivering national training programs, has been used as a methodology in ECTE, especially after COVID-19 implications.

Qualitative indicator

ECTE internal quality assurance procedure

6.1.3.5 Impact on projects management mindset

ECTE is using extensively, the online management and communication tool **D-1.2 Management and Communication platform**, set in the GSS VET project as an online tool for virtual management of projects and communicating within virtual teams.

Qualitative indicators

ECTE internal quality assurance procedure in Project Management

6.1.3.6 Long term impacts

- Free use and access to learning opportunities for the trainers and learners of ECTE.
- International cooperation with the organizations involved in the GSS VET cooperation ecosystem.
- Creation of collaboration networks between different parties (VET providers, HEIs, enterprises) through a structured set of tools and procedures;
- Development of a learning network within a transnational context;



- Strengthening the interconnection between higher education institutes, business world and vocational education and training, creating the conditions for an all-around, up-to-date vocational education and training of RES specialists in the occupational profiles of electricians and plumbers;
- Development and exploitation of new forms of learning via the use of new teaching and learning technologies.

6.1.3.7 Impact on Future plans

- ECTE, in collaboration with regional government of Crete (see minutes of workshop with VET policy makers), will exploit the deliverables **D-3.2 Innovative educational method**, **D-4.1 Training contents** and **D-4.2: Training platform**, to train plumbers and electricians for updating skills of workers in sector to meet arising market needs in Crete.
- ECTE is working for being certified as an “Erasmus accredited” training center, exploiting EQAVET recommendations exploiting the outputs **D-3.2 Innovative educational method**, and the **D-5.1 Framework for Training implementation”**
- Setting up appropriate hardware, software and equipment, for hosting online classes for synchronous ubiquitous teaching environment.
- Increasing the quality in VET through the
- as part of upgrading the **quality assurance system (EQAVET) to:**
 - ✓ Set up of graduate tracking arrangements
 - ✓ establishment of **feedback loops** to predict future skills needed in the sector of geothermal and solar installations.

6.1.4 TÜV AUSTRIA HELLAS

TÜV AUSTRIA is a Certification Body offering third party services in the areas of Technical Inspections, Audits, Certifications and Training. It has been operating in Greece since 1994 and is a 100% subsidiary company of the Austrian Inspection and Certification Organization TÜV AUSTRIA, which has a presence in over 40 countries in Europe, the Middle East and Asia. It is an accredited Inspection and Certification Body by the Hellenic Accreditation System (ESYD S.A, active member of MLA) according to the Standards ISO/IEC 17021-1, ISO/IEC 17020, ISO/IEC 17065, ISO/IEC 17024 and to the EMAS regulation and a notified body in the European Union (Notification Number 0906).

TÜV AUSTRIA HELLAS as part of a Group which has presence in over 40 countries worldwide as well as with its branches and subsidiaries combined with its broad network of clientele, partners and representatives has promoted the activities of GSS VET project and its results through social media and website (see <https://tuvaustriahellas.gr/?lang=en&s=gss+vet+project>) .

6.2 SPAIN

Spanish Partners:

1. INSTAGI
2. ALECOP

The collaborating and associated expert Organizations of the Spanish project partners:



- They updated their knowledge of the requirements of national legislation.
- They discovered new opportunities for continuous and initial training in Spain and in other countries of the European Union.
- Established contacts with other VET providers by expanding training activities for system installers in the FERE sectors.
- Became familiar with new teaching methodologies applied to technical training, including distance learning.
- They were aware of the existence of FP materials for installers of FERE systems in the other partner countries: Greece, Bulgaria, Germany.
- They analyzed the newest applications/successes/problems of innovative technologies and products used in the sectors using solar and geothermal systems worldwide.
- They established working contacts and gave practical advice to the trainees.
- They developed and tested new training methodologies adapted to the needs of the continuous professional training of FERE system installers.
- They conducted training courses for trainers of installers of solar thermal, photovoltaic and geothermal systems.
- They gave training courses for installers of photovoltaic, solar thermal and geothermal systems, through the project's e-learning platform.
- They developed and carried out a training and certification plan, according to the requirements of the project for the exploitation of the programs and resources developed.
- Nineteen instructors from Gipuzkoa, Madrid, Barcelona and Seville were trained and three training courses for solar system installers were held, attended by 50 students.

6.3 BULGARIA

Bulgarian Partners:

1. European labor Institute (ELI)
2. Chamber of Installer Specialists in Bulgaria (CISB)
3. Sofia Energy Centre (SEC)
4. Technical university-Sofia (TU- Sofia)

The experts of Bulgarian partners:

- Updated their knowledge on the requirements of the national legislation;
- Discovered new opportunities for vocational training in Bulgaria and other EU countries included in the Build-up Skills roadmap;
- Established contacts with other VET providers for a wider implementation of training activities for installers of RES systems;
- Got acquainted with new teaching methodologies, including distance training
- Got acknowledged of the existing VET training materials for installers of RES systems in the partner countries: Greece, Spain, Germany;
- Analyzed the recent applications/success/problems with the advanced technologies and products in the solar and geothermal systems world-wide;
- Established working contacts and gave practical advises to the trainees;



- Developed and tested new training methodologies adapted to the needs of continuous VET of installers of RES systems;
- Performed trainings for trainers of installers of PV and solar thermal systems;
- Performed trainings for installers of PV and solar thermal systems, including via on-line Platform;
- Developed and carried out a training and certification scheme according the requirements of the National Agency for Vocational Education and Training.
- 6 trainers from ELI, CISB, SEC and TU Sofia were trained and conducted 2 training courses for installers of solar systems and 1 training for trainers from other VET providers.

6.4 GERMANY

German Partners:

1. Hochschule Bochum
2. Bundesverband Geothermie - German Geothermal Association (BVG-GGA)
3. International Geothermal Association (IGA)

The experts of German partners:

- Updated their knowledge on the requirements of the national legislation;
- Discovered new opportunities for vocational training in Germany and other EU countries included in the Build-up Skills roadmap;
- Established contacts with other VET providers for a wider implementation of training activities for installers of RES;
- Got acquainted with new teaching methodologies, including distance training
- Got acknowledged of the existing VET training materials for installers of RES systems in the partner countries: Greece, Spain, Bulgaria;
- Analyzed the recent applications/success/problems with the advanced technologies and products in the solar and geothermal systems world-wide;
- Established working contacts and gave practical advises to the trainees;
- Developed and tested new training methodologies adapted to the needs of continuous VET of installers of RES;
- Performed trainings for trainers of installers of geothermal systems;
- Performed trainings for installers geothermal (E-Learning part via Platform)
- They developed and carried out a training and certification plan, according to the requirements of the project for the exploitation of the programs and resources developed.
- 3 trainers from HS Bochum, 1 from IGA and 1 from BVG-GGA were trained and conducted 1 training courses for installers and 1 training for trainers from other VET providers.(7+2 participants).

7. IMPACT ON THE TRAINEES & TRAINERS



7.1 GREECE

7.1.1 Impact on Trainers engaged in the pilot trainings (HMU)

The results and the impact of the GSS-VET project on trainers – experts on the RES exploitation are depicted below:

On 2nd and 3rd September 2019, a short seminar – presentation of the project of 10 hours took place in Vocational Training Center of Hellenic Mediterranean University (HMU) in Heraklion.

Ten trainers in total took part in this event:

1. Associate Professor, E. M. (expertise: Electrical Engineer)
2. Assistant Professor, Y.K. (expertise: Mechanical and Environmental Engineer)
3. Assistant Professor A.T. (expertise: Electrical Engineer)
4. Assistant Professor C.C. (expertise: Mechanical Engineer)
5. Assistant Professor K.S. (expertise: Electrical and Computer Engineer)
6. Eng. S.A. (expertise: electrical engineer)
7. Eng. E.T. (expertise: civil engineer)
8. Eng. M.V. (expertise: electrical engineer)
9. Eng. M.A. (expertise: environmental engineer)
10. Eng. G.V. (expertise: Electrical and Computer Engineer)

All trainers have many years of expertise in vocational training and development of RES energy systems and have taught in previous seminars of vocational education center of HMU. Five (5) of them are members of the teaching staff of HMU, three (3) of them are members of the technical staff or laboratory assistants, one (1) of them works on Regional Agency of Crete and one (1) of them works on a local municipality of Crete.

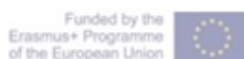
In the end all participants filled in a questionnaire to mention their opinion and propose improvements on the contents of the three (3) training curricula, the training platform, the training process and the expected benefits for the trainees.

7.1.1.1 Quantitative results

- 10 trained trainers



7.1.1.2 Qualitative results



QUESTIONNAIRE OF THE TRAINING PROCESS OF PROGRAM GSS-VET - TRAINERS

Name-Surname: _____

Profession: _____

E-mail: _____

Years of working experience: _____

	Yes	Nearly Yes	Nearly No	No
Are you satisfied with the content of the training platform?				
What is your opinion about the organization of the training event (time, duration, classroom)?				
What is your opinion about the program of the training event?	The training program includes the required information that an experienced technician needs to know. (Yes / No)		The training program includes the required information that a technician with little experience needs to know. (Yes / No)	
1 st curriculum: Solar-Thermal Systems				
2 nd curriculum: Photovoltaic Systems				
3 rd curriculum: Geothermal Systems				

What are the changes I would suggest in the configuration of the place where the training was implemented in order to be optimized?

How user friendly do you think the training platform was for the needs of the program?

How useful were the instructions I received before starting the training process in order to meet the training requirements?

How much did the program help me improve the skills I already have on the subjects I teach?

What difficulties did I face in using the offered media for the training process?

Thanks for your answers.

The results of the questionnaires showed that all trainers were more than satisfied with the contents of the training curricula in solar-thermal and photovoltaics. Concerning the 3rd curricula in geothermal systems none of the trainers was expert in the field so they just mentioned that the educational material seems to be very informative however they could not express opinion as experts.



Concerning the self-assessment questions and the serious games all trainers agreed that they were very helpful for them to understand the training material and they were sure that they will also help trainees to learn in an effective way the necessary knowledge they should acquire before they pass their final exam for their accreditation.

As suggestions for the training material and the training platform they said that:

- It would be better to exist in the training material more real case examples.
- In parallel with the training platform also more hours of practice training should exist (because issues of installation, maintenance and design of RES systems include many specific issues that someone can learn in the best way only in practice).
- A suggestion for the future is to update the training process and to create also a second more complex serious game with more scenarios and questions separate for beginners and more experienced trainees.

7.1.2 Impact on Trainers of other VET providers (ECTE)



Picture1: Training trainers for other VET institutes

In two training workshops carried out by ECTE in Rethymnon, 19 trainers from other VET providers participated been trained in the use of the training and certification process via the GSS VET training platform. The trainers were coming from five Vocational training institutes of Crete, specializing in fields related to the PV, solar thermal and geothermal sector.

Quantitative indicators

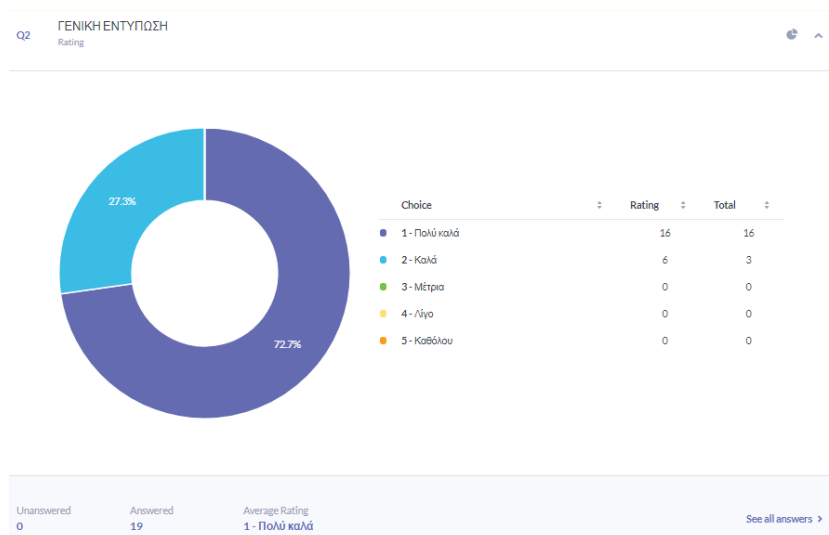
19 trainers of other VET trainers were trained,
5 VET providers, other than those in the partnership.

Qualitative indicators

Trainers from who participated in the workshops for other VET providers, assessed the training training material, the e-learning platform and the educational method. <https://s.surveypplanet.com/OwxuVDPNh>).

The general impression of the trainers was positively “very good” (72,3%), and the methods and theoretical coverage of the training was rated very good.

It was reference to strong points of the GSS training program, which are related to the flexible educational method allowing trainee to use any mobile application like mobiles and tables, having the theoretical part of the training in any time, any place they like. The inclusion of serious games was pointed out as very innovative. It was also rated possibility the possibility of a trainer to use the GSS platform as a reference material tool for teaching different Learning Units according to the specific needs of an audience.



7.2.1 Trainees (HMU)

The pilot training process for trainees has taken place in 2 stages. The 2nd stage of pilot training is still in process as explained subsequently so in this report are presented the results and the impact of trainees training from the 1st stage of pilot training and concerning the 2nd stage is only described the implementation process.

1st stage of trainees' pilot training

Electric installers, plumbers, environmental, electrical, mechanical, civil and electronics engineers with prior experience were invited to participate in short courses in organized classrooms and laboratories (for that purpose special sessions where organized in Hellenic Mediterranean University with collaboration of corresponding Unions and Chambers (Region of Crete, Technical Chamber of Eastern Crete, local Associations of Electricians and Plumbers) in Chania and Heraklion.

In these short sessions (each of them had duration of 30 hours in 5 days) the training material in photovoltaics and solar thermal systems was presented (in that time period the current form of the training platform included the most of the training material (the finalization of the training platform

took place in October 2019). The reason, these short seminars took place before the finalization of the training platform was because:

- the finalization of the training material and the translations took more time that expected to be finished
- we wanted to have a series of pilot training seminars of trainees time in the end of the summer touristic season for the island of Crete – when the trainees are expected to have less work and subsequently more available time to attend the offered seminar and study the training material
- before the finalization of the training platform we wanted to have a quick feedback from the trainees concerning the contents of the training material and, if necessary, to make some final adjustments.

The criteria used to select the participants included:

- Knowledge of the sector
- Familiarity with new technologies
- Interest in renewables and energy saving issues
- Provide valuable feedback

7.1.2.1 Quantitative results

Two training events took place in the time period September-October 2019 and 45 trainees attended these courses. In the end of each event each participant:

- briefed on project and affiliated role,
- trained in solar-thermal and photovoltaics curriculum,
- requested to comment on both curriculums and
- requested to comment on training approach and used pedagogical methods

The first event was conducted on dates 5-6/09 & 11-13/09/2019 and it was located at city of Chania in Crete. It took place in the Laboratory of Renewable Energy Technologies of Hellenic Mediterranean University (HMU) and 23 participants were attended all sessions of training.





The second event was conducted on dates 27/09 & 30/09 and 07-09/10/2019 and it was located at city of Heraklion in Crete. It took place in the Laboratory of Energy and Photovoltaic Systems of Hellenic Mediterranean University (HMU) and 22 participants were attended all sessions of training.






7.1.2.2 Qualitative results

Participants in both events were asked in the end through questionnaires to provide comments on:


- assessing initial level of awareness - entry level
- post course evaluation of the training material

- necessity of retention of the user involved and receive of updated knowledge in the field in regular time periods
- appearance and usability of the training platform and the learning environment



GSS-VET
Green Skills Gateway for the European Union

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QUESTIONNAIRE OF THE TRAINING PROCESS OF PROGRAM GSS-VET – TRAINEES

Name-Surname: _____

Profession: _____

E-mail: _____

Years of working experience: _____

Dear Trainees:
Based on your experience from attending this vocational training event please mark within 0 (worse) - 5 (perfect) range the following characteristics of the training (Marking with X the corresponding boxes).

	mark					
	0	1	2	3	4	5
Have you understood the scope of the program before its implementation?						
How much satisfied do you feel based on the material you have watched?						



Justify your answer if necessary: _____

	mark					
	0	1	2	3	4	5
Evaluate the <u>completeness</u> of each section of the training platform						
Solar Thermal Systems training material						
Photovoltaic Systems training material						
Geothermal Systems training material						
Self-assessment questions						
Serious games						

Justify your answer if necessary: _____

	mark					
	0	1	2	3	4	5
Evaluate the value of each section of the training program in your <u>every day work</u>						
Solar Thermal Systems training material						
Photovoltaic Systems training material						
Geothermal Systems training material						

Justify your answer if necessary: _____

	 GSS-VET <small>GOVERNMENT SKILLS SERVICE - VOCATIONAL TRAINING EVALUATION TOOL</small>	<small>Funded by the Erasmus+ Programme of the European Union</small> 
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mark.

	0	1	2	3	4	5
Educational Infrastructure evaluation						
Offered media for the training process						
Distribution of hours to each training curriculum						
Total duration of each training curriculum						

Justify your answer if necessary:

mark.

0	1	2	3	4	5

How do you feel that the purpose of the specific training course was achieved?

	0	1	2	3	4	5

Up to what extent do you feel that your skills have been improved due to attending this seminar?

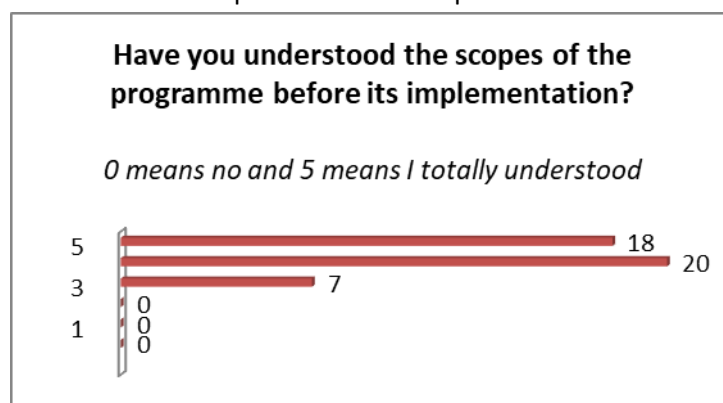
	0	1	2	3	4	5

Please refer to any remark do you think that could improve the vocational training process

Thank you for your participation!!!

Thank you for your participation!!!

The results of the questionnaires are presented in the following graphs:



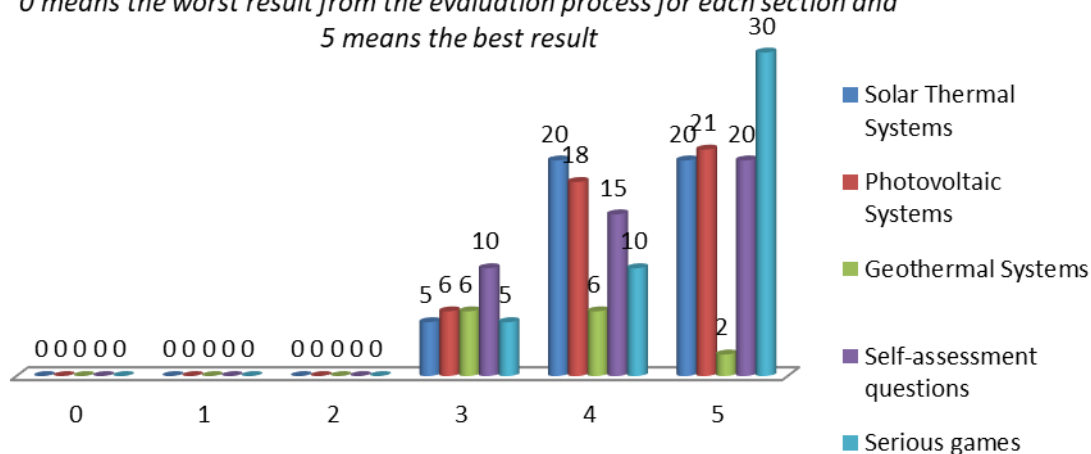
How much satisfied do you feel based on the material you have watched?

0 is I am not satisfied at all and 5 is I am totally satisfied



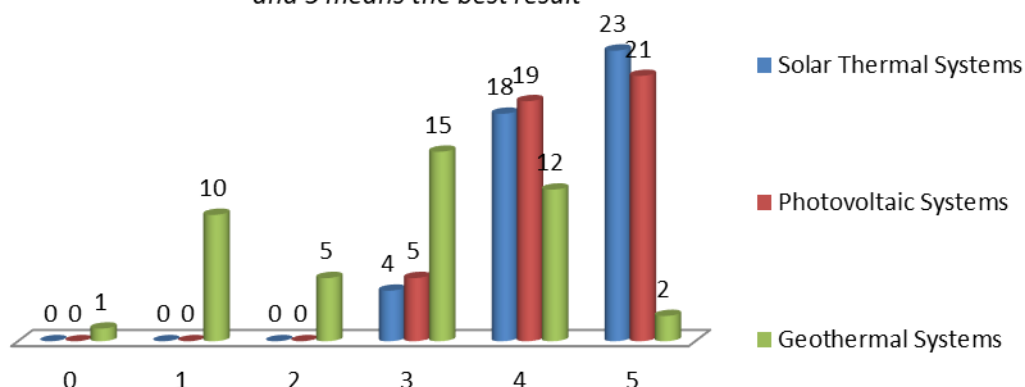
Evaluate the completeness of each section of the training program

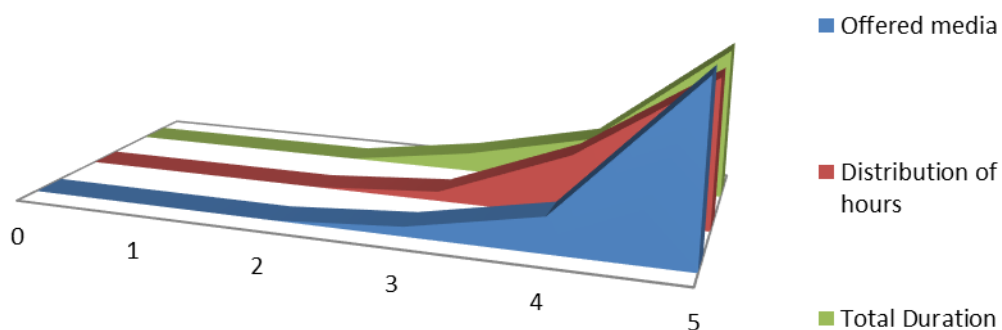
0 means the worst result from the evaluation process for each section and 5 means the best result



Evaluate the value of each section of the training program in your every day work

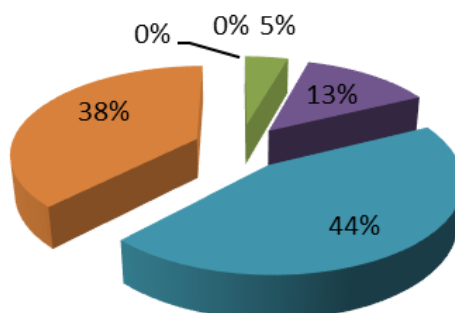
0 means the worst result from the evaluation process for each section and 5 means the best result





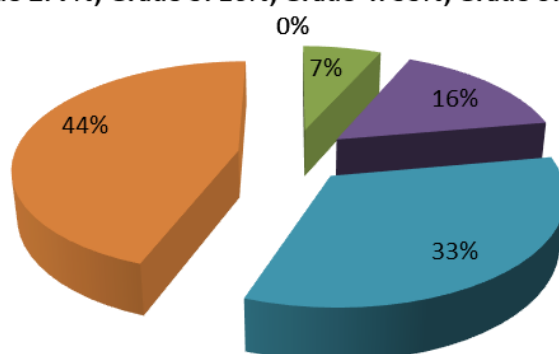
Do you feel that the purpose of the specific training course was achieved?

**From 0 to 5 (best evaluation):
Grade 2: 5%, Grade 3: 13%, Grade 4: 44%, Grade 5: 38%**



Up to what extent do you feel that your skills have been improved due to watching this seminar?

From 0 to 5 (best evaluation):
Grade 2: 7%, Grade 3: 16%, Grade 4: 33%, Grade 5: 44%



Additional remarks from the questionnaires:

The curricula recognize the competencies and skills needed in design, installation and maintenance of solar thermal and photovoltaic systems and anticipate the necessary skills that a technician should have.

Both curricula identify different knowledge levels based on the working experience of each trainee. The training platform is easily accessed and user-friendly even to people who are not familiar with online computer tools and distance learning techniques. Participants agreed that more emphasis should be given in quality control of such systems (used materials, design, installation processes) and include as many hours as possible for practice training before the finalization of the training process. Concerning the geothermal systems there were few technicians that had limited knowledge of such systems. This was an expected fact since this kind of systems are not used in great extent in Crete. However all trainees agreed that in the last years in more and more public buildings and private residences this kind of systems are installed so it is expected that in the next years the necessity for technicians to install and maintain geothermal systems will be exponentially increased (because of the climate change even in Crete the last years during the year the hours of great sunshine and the average temperature especially in the winter months have decreased). So, it is important to exist such a training tool for the technicians to learn and improve their skills and for geothermal systems.

Degree to which the course has fulfilled expectations: Most of the trainees were pleased from the courses' attendance since they learned many things, they did not know concerning their profession. The expectations of the trainers and the seminar organization were also fulfilled in a great extend since all trainees were interested to attend all courses with no absences and during the lectures many trainees had questions based on their experience or shared with the rest audience real cases where they could apply what they learned. Concerning the training platform, they agreed that the training methods adopted were effective since they learned in a short time period many valuable things concerning their profession.

Previous experience: Most of participants showed significant experience in aspects that are promoted by the Greek legislative framework in previous years (mainly PV systems). However, there was a considerable lack of knowledge on other types of systems such as small wind turbines or cogeneration plants. The main applications of thermo-hydraulic installers in Greece include solar thermal collectors and heat-pump systems, whereas there is an increasing interest in biomass systems and geothermal plants. The experience in aspects like water recycling systems, and advanced solar thermal technologies (trigeneration) is relatively poor.

Evaluation of trainers: The trainees were pleased with the program trainers since all trainers are Engineers and had much prior experience in photovoltaic and solar-thermal systems and real case applications of such systems in Crete.

Evaluation of knowledge or skill level in each area before and after participating in the course: The knowledge and skill level of trainees is improved after the implementation of the course. The increased interest that the attendants showed for different technologies that they were available in the courses proved that the combination of theory and practice would provide even better results

Overall evaluation of the training: Both trainees and evaluators of the program agreed that the overall evaluation of the training process was successful however there could take place improvement actions for the future as to include more seminar hours for more specialized topics to be presented as small wind turbines and other RES applications in residential buildings (apart from PVs and solar-thermal systems), polygeneration systems, advanced automation systems, and also to include more lecture hours on topics of great interest in Crete.

Confidence about capability to effectively apply the knowledge or skills on the job: Most trainees agreed that their new knowledge achieved can be applied successfully on their job. However, they also commented that the results would be improved if practical lessons have included in the courses. However, the effective application of achieved knowledge would also require practical demonstration of specific technologies.

Degree of the use in professional job of the knowledge and skills acquired during the course: During the courses, the trainees had the chance to extend their practical knowledge and skills. This improvement will be more significant in aspects that they are not familiar with. However, these courses will also help to update their knowledge and skills in aspects that are already familiar (such as PVs), as they were informed about the state of the art that exists.

Potential barriers hindering or preventing application of the knowledge and skills learned to job: The main barrier for preventing application of a part of achieved knowledge to practice is the questionable direct financial profits of some described technologies (for example, wind turbines in urban environment). However, the continuous evolution and actions related to national legislative framework may reverse this trend. The main barriers are related to the viability of some mentioned technologies (water recycling systems or trigeneration systems). Moreover, a detailed technical description of technology during a specific operation would be proven to be very helpful.



2nd stage of trainees' pilot training

After the project final meeting on 13-14/02/2020 there was scheduled to take place in Heraklion and Chania an on-line pilot training in all curricula in organized classrooms with PCs where all trainees would study the training material and could ask the trainers questions if they had. They also could study the training material online from their own places. For this 2nd stage of training 42 technicians had been selected (30 of them had also participated in the 1st stage of the pilot training but they asked to participate in this stage also in order to attend all the training process and have the chance in the end to give exams and get the accreditation from the project. The training period for these two groups was scheduled in the time period of 20/02 till 13/03/20.

The unexpected situation of COVID-19 virus spread has changed this plan since in Greece all pilot courses and workshops that were scheduled to take place in that time period have stopped or postponed (in Greece on 25/02 a law was voted No 42 under the title: "Emergency avoidance and containment measures of coronavirus spread" where among other measures all people should avoid places with many people as meetings, conferences, etc.). This has caused the cancellation of all meetings and trainings of small and big groups in most training facilities since that date (after the 10th of March Greece has closed all schools, universities, training centers, etc., with no exception at least till May 2020).

So, after the approval of the project extension from the Agency for one month (till the end of April) the pilot training is in process and takes place only from the personal computers - tablets - mobile phones, etc. of the trainees from their homes and/or workplaces. Till today (23/04/2020) this training process has not been finalized yet. We can only confirm that all participants are studying the training platform and that they send any questions they have by e-mail to the trainers of the program. Some of them have difficulties with their internet connections but all of them try to study the training material in a regular basis. It is expected that, based on what the Greek Government will decide, whenever the HMU will open for educational activities to re-schedule the training process for all trainees (even after the end of the project) in the 2 classrooms in Chania and Heraklion so all of them to have the chance to study from the training platform the curricula they have chosen and give in the end the final exams for certification whenever they are ready. At this stage we have not results from evaluation questionnaires since the training is still in progress but in the end of this stage, we will get feedback (even after the end of the project) and we will analyze the results. We are interested to analyze these results because apart of this project we are a University and one of our main goals is to optimize the training process, the educational tools and the pedagogical methodologies for all our trainees (students, postgraduates, technicians, etc.).

7.2.2 Impact on trainees (ECTE)

26 plumbers and electricians were trained by ECTE for testing the e-learning platform, the educational methods and the training contents in Photovoltaic and solar thermal installations field.

7.2.2.1. Impact initiated by the use of training e-platform

Related deliverables: "D-4.2 Training content", the "D-4.2: Training platform" the D-5.1: Framework for Training (EQAVET)



- Training in skills and competences that are tailored to the needs of electricians and plumbers learners based on a learning outcomes oriented vocational curricula;
- Up-skilling of installers in order to meet new challenges in the work field;
- Free access to learning opportunities and training methodologies for the plumbers and electricians and businesses in RES that lack training facilities and departments;
- Reduced training expenses for trainees due to the free access to the GSS VET training programs;
- More interactive learning opportunities via the use of serious games based on new teaching and learning technologies for learners;



- Use of the “**D-4.2 Training content**” and “**D-4.2: Training platform**” outputs of the Project, pilot testing training sessions carried out by ECTE with the collaboration of the Chamber of Commerce and industry of Chania (CCIC). There were implemented two trainings, one for electricians in the field of photovoltaic installations and one for plumbers in the field of solar thermal installations. The training was implemented in collaboration with Chamber of commerce and industry of Chania, who is the successor institute of partner ETAN, the developmental agency of Chania, and been both partners in GSS VET consortium.

7.2.2.2 Impact initiated by the use of the Certification scheme

Related deliverables: **D-4.3: Qualification standards** and **D-4.4 Validation and recognition method** will be useful for the promotion of the professional career, giving greater access to national as well as the European labor markets.

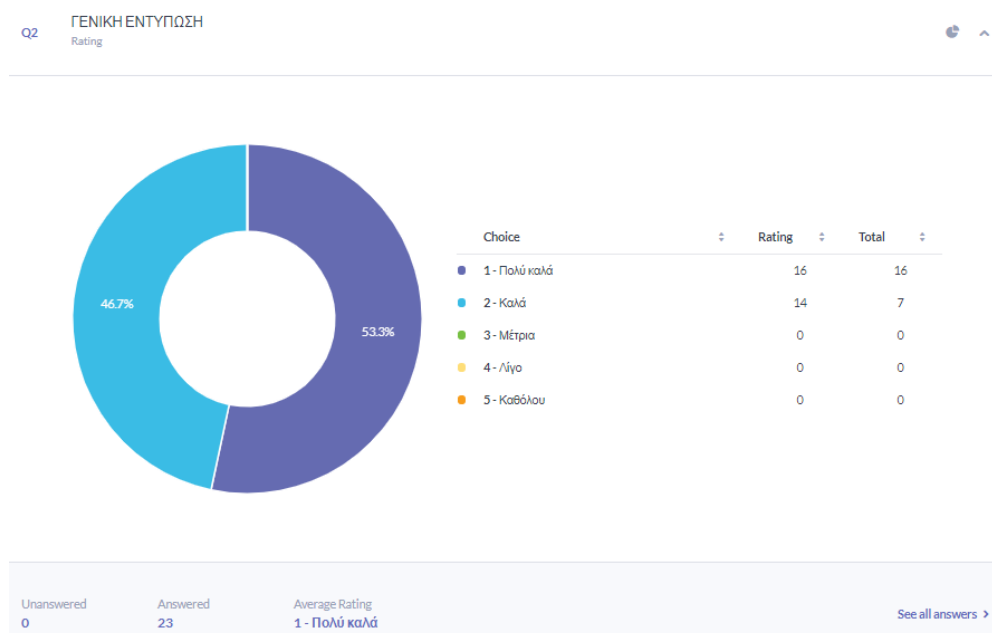


Quantitative indicators

- 26 participants attended two training courses, implemented by ECTE.
 - 24 trainees** (14 installers in solar photovoltaic and 10 in solar thermal systems) were **certified** in line with the **D-4.3: Qualification standards**.

Qualitative indicators

- 24 trainees out of 26 trainees were positively evaluated after exams and were granted the GSS VET professional certification, in line with the **D-4.3: Qualification standards**. Success rate 91,3%
- The original training plan as referred in the GSS **D-5.1: Framework for training implementation** that developed in WP5 included a **satisfaction survey** for trainees (<https://s.surveypal.com/lv5rkTsja>). The general impression of trainees was above the 53% Very good and 47% Good. They referred to the strong points of the training program which are the validation and certification of the learning outcomes, the GSS learning platform and the effective training material as well as the educational methods, pointing mainly at the ubiquitous learning environment.



7.2.2.3 Impact on Future plans

More courses related to the needs of the RES professionals will be developed and delivered using the educational methods developed by the GSS VET project. The courses will lead to a certification of the learning outcomes and an acquisition of a professional qualification.

7.2.3.4 Impact on VET providers

The GSS VET project outputs had an impact on VET providers which participated in training of trainers workshops or been directly contacted by ECTE.

- Use of the **D-8.4: Certification pathway, and a combination of the D-4.3: Qualification standards and D-4.4 Validation and recognition method**, to national training programs.
- Use of the **D-5.1 Framework for Training implementation (EQAVET)** when sending learners and staff for learning periods, for their international Erasmus mobility programs.
- Use the **D-3.2 Innovative educational methods**, formulated in the GSSVET project, namely the ubiquitous environment in delivering training programs, especially after the COVID-19 implications on the traditional training methods.
- Free access to learning opportunities and training methodologies for the plumbers and electricians and businesses in RES that lack training facilities and departments;
- Creation of collaboration networks between VETs as well as different parties (VET providers, HEIs, enterprises) through the GSS VET network;
- Strengthening the interconnection between the VETs and the higher education institutes, the business world, creating the conditions for an all-around, up-to-date vocational education and training of RES specialists in the occupational profiles of electricians and plumbers;
- Free use and exploitation of new forms of learning via the use of GSS VET training platform.

Quantitative indicators

- **Six VET providers** from the Crete region other than the members of the partnership, have been participated in the two training workshops carried out by ECTE in Rethymnou. The Vet providers were ES Rethymnou, the 1st EPAL Rethymnou, the VET school of Chania (EPAL), the training DP of a private company in RES (Georgilakis in Chania), EPAL Arkalochoriou, and EPAL Heraklion, and the GSEVEE CVET training center.
- **905 VET providers in CVET and IVET** in Greece, were contacted by ECTE via a mobilization campaign through a campaign contacted.
- **Eight letters of intent** confirming direct interest on using GSS VET outputs for both trainers and learners in VET schools.
- **290 VET providers in European** countries were contacted by ECTE through a mobilization campaign




7.2 SPAIN

The results and the impact of the GSS-VET project on the trainees as well as on trainers of the solar thermal, photovoltaic and geothermal installation programmes are depicted below:

7.2.1 Trainees

7.2.1.1 Qualitative results

A survey was distributed to the participants of the training courses for photovoltaic, solar thermal and geothermal installers to assess subjectively the training methods used, the training programme, content and materials, as well as the satisfaction with the e-learning platform and the trainers. This is the summary of results:

SATISFACTION QUESTIONNAIRE Assessment of training under GSS-VET Project SUMMARIZED RESULTS			 GSS-VET <small>Geothermal and solar skills - Vocational education and training</small>		
ASPECTS OF THE TRAINEE MODULE	NO DISAGREEMENT AT ALL 1	DISAGREE 2	NEITHER AGREE NOR DISAGREE 3	OF AGREEMENT 4	ABSOLUTELY AGREE 5
1. General impression			11%	78%	11%
2. Aptitude of the trainers			11%	56%	33%
3. Content interest/duration			22%	67%	11%
4. Training material			22%	67%	11%
5. Place and audiovisual media			12%	44%	44%
6. Support from the training centre		11%	22%	22%	45%

INSTAGI organized two preliminary training seminars. The aim of these seminars was to present the training material to installers of solar thermal, photovoltaic and geothermal systems, as well as the e-learning platform in order to get their feedback and suggestions from the participants.

The participants gave a generally positive opinion on the content of the training material and were particularly interested in the e-learning platform. They commented that a tool like the e-learning platform of the GSS-VET project can be very useful for installers who want to improve their knowledge through self-training and in a highly flexible and ubiquitous learning environment.



On the other hand, the Spanish partners of the GSS-VET project have organized training courses for installers, after which the participants have had the opportunity to obtain the professional aptitude certificates, according to the certification schemes developed in the project itself, and which are recognized in all the EU countries. In the surveys, the trainees expressed their satisfaction with the training courses.

Conclusions:

- Installers have acquired new professional skills and competences.
- The installers were trained:
 - Using new training methodologies that include: Inverted classroom, projects, self-training using the e-Learning platform specially developed in this project, with personalized access to training contents, tests, exams and simulation games.
 - By experienced instructors.
 - With current training materials, with information on the latest technological advances in the corresponding sectors of the project.
 - Supported by a database of questions related to programme design and corresponding training materials for self-training and evaluation.
 - Serious games, or simulators, which represent an attractive form of hands-on



learning through projects.

- They were also informed about the attractiveness of "green" professions and illustrated the scenarios, trends and prospects for the development of economic sectors, enterprises and "green jobs".

7.2.1.2 Quantitative results

- 19 trainers received the preliminary pilot training to train installers of solar thermal, photovoltaic and geothermal systems based on the programmes and materials developed in the GSS-VET project.
- 50 solar thermal, photovoltaic and geothermal installers attended the training course

7.2.2 Trainers

7.2.2.1 Qualitative results

- Two training courses for trainers were held.
- The following satisfaction questionnaire was distributed to those attending the trainings:

A satisfaction survey on the e-learning platform which supports the training courses for trainers of installers of photovoltaic and solar thermal systems was distributed to the participants. The results of the questionnaires show the evaluation made by the participants:



SATISFACTION QUESTIONNAIRE
Assessment of training under GSS-VET Project
SUMMARIZED RESULTS



ASPECTS OF THE TRAINING OF TRAINERS MODULE	NO DISAGREEMENT AT ALL 1	DISAGREE 2	NEITHER AGREE NOR DISAGREE 3	OF AGREEMENT 4	ABSOLUTELY AGREE 5
1. The content of the workshop has been described in brochures and/or programs				30%	70%
2. The content of the workshop has been presented according to the programme				20%	80%
3. The information presented has been relevant and useful.				11%	89%
4. The demonstrations, exercises or practices have been relevant and useful.					100%
5. The participatory dynamics have been adequate (discussion, teams, ...).				20%	80%
6. The times assigned to sessions and topics have been sufficient in general.				40%	60%
7. The facilitator(s) have conducted their sessions well.				10%	90%
8. The facilitator(s) have been good communicators.					100%
9. Facilitator(s) was/are proficient in the topics.					100%
10. The workshop has fulfilled its training purpose				10%	90%
11. The workshop has met my expectations and I would recommend it to others				10%	90%

Conclusions:

- The GSS-VET e-learning is a very efficient and useful tool for vocational education and training and will be widely applied in the training of FERE system installers.
- There are clear and detailed instructions on how to use the Platform for self-training.
- Online tests for self-assessment and serious games are innovative forms of training and represent an effective tool for assessing acquired skills and knowledge.

7.2.2.2 Quantitative results

- Two training of trainers' courses were held.
- 19 trainers were trained

7.3 BULGARIA

The results and the impact of the GSS-VET project on the students as well as on trainers of the solar thermal, photovoltaic and geothermal installation programmes are depicted below:



7.3.1 Trainees

7.3.1.1 Qualitative results

- A questionnaire on the training methods, content of training materials and satisfaction with the e-learning platform was distributed to the participants on the training courses for installers of PV and solar thermal systems.
- Template and summary of results:



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GSS-VET

Geothermal and solar systems - Vocational education and training

SATISFACTION QUESTIONNAIRE

Assessment of the training under GSS-VET Project

SUMMARIZED RESULTS

Please, provide feedback on your training. This feedback is important for enhancing the quality of your training.

In this Questionnaire, the term 'training' is used to describe the training under GSS-VET Project.

The term 'trainer' refers to lecturers, instructors and trainers in your training institution.

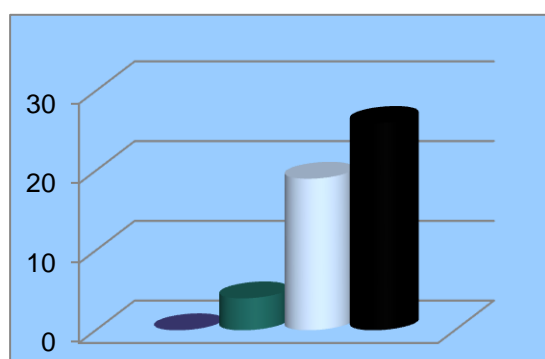
Please, tick (X or V) only one option for each question in the two sets of questions.

CONCERNING THE TRAINING	I completely agree	I agree	I disagree	I completely disagree
I have mastered the skills as expected from this training.	40%	60%		
The training was focused on developing the respective skills	40%	60%		
I have mastered the knowledge, as expected from this training	30%	70%		
The training has prepared me for the work I do	40%	60%		
The training offers a good balance between theory and practice	60%	40%		
As a whole, I am satisfied with the training.	60%	40%		
I would recommend the organization - training provider - to other people.	40%	60%		
The team of the organization - training provider - respected my experience and my needs.	50%	50%		
Now I understand important things which were not clear to me before.	50%	50%		
The trainers showed profound knowledge of the material taught.	70%	30%		
My performance - skills and knowledge - was assessed fairly	40%	60%		
The level of difficulty of the training was appropriate for me.	50%	50%		
The workload during the training was reasonable.	40%	60%		
The grades I received were based on actually performed tasks.	60%	40%		



CONCERNING THE TRAINING	I completely agree	I agree	I disagree	I completely disagree
The training facility and aids were in good condition	40%	60%		
The trainers explained the material clearly.	80%	20%		
The training provider offers a range of services which assist the trainee.	80%	20%		
Modern equipment, teaching aids, and training content were used.	40%	60%		
When I needed help, I turned to my trainers.	50%	50%		
The trainers presented the topics in a truly interesting way.	70%	30%		
I would recommend this training course to other people.	40%	60%		
The training provider showed appreciation of the acquired knowledge and skills	60%	40%		
When I needed training resources, I had access to such	50%	50%		
I was given enough materials to keep me interested	50%	50%		
The training was flexible and adequately met my needs	40%	60%		
The trainers encouraged trainees to ask questions and discuss issues	70%	30%		

- Results of the pilot training



■ – Satisfactory, ■ – Good, ■ – Very good, ■ – Excellent

The results of the questionnaires show that the participants evaluate the training as:

- ✓ Excellent – 28 participants
- ✓ Very good – 15 participants
- ✓ Good – 4 participants

- CISB organized and performed a preliminary training seminar. The aim of this seminar was to present the training materials for installers of solar thermal systems and the e-learning platform

in order to get feedback from the participants. The participants gave a positive opinion regarding the content of the training materials and were especially interested in the e-learning platform. They commented that a tool like the GSS-VET e-learning platform is very useful for installers who want to improve their knowledge through self-preparation.

- On the other hand, the ambition of the Bulgarian partners in the GSS-VET project to perform trainings for installers approved by NAVET, following which the participants will get certificates for professional qualification recognized in all EU countries is very important for the installers working in this field, as it will give them not only a valuable professional knowledge, but an important input to their CVs and new job opportunities.
- At face-to-face meetings and during the discussions following different events, trainees expressed their satisfaction with the trainings. They shared their experience with other installers, following this several experts performed a self-training through the e-learning platform and passed the on-line test. Moreover, an installer shared during the ceremony for certificates awarding that he already put into practice his new skills and was successfully involved in the installation of 2 PV systems.

Conclusions:

- The installers have new professional skills and competences;
- The installers were trained
 - ✓ Using a new training methodology – Flipped classroom, Self-training using the specially developed e-Learning Platform of the Project, with personalized access to training content, quizzes, tests and games and Work-based module - practical training in a real-life working environment.
 - ✓ By experienced trainers;
 - ✓ With detailed training materials in PPP format with information about the latest technological achievements;
 - ✓ Disposing of a professional Database of questions related to the training material for self-training and evaluation;
 - ✓ Serious games representing an attractive form for practical project developing;
- Were informed about the perspective of the green professions and the scenarios for the development of the Green economy;
- Granted with Certificated valid country- and EU-wide issued by the Ministry of education and science that is included in the Register of RES installers of the Sustainable Energy Development Agency that give them new job opportunities.
- Granted with GSS VET certificates issued by TÜV AUSTRIA.





7.3.1.2 Quantitative results

- 36 experts passed the preliminary pilot training for installers of solar thermal systems
- 30 installers of PV systems attended the training course and successfully passed the examination mechanism and are awarded with certificates for professional qualification recognized by the Ministry of Education and Science and valid in all EU countries and also awarded with GSS-VET certificates issued by TÜV AUSTRIA.
- 9 installers of PV systems passed the on-line training course and the test in the e-learning platform they are awarded with GSS-VET certificates issued by TÜV AUSTRIA.
- 17 installers solar thermal systems attended the training course, 16 of them successfully passed the examination mechanism and are awarded with certificates for professional qualification recognized by the Ministry of Education and Science and valid in all EU countries and also awarded with GSS-VET certificates issued by TÜV AUSTRIA.
- 46 installers of solar systems were awarded with **nationally and EU-wide recognized Certificates** issued by the Ministry of education and science.
- 55 installers of solar systems were awarded with GSS-VET certificate issued by TÜV AUSTRIA.



7.3.2 Trainers

7.3.2.1 Qualitative results

- Two training of trainers were performed: for trainers from participating organizations for the pilot training and training of trainers from other VET providers.
- A satisfaction questionnaire was distributed to the attendees of the trainings:



Please mark with X or V your answer in the following table.

About the training module	STRONGLY DISAGREE 1	DISAGREE 2	NEITHER AGREE, NOR DISAGREE 3	AGREE 4	STRONGLY AGREE 5
1. This training module included all the content necessary for participants to correctly understand and deliver solar system installations' services.					
2. The teaching/training materials and learning resources (including slides, handouts, and instructor's notes) facilitated the delivery and the effective acquisition of the module content.					
3. The content of the training module was well structured.					
4. The training material was adequately covered in the allotted time.					
5. The Exercises and Trainer's Tips booklet contained activities that facilitated the effective learning.					
6. There was a good balance between theory and practice in the training materials.					
7. The training session was carried out interactively.					
8. The trainees were encouraged to ask questions in order to develop critical thinking.					
9. The overall training session was well accepted by the trainees.					
10. Certain changes can be made in the training materials (re-structure the content; more relevant examples and exercises; appropriate level of difficulty; more visualizations).					
11. Components that will contribute to technology enhanced learning can be included in the training materials.					
12. The trainees were given enough materials to keep their interest.					

The results show a high level of satisfaction, the average results are 13 trainers give and excellent score of satisfaction, 1 trainer give a very good score of satisfaction.

A questionnaire of satisfaction dedicated to the e-learning platform was distributed to the participants on the training courses for trainers of installers of PV and solar thermal systems.

The results of the questionnaires show that the participants evaluate the e-learning platform as:

- Good: 2%
- Very good: 29%
- Excellent: 74%



Funded by the
Erasmus+ Programme
of the European Union**АНКЕТА****Оценка за работа с обучителната платформа по проект GSS-VET**

Моля разплатете ни за Вашите впечатления от работата с обучителната платформа. Офертата е вярна с Ваш избор вие имате роля за повишаване на качеството на обучаваните Ви.
Изберете по един отговор на всеки въпрос.

* Моля, отбележете с X или ✓ Вашите отговори в следната таблица.

ЗА ОБУЧЕНИЕТО В ПЛАТФОРМАТА	НАЙ-ЛОШ СЪГЛАСЕН	СЪГЛАСЕН	НЕСЪГЛАСЕН	НАЙ-ЛОШ НЕСЪГЛАСЕН
Някои трудности при включването в платформата	6	3		
Инструкциите за ползване на платформата са ясни	6	1	1	
Учебните теми са разработени на разбираем за мен език	6			
Обучението на подготвя за работата, която ще извършвам	4	4		
Въпросите са структурирани разбираемо	3	3		
Въпросите съответстват на разработения учебен материал	6	2		
Сметам, че представеното он-лайн обучение е полезно за моята работа и напредно развитие	3	3		
Въпросите за специална запаметяване предобитите знания	3	3		
Някои проблеми с решаването на теста в платформата	6	1	1	
Професионалната игра е била много полезна	3	3		



Conclusions

- The GSS-VET e-learning training tool is a very efficient and helpful instrument for VET and will be widely applied in the training of installers of RES systems.
- There are clear and detailed instructions on how to use the Platform for the self-training.
- The on-line tests for self-assessment and the serious games are innovative training forms and represent an efficient tool for evaluating the acquired skills

7.3.2.2 Quantitative results

- 2 training of trainers
- 13 trained trainers from:
- 9 VET providers

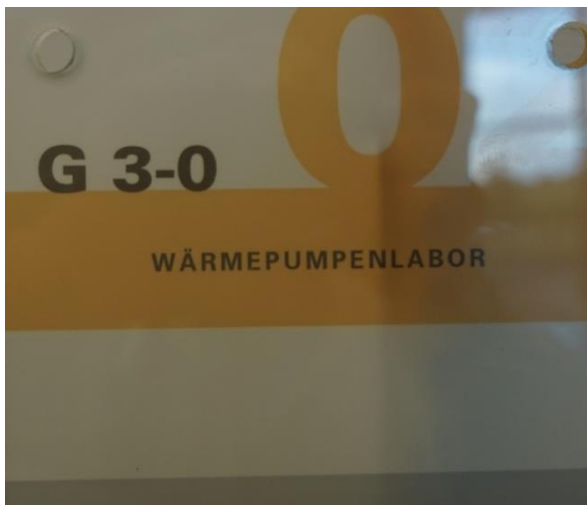
**7.4 GERMANY****7.4.1 Trainees**

The course Geothermal Systems - compare curricula "geothermal" - consists of theoretical and practical teaching contents. The theoretical content is to be taught and taught for the most part via the e-learning platform. This has the advantage for the participants that they are free to choose the location, the procedure, the time frame and the intensity.

The practical teaching content is taught in the "classroom" and/or "laboratory". This is essential for the practical tasks (e.g. installation of the heat pump, commissioning of the heat pump, maintenance of the heat pump, ...)

The corona pandemic in Germany led to a comprehensive lockdown in Germany. In addition to the closure of shops, restaurants, administration or schools, universities and colleges were also closed nationwide. In the 2020 summer semester (03/2020 to 08/2020), there were no attendance events at universities anywhere in Germany. Independently of this, these were generally prohibited. For the coming semester (from 10/2020 onwards), attendance events will also be largely dispensed with. At most events - e.g. examinations - which require attendance, it is possible to hold them in compliance with extensive hygiene measures. Particular attention must be paid to sufficient distance between the participants. In the heat pump laboratories of the HS Bochum, this cannot in fact be implemented.





Heat pump, Bochum





The following procedure was therefore decided for the pilot course:

- The participants could start the course with the regular e-learning part
- The practical part cannot (and must not) take place at present; it is planned to make up for this part as soon as possible. A date cannot be given during the corona pandemic. We assume the beginning of 2021.
- This procedure was communicated to the participants
- Accordingly, no formal evaluation has taken place. The evaluation process has been worked out so far. Instead, the experiences of the participants were collected in individual interviews.
- Certification could therefore not yet take place.

The evaluation form for the participants is depicted below:

Erasmus+ 1		GSS VET – Geothermische Systeme		1
Kursbezeichnung:		Kurszeitraum/-datum:		BO
Modulbezeichnung:		GSS-VET Geothermal and solar systems: Vocational education and training		
Bitte so markieren: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Bitte verwenden Sie zum Ausfüllen einen Kugelschreiber oder einen dünnen Filzstift und die Bei Korrektur: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> links gegebenen Hinweise, um eine optimale Erfassung Ihrer Angaben zu ermöglichen.				
Liebe Kursteilnehmerin, lieber Kursteilnehmer, durch das Ausfüllen dieses Fragebogens helfen Sie uns, unser Bildungsangebot weiter zu verbessern. Die Beantwortung der Fragen ist freiwillig und erfolgt anonym.				
A Angaben zur Person				
A1 Alter	<input type="checkbox"/> <30 Jahre	<input type="checkbox"/> 30 - 40 Jahre	<input type="checkbox"/> 40 - 50 Jahre	<input type="checkbox"/> >50 Jahre <input type="checkbox"/> Keine Angabe
A2 Geschlecht	<input type="checkbox"/> Weiblich	<input type="checkbox"/> Männlich	<input type="checkbox"/> Keine Angabe	
B Rahmenbedingungen der Veranstaltung				
	Trifft voll zu	Trifft teilweise zu	Trifft überwiegend nicht zu	Trifft gar nicht zu
B1 Die Veranstaltungen des Moduls sind gut organisiert.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B2 Die technische Nutzung der E-Learning Plattform war problemlos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B3 Die Lehrinhalte stimmen mit der Modulbeschreibung überein	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B4 Die Menge des vermittelten Stoffes ist angemessen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B5 Mein Vorwissen war ausreichend, um der Veranstaltung folgen zu können.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C Stoffvermittlung und Arbeitsaufwand				
C1 Die Aufbereitung des Stoffes ist gut strukturiert und hat eine klar erkennbare Konzeption („roter Faden“).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C2 Folien und Inhalte sind klar strukturiert und waren für mein Verständnis der Lehrinhalte hilfreich.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C3 Die Interaktion mit den Dozenten war gut	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C4 Die Lehrinhalte verbessern meine Chancen auf dem Arbeitsmarkt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C6 Das Tempo der Stoffvermittlung ist für mich	<input type="checkbox"/> zu schnell	<input type="checkbox"/> genau richtig	<input type="checkbox"/> zu langsam	
C7 Mein Arbeitsaufwand für die Vor- und Nachbereitung der Module ist	<input type="checkbox"/> eher groß	<input type="checkbox"/> mittel	<input type="checkbox"/> eher gering	
C8 Die innovativen Lehrmethoden (E-Learning / Serious Game) waren für mich hilfreich	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D Gesamtbewertung				
	Sehr gut	Gut	Befriedigend	Unbefriedigend
D1 Wie bewertet die Dozentin/den Dozenten?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D2 Wie beurteilen Sie die Eignung der Lehrmaterialien (z.B. Skripte) und der empfohlenen Literatur?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D3 Wie bewerten Sie Ihren Lernerfolg?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D4 Welche Note geben Sie der Veranstaltung insgesamt?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E Persönliche Kommentare und Anregungen				

Erasmus+ 1		GSS VET – Geothermische Systeme		2
Hinweis: Bei der Auswertung der Fragebögen werden die Antworten auf die folgenden Fragen bei Bedarf eingesehen und dann als Graffiti dem Ergebnisbericht an den Dozenten beigefügt. Theoretisch ist es möglich, über die Handschrift Rückschlüsse auf die Beantworter/ den Beantworter des Fragebogens zu ziehen.				
E1	Ich bin damit einverstanden, dass meine Antworten auf die Freitextfragen an die Dozentin/den Dozenten weitergeleitet werden.			<input type="checkbox"/> Ja <input type="checkbox"/> Nein
E2	Was sollte der Dozent auf jeden Fall beibehalten?			
E3	Was sollte der Dozent auf jeden Fall ändern?			
E4	Welche anderen Verbesserungsvorschläge oder Anregungen haben Sie für das Seminar?			

7.4.1.1 Implementation of the training in Germany

The Bochum University of Applied Sciences has offered a course "Geothermal Systems" in cooperation with the Fraunhofer IEG.

The following lecturers were involved:

- Prof. R.B. (Bochum University of Applied Sciences)
- St.E. (Bochum University of Applied Sciences)
- Dipl.-Ing. H.B. (Fraunhofer IEG)

On 01.01.2020, the Geothermal Centre at Bochum University of Applied Sciences became part of the newly founded Fraunhofer Institute for Energy Infrastructures and Geothermal Energy.

As the teaching laboratories for heat pump technology in particular also became part of the new institute, both parties - the university and Fraunhofer IEG - have agreed to cooperate closely in implementing the courses.

This was and is a successful and trustful cooperation for all parties involved.

The start of the course was on 29.06.2020 and the participants were 46 - predominantly male

All participants were:

- Trained in renewable technologies and had first experiences with heat pump systems
- Familiarity with new technologies
- Interest in renewables and energy saving issues

Course schedule



We can only confirm that all participants are studying the training platform and that they send any questions they have by e-mail to the trainers of the program.

By e-mail and/or video telephony we had check the following aspects:

- Participants have acquired new professional skills and competences.
- Participants were fine with
 - ✓ Using new training methodologies that include: Inverted classroom, projects, self-training using the e-Learning platform specially developed in this project, with personalized access to training contents and simulation games.
 - ✓ Only a few technical problems took part. mostly depending on a insufficient connection for short times
- Quite good interactions between trainers and trainees
- Participants are waiting strongly of the practical work
- Participants sees the need for more quality during planning and installation. The (theoretical) input seems to be the right answer

7.4.2 Trainers

7.4.2.1 Qualitative results

- Two training of trainers were performed: for trainers from participating organizations for the pilot training and training of trainers from other VET providers.
- Both were held as an online webinar according to the Corona pandemic (see above)
- A satisfaction questionnaire was distributed to the attendees of the trainings (see below)

All trainers off the other VET Providers passed a university and have long time experience

The survey results show a high level of satisfaction:

- ✓ Satisfaction with whole course /Training: 1,78 of 5
- ✓ Satisfaction with the E-Learning platform: 1,67 of 5
- ✓ Relevance of the units for daily work of participants: 2 of 5

Note: Two trainers mentioned that the basics are slightly overstated.

Conclusions:

- The GSS-VET e-learning training tool is a very efficient and helpful instrument for VET and will be widely applied in the training of installers of RES.
- There are clear and detailed instructions on how to use the Platform for the self-training.
- The on-line tests for self-assessment and the serious games are innovative training forms and represent an efficient tool for evaluating the acquired skills and knowledge.
- The key for success is the combination of theoretical and practical parts.





Kurstitel: GSS VET Geothermal Systems

 Dozent für: ☐ Praxisteil / Praxisinhalte / Übung(en)
☐ Theorieteil / Theorieinhalte
☐ Webinar
Der Dozent

Welche(s) relevante Ausbildung / Studium haben Sie absolviert? _____

Welcher Tätigkeit gehen Sie aktuell nach? _____

Wie lang ist ihre Berufs- und Praxiserfahrung, in dem Themenfeld zu dem Sie als Dozent mitgewirkt haben? _____ Jahre

Haben oder hatten Sie bereits Erfahrung als Dozent / Referent / Lehrender? ☐ ja ☐ nein**Der Kurs**

*Richte beantworten Sie die Fragen auf einer Skala von 1 bis 5, wobei
 1=sehr zufrieden / sehr geeignet / sehr passend
 5= sehr unzufrieden / völlig ungeeignet / gar nicht passend
 bedeutet.*

	1	2	3	4	5
Wie zufrieden sind Sie insgesamt mit dem Kurs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wie zufrieden sind Sie insgesamt mit der E-Learning Plattform?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Die Lehrinhalte decken alle relevanten Bereiche für die Teilnehmenden ab?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
War der zeitliche Umfang für die Inhalte passend?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Wie beurteilen Sie die Verknüpfung von Theorie- und Praxisanteilen in dem Kurs? ☐ ☐ ☐ ☐ ☐

Wie hoch war ihr Zeitaufwand in der Vorbereitung des Kurses? ____ Stunden

Welche Inhalte halten Sie über das konkrete Modul hinaus für relevant in dem Weiterbildungsangebot?

1. _____

2. _____

3. _____

Die Organisation

1 2 3 4 5

Wie zufrieden waren Sie mit der Organisation im Vorfeld des Kurses? ☐ ☐ ☐ ☐ ☐Wie zufrieden waren Sie mit der Betreuung / Ansprache während des Kurses? ☐ ☐ ☐ ☐ ☐**Praxisbezug**

1 2 3 4 5

Sind Sie der Meinung, dass die Kursinhalte für die Teilnehmer einen konkreten Bezug zu deren Tätigkeiten im Berufsalltag haben? ☐ ☐ ☐ ☐ ☐Halten Sie diese Art von Weiterbildungsangeboten für die adressierte Zielgruppe für relevant? ☐ ☐ ☐ ☐ ☐

Platz für weitere Anmerkungen / Kritik / Anregungen an uns:

7.4.2.2 Quantitative results

- 2 training of trainers
- 9 trained trainers from:
- 8 VET providers



8. IMPACT ON THE STAKEHOLDERS

8.1 GREECE

The chance to learn more on solar-thermal, photovoltaics and geothermal systems is in priority in Greece and generally speaking in Europe level based on the EU Directives. This was mentioned by all stakeholders who attended the project event organized in Athens on 13/02/2020. In this meeting have participated representatives from Center of Renewable Energy Sources, from National Technical University of Athens, from Greenpeace, from Ecotec magazine and 12 representatives from private sector - technical companies related to solar-thermal, photovoltaic and geothermal sector.

Also, in Demsee2018 conference (12th International Conference on Deregulated Electricity Market Issues in South Eastern Europe) that took place on Frederick University in Nicosia-Cyprus on 20-21 September 2018, the current results of the project were presented to many members of the academic community (from Cyprus, Greece, Ireland, Ireland, Italy, Serbia, Slovenia, Bosnia-Herzegovina, Bhutan, Brazil, Nepal, Pakistan, Iraq and representatives of private (METKA) and non-private stakeholders (CIGRE – International Council on Large Electric Systems). During this presentation the contents of the training curricula, the characteristics of the training platform were presented and the benefits GSS-VET program offers for training of adults – workers who do not have the flexibility to attend courses in fixed hours in a classroom or a laboratory were presented. All participants mentioned that GSS-VET program could also train technicians in their own countries / companies since it is in line with their National Policy for sustainable energy development. Also, it could be used in vocational training of technicians who want to update their skills and learn more on their profession and seek the opportunities to do that especially through distance learning programs which offer a flexibility to them.

Vocational education training programs that most of Educational Institutes, certified public authorities and certified private entities offer to cover the need of people to upgrade their working skills especially in technical subjects are always interest in applying new training tools and methods. People that teach in vocational training programs and participated in this conference mentioned that they could use this training platform in their future seminars in the specific subjects.

After the end of the project two (2) more conference publications are prepared to be submitted in 30th Annual Conference of the European Association for Education in Electrical and Information Engineering (EAEIE) that is scheduled to take place September 2020 in Prague.

Also, in regional level, after the crisis from corona virus, workshops are scheduled to take place in local associations, technical chamber of Chania and Heraklion, in Region of Crete and in Municipalities that will express their interest to learn more for this program. Also, the project website will be renewed in regular basis even after the end of the program till 2025 and it will include all related dissemination and training activities that will take place.

Finally, all stakeholders mentioned that a very important issue that needs to be solved in the future is the certification process of the trainees. This is a subject that each country should solve soon. For GSS-VET project in Greece concerning the trainees' certification we are in process to apply and propose a mechanism in the National authority which oversees accreditation of vocational education training.



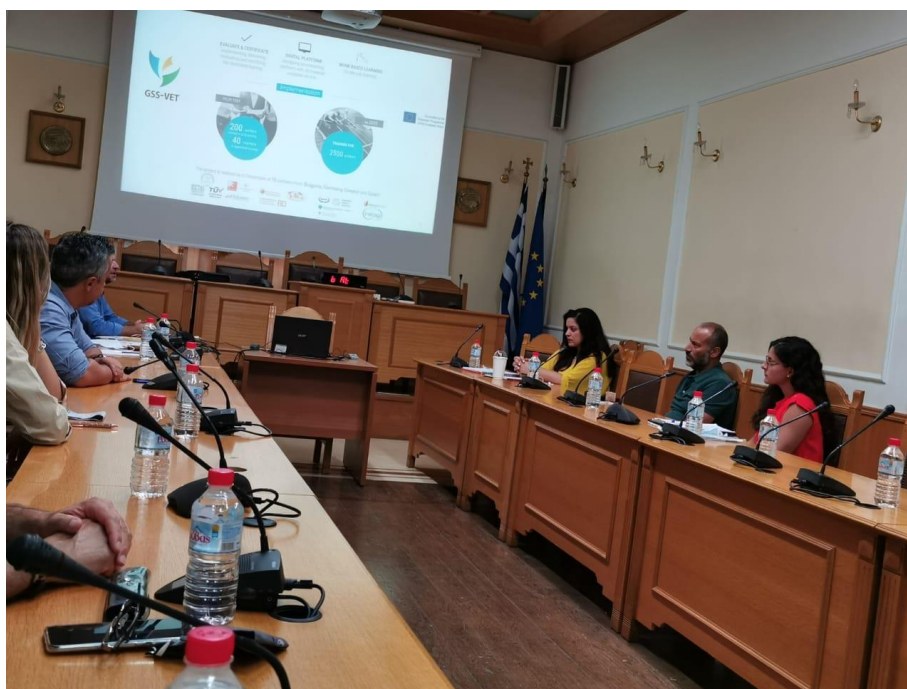
8.1.1 Impact on Stakeholders (ECTE)

8.1.1.2 VET policy makers - REGION OF CRETE VET

The Crete's strategic plan for Continuous Vocational Education and Training, will take into account the workshop conclusions, in developing Crete's strategic plan for education and Life-Long Learning, that is under public discussion.

More specifically the objectives are to:

- Promote regional cooperation and networking for enhancing **access to training and qualifications for all**, with particular attention to the low-skilled, through continuing VET, notably by increasing quality, supply, and accessibility of continuing VET, validation of non-formal and informal learning, promoting workplace learning, providing for efficient and integrated guidance services and flexible and permeable learning pathways.
- The inclusion of developing partnerships between micro, small and medium-sized companies, VET providers, and scientific and research institutes aimed at promoting joint competences centers, earning networks, support to pooling of resources, and providing initial and/or continuing training to their staff.



Picture: workshop with Regional government of Crete policy makers

For this reason, the registration of the capacity of the Crete region around the skills, knowledge and competences system, and the effort of networking all VET engaged, under a continuous improvement quality system (EQAVET) “**D-5.1: Framework for training implementation – EQAVET**”

for achieving “learning outcomes” that are leading to validation and certification is crucial for the region of Crete, **“D-4.3: Qualification standards”, “D-8.4: Certification pathway”**.

Under this perspective, the Crete Region supports the promotion of the use of the GSS Vet outputs the ubiquitous learning platform **“D-4.2: GSS e-learning platform”** for the electricians and plumbers, and the respective certification scheme **“D-4.3: Qualification standards”**.

Quantitative indicators

One- the educational policy maker in Crete

8.1.1.3 Impact on RES – Building sector

Intra-EU labor geographic mobility through a common qualification scheme for skills’ and competences’ at national, European and/or International level **“D-4.3: Qualification standards”. “D-4.4: Evaluation, validation and recognition method”**

- Better matching between labor workforce supply and demand in the RES sector;
- Intra-EU labor geographic mobility through the use of ECVET system and the certification of the developed the professional profiles if the Solar and geothermal installer.
- More attractive opportunities for vocational education and training in RES sector at a pan-European level;
- More cohesive society through increased opportunities for mobility and professional development;
- Enhanced productivity, innovation, competitiveness and growth potential in the European Building sector;

8.1.1.3 Impact on RES professionals and companies (ECTE)

- Training in skills and competences that are tailored to the needs of the geothermal and solar installation learners and industry based on a learning outcomes oriented vocational curricula **“D-2.9: GSS VET curricular”**
- Up-skilling of electricians and plumbers to meet new challenges in the work field, **“D-4.2: GSS e-learning platform”**.
- Free access to learning opportunities and training methodologies **“D-4.2: GSS e-learning platform”**, for RES businesses that lack training facilities and departments.
- Reduced training expenses for companies due to the free access to the VET program **“D-4.2: GSS e-learning platform”**.
- More interactive learning opportunities via the use of new teaching and learning technologies for learners **“D-4.2: GSS e-learning platform/ serious games”**
- Enhanced productivity, innovation, competitiveness and growth potential in the European RES sector

Quantitative indicators

57 Chamber of commerce and industry in Greece



8.1.1.4 Impact on other stakeholders

- Creation of collaboration networks between different parties (VET providers, HEIs, enterprises, professionals associations) through a structured set of tools and procedures.
- Development of a learning network within a transnational context.
- Strengthening the interconnection between higher education institutes, business world and vocational education and training, creating the conditions for an all-around, up-to-date vocational education and training of RES specialists in targeted occupational profiles
- Development and exploitation of new forms of learning via the use of new teaching and learning technologies “**D-4.2: GSS e-learning platform**”

Quantitative indicators

57 Chamber of commerce and industry in Greece that act as an umbrella of RES companies

8.1.1.5 Impact on Future plans

A lot of projects in Europe have already created training programs and certifications’ schemes in RES, in an effort to fill the gap of needed skills and existing skills. However, future needed skills, time-lags between needed skill identification, training offer, and the eventual work placement mean that decisions on the design of the education and training need to be made in a continuous base in order to be in line with emerging demands of the market of renewable industries. A key challenge to the renewable energy industry is to align education and training to meet the emerging skill needs in the sector.

Based on the “GSS Vet Project outcomes and in collaboration with the region of Crete policy making authorities, the following points/ objectives will be part of the strategic plan for VET in the following years:

- Make the best use of the certification and validation pathway “**D-8.4: Certification pathway**”, developed in the context of the GSS Vet Project
- Make the best use of the existing ubiquitous learning environment **D-3.3: Systemic Definition of the innovative teaching methodology**”, for the working professional in the solar thermal and geothermal sector in the Crete region
- make the best use of the data available online to capture insights and improve decision-making in RES education (**all GSS outputs**).
- The update of the curriculums that have been developed “**D-2.9: GSS VET curriculum**” are of the first priorities of the Crete region policy in RES training for CVET.
- Tackle skills gaps and mismatches through the development of an up-skilling pathway based on updating learning-outcomes-oriented curricula (**D-2.9: GSS VET curriculum**), that better meet the individual needs, being in line with the “real market” evolving.
- Establishment of an **Academy for skills and competences for the Renewable Energy Sector** (RES), aiming at the sustainability and the exploitation of the results of the GSS Vet Project.
- Employing the “**D-3.3: Systemic Definition of the innovative teaching methodology**”



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- Development of missing Skills identification mechanism to update the “**D-2.9 GSS curriculum**” and “**D-4.1: Training contents**” to better meet the professionals future needs, being in line with the “real market” evolving.
- Use contemporary digital tools to predict future skills that will be needed on the RES labor market in the coming years and make the best use of the data available online to capture insights and improve decision-making in education

Qualitative indicators

Minutes of the workshop with the Regional Government of Crete policy makers



8.2 SPAIN

8.2.1 Impact on relevant Authorities

- The training activities developed within the framework of the GSS-VET project and implemented have been highly appreciated by the Department of Industrial Security of the Basque Government:



- Furthermore, the GSS-VET project is in line with the Energy Strategy for the development of a sustainable energy system.

8.2.2 Impact on Vocational Training Providers

- The professional training centres that have participated in the training for trainers, both in Gipuzkoa, Madrid, Barcelona and Seville, are qualified to provide training for plumbing and electrical installers in their various specialties. The contents provided by the GSS-VET project are very valuable as complementary training in the field of renewable energies, and many installers are showing great interest in it, so they plan to continue the training.
- Official vocational training centres, which train students in renewable energies, are also interested in new training methods and new training materials. Several teachers from these schools attended the training of trainers and will use the materials of the GSS-VET project, especially the platform of question banks, PPT files and games



8.2.3 Impact on companies in the sector (Solar Energy)


- The GSS-VET project can contribute to fill the lack of installers specialized in solar energy installations, both thermal and photovoltaic, as well as geothermal. Companies will now have training for solar energy technicians (photovoltaic and solar thermal) in their own associations and in the confederation of associations CONAIF. This is what they say after the presentation made to the members of their Board of Directors and the dissemination of the project among all the associations.





- Solar installation companies can organize training activities for their staff using the e-learning platform.

- Businesses are informed about the "green" skills needed and the prospects for their further development in line with the deployment in the "green" economy and the important role of the professions in this sector for the transformation of economies towards sustainability paradigms.
- A satisfaction survey was conducted among the companies that have accessed the platform to analyze their impressions, which gave the following results:

SATISFACTION QUESTIONNAIRE Assessment of training under GSS-VET Project SUMMARIZED RESULTS			 GSS-VET <small>General and sector skills - vocational education and training</small>		
Evaluation of the platform's contents	NO DISAGREEMENT AT ALL 1	DISAGREE 2	NEITHER AGREE NOR DISAGREE 3	OF AGREEMENT 4	ABSOLUTELY AGREE 5
1. General impression				30%	70%
2. Interest of the content as a whole				45%	55%
3. Interest of training materials			10%	50%	40%
4. Interest of the game			27%	36%	37%
5. Interest of the evaluation tests				40%	50%
6. Mobility within the platform			10%	30%	60%

8.2.4 Other Organizations, at European Level

Organizations from Portugal that are members of the European Association of Installers also have the information of the GSS-VET project and specific presentations of the same have been programmed for those other associations of the country that wish to do so.

8.2.5 Quantitative Impact

Several events were held and attended during the implementation of the project activities:

- 2 representatives of the Basque Government's Department of Industry
- 2 representatives of Zubigune Fundazioa
- 11 installation companies in Gipuzkoa
- 25 general secretaries of the associations integrated in Conaif
- 28 presidents and members of the working commissions of the Installers' Associations integrated in Conaif
- 5 members of the Board of Directors of the Installers Association Fenie

8.3 BULGARIA

8.3.1 Impact on relevant Authorities

- The training activities developed and performed under the GSS-VET project are highly appreciated by the National Agency for Vocational Education and Training as they meet its objectives. Moreover, they recognize the curricula and certification schemes and the GSS-VET training is included in their data base of certified trainings.

- The Sustainable Energy Development Agency (SEDA) keeps records of all certified installers of RES systems. They appreciated a lot the GSS-VET initiative, as a result of it 47 new certified installers will be included in this list. Moreover, the GSS-VET project is in line with the National Policy for sustainable energy development.

8.3.2 Impact on VET providers

- The centre for vocational education and training of CISB is certified from NAVET for performing trainings following the GSS-VET scheme. This is a valuable activity and, as many installers show a big interest in it, they foresee to continue the trainings. CISB want also to implement a distance learning training course based on the GSS-VET learning platform and approved by NAVET.
- Professional high schools that train installers of RES systems are also interested in new training methods and new training materials. Several teachers from such schools attended the training of trainers and will use the materials from the GSS-VET project, especially question banks, platform, PPT files and serious games.
- Although the Build-Up Skills roadmap for Bulgaria is scheduled till the end of 2020, the coordinator EnEffect is involved in several training activities, including such for RES installers. They will use materials from the GSS-VET project as: new training methodologies, e-learning platform, PPT files, question banks and serious games.
- Technical universities will also profit of the advanced technical information for the newly open masters' degrees "Renewable energy engineers".

8.3.3 Impact on Companies / Municipalities for Solar Systems:

- The GSS-VET project is filling the gap of lack of certified installers of solar and geothermal installers. Construction companies can now find well trained and certified technicians for solar (PV and solar-thermal) systems on the site of the Chamber of installers in Bulgaria, in the Register of the Agency for sustainable energy development, on the website of the Chamber of commerce and industry.
- The companies for solar installation can organize training activities for their staff using the e-learning platform.
- The companies are informed about the necessary green skills and the perspective for their further development in line with the deployment in the green economy and the important role of the green professions for the green transformation of the economies
- Municipalities can organize trainings for their public officers (from schools, hospitals, other public buildings) using the on-line Platform at beginners' level i.e. without self-evaluation and certification.

8.3.4 Quantitative Impact

During the implementation of the project activities were performed several events with interactive discussions through national round tables, workshops and working meetings that were attended by:

- 3 representatives of NAVET
- 11 representatives from SEDA
- 7 experts from ministries



- 96 experts from VET providers
- 43 representatives from municipalities
- 253 representatives from companies for design and installation of RES systems
- 145 experts from consulting companies, energy agencies, NGOs



8.4 GERMANY

8.4.1 Impact on relevant Authorities

- Through the multi activities like workshops, round-tables, conference participation all three German partners established the GSS courses at all levels of public and technical administration. On the one hand we have a lot of contact to public authorities dealing with green energy, on the other hand the chambers of technicians are strongly behind the programme.
- The wide spread into community guaranteed a bright success.

8.4.2 Impact on VET providers

- A couple of VET providers – via their trainers – were introduced to the courses. They agree with the need of the courses, the curricula and are glad to have the E-Learning platform. Combined with the big interest of the installers they want to implement the GSS VET distance learning training course based on the GSS-VET learning platform.
- The certification of the courses (and the learners) is a big advantage to implement a GSS VET course. The financial risk will be minimized.
- The HS Bochum will also profit of the advanced technical information for the own programs, such as the master course “Geothermal Energy systems” or the brand new Bachelor course “Renewable energy”.



8.4.3 Impact on companies & on the market

- The GSS-VET project is filling the gap of lack of certified installers of solar and geothermal installers. Well trained and certified technicians are available for companies.
- Multiplication of the training in future can be the base for the energy transformation of heating / cooling in houses. The quality of the systems will raise as much as more well-trained technicians are available.
- The companies are informed about the necessary green skills and the perspective for their further development in line with the deployment in the green economy and the important role of the green professions for the green transformation of the economies.

8.4.4 Quantitative Impact

During the implementation of the project activities were performed several events with interactive discussions through national round tables, workshops and working meetings.

- One (1) workshop for GSS VET trainers
- 7 trained GSS VET trainers
- One (1) workshop for training other VET providers
- 5 trained trainers of other VET providers



9. SOCIAL / ENVIRONMENTAL / ECONOMICAL IMPACT

9.1 GREECE

9.1.1 Social Impact in energy / construction sector

Today, we must keep in mind the struggle between technology and education. Technology is evolving faster than education in terms of the knowledge provided to Universities and technical education during studies, while the skills required by the labor market can also change at a high rate.

The GSS-VET project aims to strengthen the skills of already employed workers in technological issues such as those related to Energy and RES and to improve knowledge for new employees with limited experience. In each case, they have seized it, despite obstacles we can scarcely imagine.

The goal of the project will be achieved through the strong interaction of all project partners with stakeholders. Beneficiaries can be divided into two categories, direct and indirect. Employees in these systems are direct and direct beneficiaries, as they will acquire up-to-date knowledge and develop skills and abilities required by those interested in the job market. Instructors and technical staff of the participants in the project's institutions are the next group of beneficiaries. Beneficiaries are employment associations, vocational training centers, and universities that will benefit from long-term study programs.

After the project, the training material, the training platform, and the applied teaching methodologies will be available to the public at least till 2025. Electronic newsletters, seminars, daily conferences, social media posts will be used to update and share the results in more interested places and countries. Knowledge can also be transferred to Educational Institutions through educational or research collaborations maintained by school members with colleagues from other Institutes.

9.1.2 Environmental Impact in energy / construction sector

The technical potential of renewable energy systems' use is significant in the development of energy sector in all countries (energy savings, minimize use of conventional energy sources, minimize the environmental pollution).

The general aim of the project is to prepare building professionals for taking care of the environment and the natural resources using mainly RES. The results of the project activities will lead to an increase of number of solar-thermal, photovoltaic, and geothermal systems installed in Greece and the produced kW/h of green energy and the increase of people working on green jobs.

9.1.3 Economic Impact in energy / construction sector

In recent years, Greece has been trying to find its way out of the crisis of European public debt, which has affected all its activities, either directly or indirectly. In this regard, one of the factors that can contribute to the sustainable development of a society is the improvement of the quality of education and especially the quality of continuous adult education. Education should be considered an investment and therefore it is necessary to provide people with cutting-edge knowledge and up-to-date skills that will strengthen their position in the labor market.

An economy can become more competitive if it can prevent labor market shortages. In this context, vocational training providers should update their program studies and provide new or up-to-date knowledge and skills to employees that will allow them to compete in the job market.

As part of the results dissemination and exploitation activities, the project will provide an opportunity for local companies and EU companies to strengthen their presence in the market and contribute to the creation of new green jobs and increase the exploitation of RES systems.

The category of indirect beneficiaries of the project consists of very small, small, medium and large enterprises, and of course, individuals in the wider energy sector and renewable energy sources. Small and medium-sized enterprises make up 99% of all businesses in the EU and, therefore, those in the energy sector are an important group of stakeholders. Businesses can be approached either directly by electronic means or by mail or through the respective Chamber of Commerce and



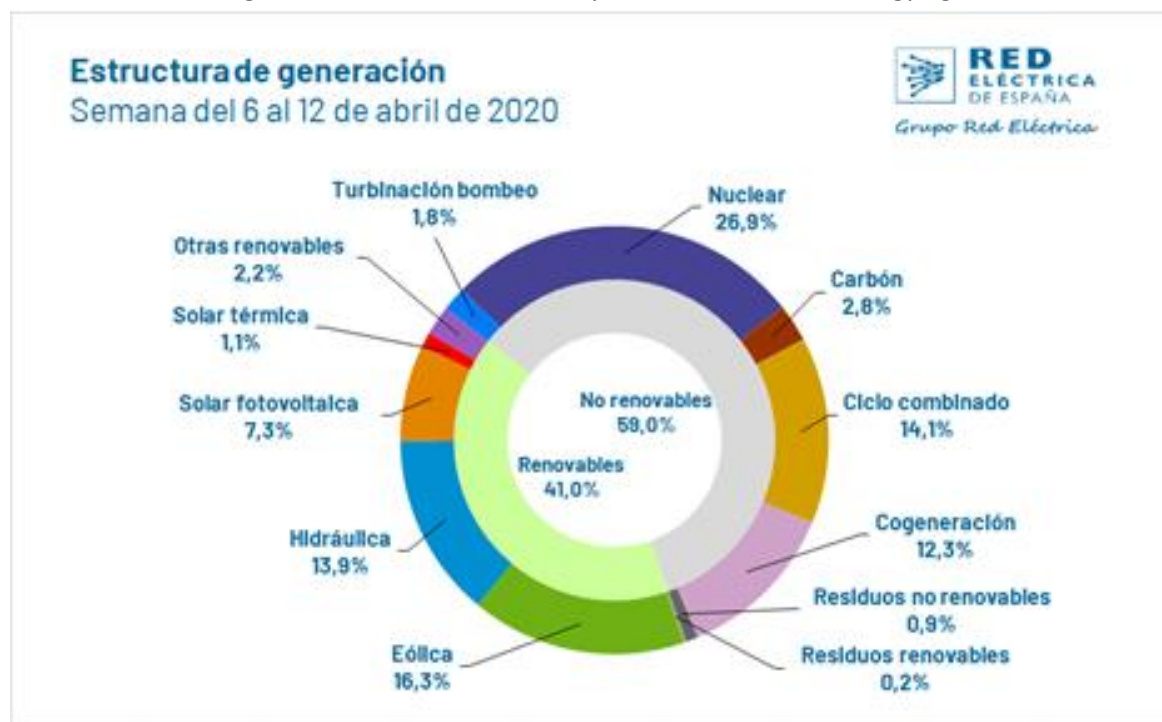
Industry. Electronic newsletters, seminars, daily conferences held at business premises, social media will be used to transmit the results of the project to the labor market.

Upon completion of the project, updated curricula will continue to be taught by HMU instructors. Therefore, on a regular basis, new learners will have the opportunity to gain new knowledge, use information and communication technologies, conduct experiments with equipment and cutting-edge practice. In addition, HMU aims to regularly upgrade the curricula offered.

9.2 SPAIN

9.2.1 Social Impact

- 50 trained professionals with up-to-date skills and knowledge of solar installations and greater potential for career development in these sectors and increased remuneration.
- 19 trained instructors with professional experience to provide training to students, youth and the unemployed.
- Almost 100 stakeholders informed about new training options in FERE.
- Stakeholders were aware of the importance of FERR-related professions, the requirements of the renewable and green transformation industry, the EU renewable energy agreement, etc.



9.2.2 Environmental Impact

- The general objective of the project is to prepare professionals in the building sector to intervene in the installation and maintenance of the building's energy systems, with care for the environment and with an awareness of performance that must be sustainable, through the use of FERE. The results of the project activities will lead to an increase in the number of solar systems installed in Spain and in the green energy produced in kW/h.

- The e-learning platform does not require manuals, instructions or guidance on paper, only a computer or other computing device such as mobile phones or tablets. The application of new teaching methods reduces the need for materials, and also for travel.
- In the project, most of the dissemination materials and reports used paperless technology, i.e. they were designed in electronic format.
- GSS-VET awareness campaigns, events and workshops stressed the importance of building "green", behaving "green", training and learning "green".

9.2.3 Economic Impact

- Creation of new green jobs, 50 within the duration of the project, and much more after.
- Opportunities for further development of companies dealing with FERE systems.
- Increase in the rate of renewable energy in the country's energy mix
- Decrease in the costs of installing FERE systems due to the increase in the market.
- Increase in the income of people involved in the FERE industry.
- Increase in the human resource potential for the ecological transformation of the country in relation to the "Green Deal".
- Support to national authorities to fulfil their commitments in relation to both Directives regarding the training of installers: DIRECTIVE (EU) 2018/2001 (art.52) and DIRECTIVE 2009/28/EC (art. 14.3).

9.3 BULGARIA

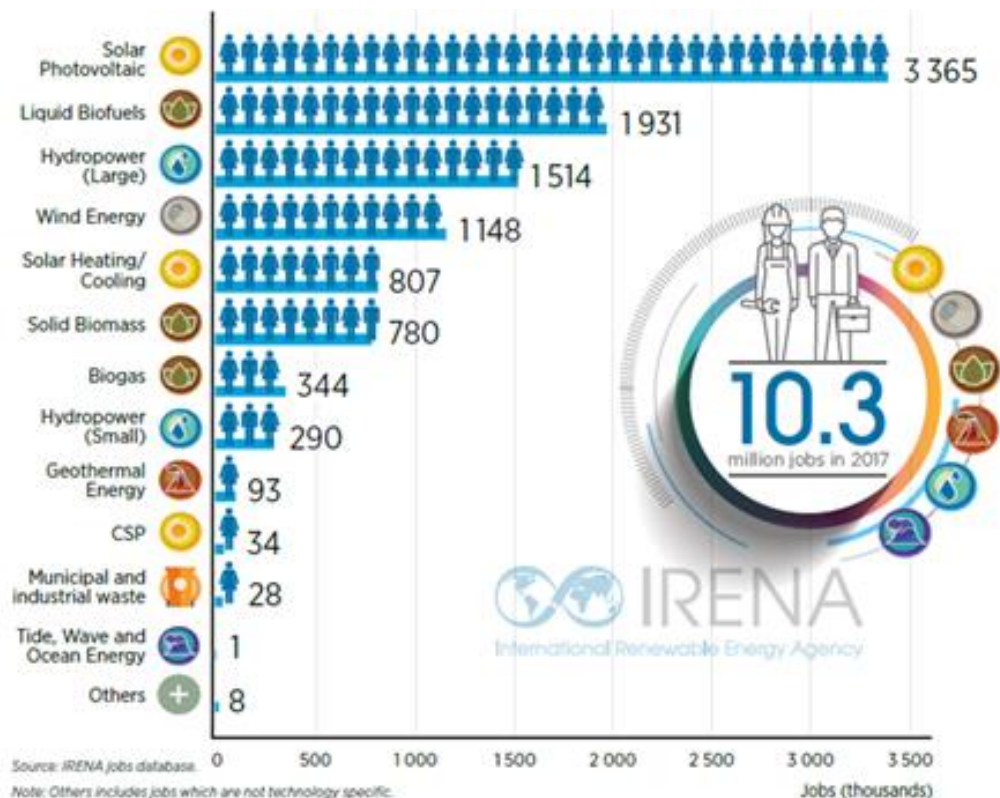
9.3.1 Social Impact

- 50 trained professionals with updated skills and knowledge on the solar installations and higher potential for career development and increase of remuneration;
- 14 trained trainers with professional experience to deliver training to students, young and jobless people;
- nearly 700 stakeholders informed about the new VET options and the available qualified building professionals;
- Stakeholders acquainted with the importance of the green professions and their further development, the requirement of the green industry and green transformation, the EU green deal etc.



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9.3.2 Environmental Impact

- The general aim of the project is to prepare building professionals for taking care of the environment and the natural resources using mainly RES. The results of the project activities will lead to an increase of number of solar systems installed in Bulgaria and the produced kW/h green energy.

- The e-learning Platform does not require paper handbooks, instructions and guidelines, just computer/laptop/smartphone. The implementation of new teaching methods decreases the needs of materials and transport.
- Most part of the dissemination materials and the reports used the paperless technology i.e. were designed in electronic format.
- The GSS-VET awareness campaigns, Round tables and national workshops stressed the importance to construct “green”, to behave ‘green”, to train and learn “green”.



9.3.3 Economic Impact

- Creation of new green jobs, 50 in the frame of the project duration and much more after.
- Opportunities for a wider development of companies dealing with RES systems.
- Increase of the rate of green energy in the energy mix of the country.
- Decrease of costs of installation of RES systems due to the increase of the market.
- Increase of incomes of people involved in the RES systems industry.
- Increase of the potential of human resources for the green transformation of the country in regard to the Green deal.
- Support to the National Authorities to fulfill their commitments in regard of both Directives regarding the training of installers: DIRECTIVE (EU) 2018/2001 (art.52) and DIRECTIVE 2009/28/EC (art. 14.3).



9.4 GERMANY

9.4.1 Social Impact

- more than 40 trained professionals with updated skills and knowledge on geothermal installations and
- higher potential for career development
- 7 trained trainers with professional experience to deliver training to students, young and jobless people;
- uncounted stakeholders informed about the new VET options and the available qualified building professionals;

9.4.2 Environmental Impact

- The general aim of the project is to prepare building professionals for taking care of the environment and the natural resources using mainly RES. The results of the project activities will hopefully lead to an increase of number installed RES in Germany
- Furthermore, the quality of planning, installation and maintenance will raise
- Summarizing, the GSS-Course are part of the transformation of the energy system, especially in the (private) housing sector
- The e-learning platform decrease the needs of materials and transport.
- The GSS-VET awareness campaigns focus on the green energy (Solar / PV / Geothermal). These might be a part in the change of behavior and attitude in Germany

9.4.3 Economic Impact

- Qualification leads to better jobs, within the project duration and much more after.
- Quality of installation and maintenance leads to less operating costs.
- Opportunities for a wider development of companies dealing with RES systems.
- Slightly, but continuous increase of the rate of green energy in the energy mix of the country.
- Qualification can partly increase incomes of trained people.
- Increase of the potential of human resources for the green transformation.





GSS-VET



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The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Funded by the
Erasmus+ Programme
of the European Union



GSS-VET PARTNERS

The project is realized by a Consortium of 15 partners from: Bulgaria, Germany, Greece and Spain



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Chamber of Installation
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