



Developing Competences of Pre-Service Teachers through STE(A)M-based Renewable Energy Curriculum

PROJECT NO: 2021-1-TR01-KA220-HED-000027614

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WHAT IS RENEWTEACH?

RenewTeach is an European project (2021-1-TR01-KA220-HED-000027614), having the main aim of developing a curriculum on the subject of Renewable Energy (RE) for preservice teachers studying in higher education.

The project's consortium is made up of public and private organizations from four countries: Türkiye, Slovenia, Romania and Spain.

After the *RenewTeach* project is completed, it will produce links, information and resources by the Renewable Energy-related curriculum for preservice teachers in higher education. Also learning activities and an online portal through which they exchange their ideas will be created so that future teachers improve their professional and pedagogical knowledge level about RE.

The project results will be specifically developed to ensure that preservice teachers will be provided with knowledge, skills and attitudes towards RE, such as:

- raising awareness of environmental issues and climate change in the context of higher education;
- the ability to discover geographical and climatic aspects specific to different regions and to provide solutions to local and global renewable energy issues;
- better understanding of interdisciplinary STEAM, since RE sources are presented to them as a context in which science and engineering intersect.

DEVELOPING KNOWLEDGE & SKILLS

ABOUT THE PROJECT



GOALS & OBJECTIVES

RenewTeach aims to develop an inclusive curriculum in the context of RE, to design educational environments and to raise the awareness of teachers and teacher candidates who can be defined as change agents and the most important representatives of these environments.

Prospective teachers will be asked to find solutions to local and global problems and they will learn to shape their solution suggestions by considering parameters such as benefit and loss analysis, risk analysis.

In this way, prospective teachers will become aware of the working disciplines of engineering, climate scientists and risk psychologists, and will grow up as individuals who are sensitive and valued on environmental issues.

Pre-service Teachers (science and elementary preservice teachers, especially women) who are going to teach pupils in elementary and secondary classes are the main targeted groups.

The Renewteach consortium is experienced on all the project theme and activities. The partnership ensures a breadth of knowledge and experience from teacher training, pre-service teachers, Renewable Energy, curriculum development, project delivery, course design, digital educational resources and personal and academic professional development.

The highly experienced partners will ensure that there is a high level of cooperation in the project and also ensure the sustainability of the project outcomes.

The consortium is made up of: Bursa Uludag University, Osmangazi District of National Education Directorate, Gazi University, University of Maribor, University of Bucharest and Association of Navarre's Industry.



ABOUT THE PROJECT

"No person and no place is left behind in the transition to climate neutrality"

(European Green Deal)

ENVIRONMENT AND FIGHT AGAINST CLIMATE CHANGE

Climate change and environmental degradation has become a threat to the EU and the whole world. According to the EU European Green Deal, countries have turned to policies that prioritize clean and renewable energy sources in order to cope with this threat. Although policies for the use of RE resources have been defined and large investments have been made, one of the main drivers of the use of such innovations is public acceptance (Liarakou, Gavrilakis, & Flouri, 2009).

In this context, it is extremely important to educate all segments of the public and gain positive attitude and knowledge towards RE.

If teachers and pre-service teachers have sufficient knowledge and skills about RE resources, then their students' knowledge and skills will also develop and this change that occurs in the educational environment will spread to other parts of the society (Liarakou, Gavrilakis, & Flouri, 2009).

RENEWABLE ENERGY IN HIGHER EDUCATION

Relevant field literature states that teachers and pre-service teachers in different branches do not have sufficient knowledge or skills about RE resources and there is a need to increase their education level in this regard (Altuntaş & Turan, 2018).

Second, researchers agree that this situation stems from the inadequacy of the curriculum and training related to RE resources.

In many countries, it is frequently emphasized that there is a need for a special curriculum that will develop students' knowledge and skills about energy education and focus on thinking skills in higher education (Mälkki, Alanne, & Hirsto, 2015, Güven & Sülün, 2017).





CURRICULUM

FOR ELEMENTARY AND SCIENCE PRESERVICE TEACHERS

The curriculum is an innovative feature that enables STEAM thinking in RE context and provides innovative and transdisciplinary learning.

The impact of the curriculum will be:

- Preservice Teachers will have theoretical knowledge about RE (what is RE, what is the scope)
- Comprehend the working principle of RE skills
- Understand the nature of the sources of RE, STEAM disciplines operate together and comprehend the nature of what we call complex science.
- Understand how RE sources intersect with the principles of working (Science, Technology, Math and Eng) and what are the common ways of thinking.

The learning materials will target elementary and science preservice teachers. Learning materials will present the design activities to the target group in the context of the intersection of science and engineering fields.

Preservice teachers will be able to understand the working principles of RE resources and understand the ways of thinking about STEAM discipline inherent in RE resources through digital design activities, such as animations and simulations.

SELF ASSESSMENT TOOL

This self assessment tool is used to measure and monitor pre-service teachers' knowledge, skills, attitudes and values related to RE.

This evaluation tool will also contribute to reflective writing. In addition, the Self-Assessment tool will include STEAM-based thinking and interdisciplinary questions related to RE.

The online portal will contain the curriculum, learning content and material, assessment tool, which are developed in an innovative and creative way.

In the online portal, it will be a best practice pool where pre-service teachers in the partner countries related to RE will identify their local and regional problems and try to solve the problems and share these experiments.

MULTIMEDIA ONLINE LEARNING CONTENT AND MATERIAL

ONLINE PLATFORM

PROJECT RESULTS



ON PROSPECTIVE TEACHERS

Prospective teachers who are project participants will gain the following gains:

- Develop theoretical knowledge about RE.
- Comprehend the Working principles of RE sources,
- Understand the nature of RE sources and nature of complex science
- Understand how RE sources intersect with the principles of Science, Technology and Engineering, Mathematics
- Enhancement of STEAM skills in RE context
- Acquire to awareness on environmental-friendly behavior in RE context including local and global area

Teachers will have a framework in which they have the opportunity to establish a relationship between RE and STEAM-based thinking in their curriculum.

Students will be provided with RE attitude, value and competency. understand how the integration of different disciplines is through STEAM applications in the context of RE.

ON PARTNERS

Partner universities will have the opportunity to integrate advanced curriculum into existing STEAM education programmes as either a new non- obligatory module or a essential one.

Thus, they will be able to give preservice teachers upskilling in RE / STEAM education and make them well equipped to affect and teach kids RE basics using effective, innovative and captivating methods.

Policy makers can use outcomes of the project to experiment RE-based materials in different classroom environments as examples of guidance on evidence-based on effective technology usages to enhance STEAM accomplishment.

In addition, through workshops of the project, the universities, educational authorities, schools and RE initiatives will have a chance to meet.

This will help to create alliance between these stakeholders to build capacity within the sector of education to deliver first-class quality of RE / STEAM and STEAM education at the elementary and secondary grades in partner countries.

ON TEACHERS AND STUDENTS

ON STAKEHOLDERS

EXPECTED
IMPACT



FIVE RENEWTEACH PANEL DISCUSSIONS

MULTIPLIER EVENTS

During the five panel discussions, the project aims to disseminate the intellectual outputs: Curriculum and Training Program (PR1), Multimedia Based Online Learning Content and Materials (PR2), Assessment Tool (PR3) Online Platform Content, Best Practices Pool - E-guide (PR4) of the project through Renewteach PANEL DISCUSSIONS.

30 people in each country will be targetted to engage in the panel discussions - people from academicians in science and engineering department, educational scientists, researchers who are working in the teacher education and ICT domains; pre-service teachers and teachers, NGO and company representatives who relevant Renewable Energy.

The panels will be hosted by each country from the consortium.

PRESERVICE TEACHERS TRAINING

Learning, Teaching, Training Activities main goals are as follows: to develop content and domain knowledge of PSTs in the context of RE. To develop Preservice teachers' teaching professional knowledge/pedagogy in the context of RE. For example, using a material developed in PR2 with an inquiry-based pedagogy in internship practices. To gain the STEAM thinking skill under RE. For example understand how RE resources such as heat pump, hydroelectric power plants, bioenergy and wind turbines can benefit from science, technology, mathematics, engineering and technology disciplines.

In the training activity which will take place in the form of a workshop, preservice teachers will be supported on use design-oriented (STEAM-based) activities for RE in their professional lives, with the guidance of the trainers (academics).

By the help of Learning, Teaching, Training Activities, gained competencies and skills will be recognized and validated and recorded by issuing Europass mobility certificates.

TRAINING ACTIVITIES

**PROJECT
COORDINATOR**

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CONTACT



[renewteach](https://twitter.com/renewteach)



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[renewteacheu](https://www.instagram.com/renewteacheu)



renewteach.org



renewteach@gmail.com

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