

ECF4CLIM

**A European Competence
Framework for a Low Carbon
Economy and Sustainability
Through Education**



ECF4CLIM Project

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Newsletter 3

Operationalizing the Roadmap: the co-designed measures in Finland, Portugal, Romania and Spain

During the 2nd year, based on the work of Sustainable Competence Teams (SCTs) and Sustainable Competence Committees (SCCs), engaging students, teachers, and administrative staff from the demonstration sites (schools and universities) in a detailed co-design process, a set of 159 demonstrative interventions were proposed to create:

- *changes of the conditions, especially the environmental performances,*
- *changes for the people, the individual competences,*
- *changes for the system, the collective competences.*



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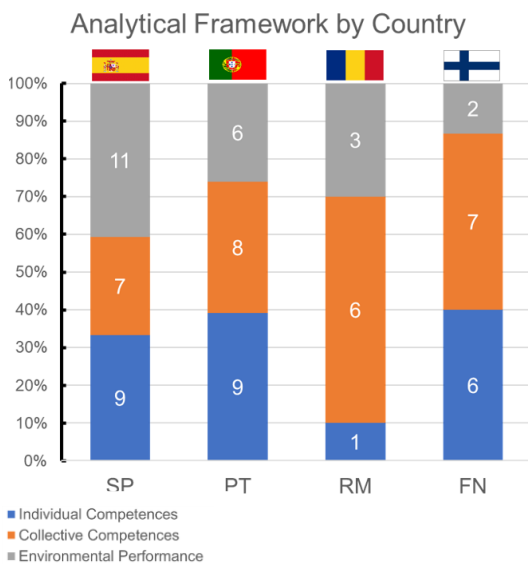
Our Demonstrative Interventions

Following a detailed analysis of the proposed interventions, 88 interventions were selected to be executed within the time framework of the project. These interventions arose and were chosen through a participatory approach in any pilot school, involving researchers, teachers, students, board of schools, and in some cases local authorities, all of them participating in any of the structures created in the framework of the Project: Sustainability competences team and sustainability Competence committee.

Detailed documentation on the planning and execution of the intervention, as well as the monitoring of results, has been created. This aims to ensure optimal conditions for implementation and to serve as a foundation for future expansion to other schools beyond the pilot sites.

The interventions are primarily focused on improving environmental performance, accounting for 62%, while those oriented to educational topics make up 38%.

The structure of the interventions, categorized into: environmental performance, individual competences, and collective competences, varies among the involved countries (Spain, Portugal, Romania, and Finland).



For the environmental performance category, in Spain and Portugal, most of the interventions aim to

improve comfort in learning spaces by revegetation of spaces, or by improving insulation. Interventions in Romania aim to install PV panels to reduce its energy consumption from the grid and reduce water consumption. In Finland, interventions focus on facility improvements to promote recycling, and sustainable transport.

For the collective competences, the predominance is the creation or developing new teaching material for teachers, as well as interventions that result in the creation of new courses or subjects. Also noteworthy are the workshop-based interventions or activities designed to encourage students towards sustainable attitudes.

For the individual competences, many aim to motivate students through talks and visits. In addition, there are interventions that seek to motivate students through debates, contests or challenges.

The distribution of interventions according to the branches of the analytical framework is balanced. Concerning the sustainability areas, interventions related to energy or waste predominate, and in the case of interventions related to education, the generation of teaching material or the creation of new subjects stands out.

Most of the active interventions are planned to be implemented during the 23/24 school year, although it is very possible that the finalization will be due during next school year.

It is important to push the feedback process to collect as much evidence as possible about the process of implementing the interventions.

Israel Marqués Valderrama
Ricardo Chacartegui Ramírez
Jose Antonio Becerra Villanueva
 Energy Engineering Department
 University of Seville

- WASTE 
- ENERGY 
- GREEN SPACES 
- FOOD 
- WATER 
- AIR QUALITY 
- TRANSPORTS 

SCT3 (Sustainability Competence Teams) and SCC4 (Sustainability Competence Committees) -discussing the interventions

The ECF4CLIm project aims to create a European Competence Framework (ECF) to help the educational community tackle climate change and promote sustainable development. Using a hybrid participatory approach based on action research and citizen science, the project works with schools and universities to co-design the ECF. This approach helps the educational community understand and evaluate their sustainability skills and identify obstacles to improvement. Together, they discuss how to encourage sustainable behaviors and assess the learning outcomes.

To involve students, teachers, and administrative staff, Sustainability Competence Teams (SCT) were formed. Additionally, Sustainability Competence Committees (SCC) were established, including school directors, sustainability managers, and external actors like NGOs and local authorities.



The third sessions (SCT3 and SCC3) focused on reflecting on interventions, discussing barriers and enablers, and using an analytical framework from the Roadmap for sustainability competences. Participants shared their experiences and discussed which aspects (individual, collective, environmental) were most important, what helped or hindered the implementation, and how to overcome challenges. They also brainstormed ways to improve communication, share experiences, attract participants, and motivate others. Post-it exercises were used to gather data.

Separate SCT meetings were held with students, teachers, and administrative staff, while one SCC meeting brought representatives together to agree on further improvements. Discussions included overcoming barriers, communicating effectively, sharing experiences, attracting more participants, and involving local institutions.

The results from these meetings help understand the values of the sustainability competences framework and find effective educational approaches for sustainability in primary schools, secondary schools, and universities. Key to the success of these interventions is clear communication of results and strategies to both educational and local communities. Internal efforts focus on engagement and impact, while external efforts aim to share successful practices with other schools. Parents are engaged to support, spread awareness, and encourage involvement, while citizens are informed about sustainability goals and practices. Outreach to local councils, businesses, and media promotes community engagement and knowledge sharing.



These interventions, especially structural enhancements, serve as models for other educational institutions and individuals. By sharing best practices and collective efforts, they can drive meaningful change and empower communities towards a more sustainable future.

Yolanda Lechon and Ana Prades, CIEMAT

ECF4CLIM Tools empowering students, teachers, administrative staff from schools and universities

Environmental footprint calculator

(ecf4clim-app.smartwatt.net/app/footprint-calculator)

The Footprint Calculator uses Life Cycle Assessment (LCA) methodology to help users evaluate and improve their environmental impact. There are three versions tailored for Schools, Universities, and Managers, allowing for self-assessment and simulations of improvements.

IoT Ecosystem Space

(ecf4clim-app.smartwatt.net/app/iot-ecosystem)

The IoT Ecosystem functions as a data aggregator, collecting information, including energy consumption and indoor air quality data, from various schools and universities participating in ECF4CLIM project. The data are transmitted to the ENLITIA platform where different Key Performance Indicators (KPIs) are calculated automatically and presented through tabular and graphical representations. Those KPIs highlight the environmental impact of the chosen educational institutions. The tool helps the educational community to test different interventions aimed to improve the KPIs. The smart phone interface allows fast and easy access to the indoor air quality and energy metering data of the selected pilot sites.



Retrofitting toolkit

(ecf4clim-app.smartwatt.net/app/retrofitting-tool-2)

This toolkit is designed to enhance awareness of energy efficiency fostering engagement across the entire educational community, encouraging behavioural shifts towards greater efficiency and sustainability. The toolkit selects the input data for each school and identify different measures to improve thermal comfort inside schools, estimate the heating and cooling needs based on the established set points, and quantify the thermal needs of a classroom based on the proposed energy efficiency measures.

Learning space

(ecf4clim.smartwatt.net/learning-space/)

The Student's Area features fifteen interactive flipbooks on climate change and sustainable development, categorized by age groups (6-9, 10-15, and 16-25) and roadmap areas. The Teacher's Area offers resources like lesson plans, activities, and games, organized by roadmap areas, resource type, and age group, to support teaching and foster a commitment to sustainability.

Games

(ecf4clim.smartwatt.net/learning-space-game/)

Games are effective for engaging learners and promoting understanding of sustainability. The ECF4CLIM project offers three categories of digital games for different age groups: Search for Crocco (6-9), Secret of the Forest (10-15), and Community2 Mall (16-25).

Lara Ramos, ENLITIA

Antonis Stratis, QUE

Yolanda Lechon, CIEMAT

Marta Almeida, IST

Nora Kovesd, TREBAG

Creative day in Bucharest

ECF4CLIM General Assembly & Steering Committee 6th Meeting in Bucharest, 9-10 May 2024, with a focus on the demonstrative interventions in schools and universities. With participation of researchers from the partners, teachers and professors from the associated partners, schools and universities from Finland, Portugal, Spain, and Romania. With a real exchange of perspectives, experiences, and good practices among the teams working for planning, implementing, and monitoring the results. And an excellent opportunity to train the participants in using the tools created by the project in support of sustainability assessment and improve knowledge and understanding.

A creative day was organized in the Herăstrău area, where the team visited the National Village Museum "Dimitrie Gusti." During the visit, they reflected on the sustainability practices observed in traditional Romanian households. This experience prompted them to reconsider what aspects of these practices are crucial to incorporate into modern life. In an era dominated by consumption, it is essential to evaluate what we genuinely need and how we can integrate sustainable habits from the past to create a more balanced and mindful way of living.

The participants worked in small groups to develop a Roadmap for Sustainability Competences. Each group illustrated different perspectives, drawing from the diverse experiences of schools, universities, and experts in sustainability and education. Through collaborative discussions, they aimed to create a comprehensive and multi-faceted approach to integrating sustainability competences into educational frameworks. This initiative highlighted the importance of diverse viewpoints in crafting effective strategies for promoting sustainability in education at all levels.

*Niina Mykrä, Anna Lehtonen, JYU
Ana Prades, CIEMAT*



Our illustrative interventions: Finland,

Improving quality and sustainability of school meals through interventions of Juhannuskylä comprehensive school and of Samke High School

Improving the quality and sustainability of free school meals served at school were raised as the top issue among the students and personnel of both of our demonstration sites: Juhannuskylä comprehensive school and Samke high school, located in Tampere Finland. The questions about how to foster positive attitudes towards vegetarian food and improve the quality of school meals have been debated in several sustainability teams and committees organised by ECF4CLIM Finland.

The intervention of Juhannuskylä school aims at fostering positive attitudes towards vegetarian food and improving the quality of school food generally. Moreover, the aim is to enable students' participation and engagement in these issues. To elevate positive attitudes towards vegan and vegetarian food, the students of the Juhannuskylä school wanted to organise a vegetarian food tasting day and recipe contest. Students wanted to give a chance to taste vegetarian food for all the students in their school. They organized funding and cooking with teachers and made posters informing everybody why we all should eat more vegetarian food. Additionally, during the autumn term 2023 a vegetarian recipe contest was organised for families together with the teachers. The recipes were published on the school website.

During the spring term 2024 ECF4CLIM Finland have organised sustainability committee meetings about food, where students, teachers and headmasters have met decision-makers and experts of Tampere municipality. They have discussed together how to improve the quality and sustainability of Finnish school meals. We have found these meeting very fruitful and interesting, they are an essential part of the participatory action research process of the ECF4CLIM project.

During the first committee meeting, Finland's a long history of free school meals and the importance of the school lunches were reflected. School lunches have throughout the history had a remarkable impact on students' wellbeing and still have. Nowadays also the environmental impact and possibilities to strive for sustainable food transition to low carbon food is debated.

During the meeting the food and maintenance service company of Tampere called Voimia told how they put a lot of effort on improving both quality



and sustainability of the food served at schools. Nevertheless, these efforts are not communicated efficiently to the students or personnel. The attitudes to the school meals have not improved, the school meals are not appreciated among the students. Generally, in Finland a half of students skip the meal at least once a week. Similar results were gained in the surveys about students and school meals in both Juhannuskylä and Samke high school.

From the perspective of sustainability education, school meals can be seen as a challenge or a constrain of sustainable food transition if the quality of especially vegetarian food remains poor and students' negative attitudes become strengthened. Nevertheless, school meals could have a remarkable role in promoting positively sustainability transitions. Through improving the quality and taste of vegetarian options and through effective communication people's engagement in the collective efforts of promoting sustainability of the food and decreasing CO2 emissions could be fostered.

In the other sustainability committee the aim was to proceed to concrete action plans, what could done at both Juhannuskylä and Samke related to school meals. Teachers and students of Juhannuskylä decided together to focus on fostering the respect and positive attitudes towards school meals generally, while at Samke the aims is to establish a

group of teachers and students aiming to improve especially the quality of vegetarian meals.

In Samke high school the food intervention has focused first on decreasing the bio waste of the leftovers of the school meals. A bio waste free day campaigns are popular in Finland and organised in almost every school. In order to be able to give exact feedback of the quality and the amount students' eat and leftover the food, a digital food scale has been procured. Next autumn a group of students and teachers will have meetings where they follow the amount of wasted food and give feedback and make initiatives how the quality of especially vegetarian meal options and sustainability of the school meals could be improved. Individual feedback and initiatives matter as constructive feedback by students and teachers is the driving for development, the head of food and maintenance service company of Tampere told to us.

Anna Lehtonen, JYU Finland

Our illustrative interventions: Spain,

Participation in environmental training programmes. Sustainability dynamic awareness.

The execution of this intervention aimed to raise awareness of the effects of excessive water use on the climate, and the impact of inadequate water consumption on the environment at the local level. It was focused on developing individual competences through the treatment of contents related to climate change (natural phenomena, causes, consequences, and actions), from the point of view of water wastage.



This implementation was held in *Villa del Escardiel*, an environmental training space located in *Castilblanco de los Arroyos*, a Sevilla's village. Surrounded by nature, the 15 attendant students enjoyed a green space that got their attention and motivated them to carry out the training activities that were carried out. The combination of different students ages from 11 to 17 years old, aimed to group the widest variety of profiles possible to achieve a wide point of view of sustainable knowledge in our demonstration site. This two-day formation had a variety of dynamic activities that engaged all the profiles of participating students.

To assess the initial sustainability knowledge of the attendants an activity called "climate artist" was developed, by painting on a mural all the things they could think of about global warming and climate change. Through a participatory and fun process, students raised their climate baselines

demonstrating that their perceptions of the problem are mainly based on consequences like pollution, loss of fauna and flora, and human disasters.



Once they finished their drawings, a debate was held to raise the main perceptions and they got into natural phenomena, causes, and consequences related to climate change, giving importance to actions they can do to combat climate change in their environment. This relationship between all climate agents was done through dynamic exercises.

After introducing and framing the problem, the rest of the training session focused on the identification of bad sustainable habits at school, viewed from the diverse points of view caused by the age variety. The development of awareness campaigns and local interventions detected was based on three steps that worked mainly on water, energy and transport sustainable areas:

- Initial perception of the problem: First pupils switched to “complaint mode” and started to raise student bad habits, structural school problems, and other kind of issues.
- Dream situation and proposals: After detecting some weak points in sustainability school performance
- Awareness campaigns and action plan: pupils made a catalogue of propositions based on water consumption, energy wastage and promotion of green transport.

During this process, students learnt how they must request changes correctly, the difficulties of achieving great results without the collaboration of all interested parties, and the need to engage the

rest colleagues by changing their behaviour and carrying out the awareness campaign designed. Regarding water, they learned about the hydrologic footprint and connected this concept to day-to-day things like clothes, technological products, and other products with a high hydrological footprint such as beef production.



They finalised their stay in *Villa del Escardiel* planting a holm oak as a sign of their commitment to take advantage of all things learned to help the school to become a more sustainable place.



Through this intervention, students developed individual competences and will extend the scope beyond this training session hoping to gain collective competences and environmental performance improvements in the demonstration site.

José Antonio Becerra Villanueva, University of Sevilla

Our illustrative interventions: Romania,

Harvesting solar energy to improve the carbon footprint.

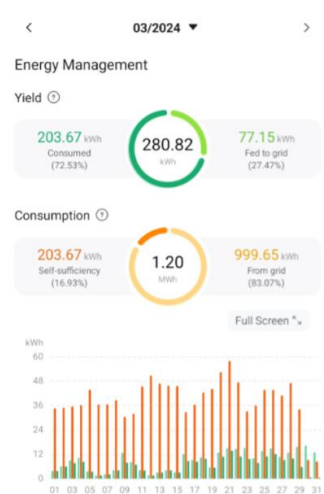
Installing solar panels on school roofs offers significant educational value. It provides students with a hands-on learning experience about renewable energy and sustainability. By integrating solar energy into the curriculum, students gain practical knowledge of science, technology, engineering, and mathematics (STEM) principles. Additionally, it fosters environmental awareness and responsibility, inspiring future generations to pursue sustainable practices and careers in green technologies. This initiative not only reduces the school's carbon footprint but also creates a living laboratory for students to observe and understand the benefits of clean energy firsthand.

Two schools from Romania (Nicolae Balcescu school from Dragasani town, and the school of Sercaia village, Brasovcounty) have benefited of these kinds of interventions. Achieving prosumer status was highly beneficial for a school. By producing and consuming their own energy, schools can reduce operational costs, enhance energy security, and promote environmental stewardship. This status empowers students with real-world insights into energy production, fostering a deeper understanding of sustainability and economics. Additionally, it positions the school as a leader in innovative practices, demonstrating a commitment to green initiatives and inspiring the community to adopt similar sustainable practices.



The experience of the two schools was enriched by dedicated educational programme to create lessons to integrate the knowledge on the solar energy, solar

panels, prosumer status, and how to estimate the production of electricity based on the accumulated data. Educational materials were created to be used in the developing of lessons for different subject approaching the sustainability.



Communication of the results was based on posters placed in the school to increase the awareness of the educational community, organizing debates with students and parents, posting in the social-media, and direct messages to the local relevant stakeholders.



Our illustrative interventions: Romania,

Water sensors to eliminate the water wasting

Installing water sensors in school toilets holds substantial educational importance. These sensors provide a practical tool for teaching students about water conservation and sustainability. By monitoring water usage, students can engage in data analysis and learn about the impact of their consumption habits.



This hands-on experience enhances their understanding of environmental science and the importance of resource management. Additionally, it promotes a culture of responsibility and awareness, encouraging students to adopt eco-friendly practices both in and out of school. Integrating technology in this manner also aligns with STEM education goals, fostering skills in critical thinking and problem-solving.

The intervention was implemented at Iulia Zamfirescu school from Mioveni town, Romania. In all the sanitary rooms a replacing of classical water sinks with sensor-equipped ones was done offering advantages combining efficiency, hygiene, and convenience. These sensor-equipped sinks utilize technology to detect the presence of hands or objects and automatically control the flow of water.

A reference consumption for water was measured before the intervention, in order to quantify the impact. An educational directly dedicated part was added by communication and educational activities. Large posters were placed in the toilets illustrating the usual water consumption in daily life and the importance of saving water.

A dedicated material on the water and water saving in the condition of climate changes was developed and recommended to be used for different lessons. The students were involved in the communication of the intervention measure and its impacts targeting other schools from town and region.



CCConstantin, MedaResearch

Our illustrative interventions: Portugal,

Revitalizing Quinta do Charco: A Step towards Sustainable Education at the Escola Básica de Camarate

Escola Básica de Camarate has embarked on a transformative journey to reactivate its biological garden, Quinta do Charco. This intervention aims to revitalize the garden as a hub for sustainability, learning, and community engagement, providing organic produce, housing animals, and serving as a multifunctional space for education and leisure. The initiative seeks to instill environmental stewardship and promote a sustainable future by deepening students' connection to nature.



Collectively chosen by the school community, the initiative presents a partnership with architects from the Center for Innovation in Territory, Urbanism and Architecture (CiTUA) at Instituto Superior Técnico (IST). This collaboration aims to redesign Quinta do Charco and empower students through a participatory design process focused on sustainability.

The project began with meetings involving school community members to gather their insights and visions for the garden. An activity specifically engaged students in a dynamic fusion of art, reflection, and collective visioning. As part of the ECF4CLIM project, students embarked on a transformative journey, expressing their thoughts

and memories of the garden through drawings and written reflections. This initial phase encouraged self-expression and fostered a deeper connection to their environment, highlighting the importance of this communal space.



In a subsequent meeting, students explored the garden site, embarking on an imaginative journey to conceptualize its future layout. This hands-on experience allowed them to envision sustainable features and interactive elements that would improve the garden's ecological integrity and function. Parents, teachers, and staff also participated, sharing their experiences and ideas for the space, identifying potential challenges, and contributing to the collective vision.

After gathering all the insights, Luis Fernandes, a master's student focusing on this intervention, developed the project for Quinta do Charco. This step is critical because it integrates sustainability into educational practices, linking to the primary objective of the ECF4CLIM project, Education for Sustainability. The proposed design will now be evaluated by the school community and the local council, with support and funding from the ECF4CLIM project ensuring its realization. The

garden's construction will prioritize using recycled materials from other sites, promoting sustainable economics.



Quinta do Charco's reactivation has the potential to significantly influence sustainability education. It provides a living laboratory where students can engage in hands-on learning about organic farming, animal care, and sustainable practices. By participating in the design and development process, students gain a sense of ownership and responsibility towards their environment, nurturing the next generation of eco-conscious leaders.



This project not only enhances the school's infrastructure but also serves as a model for sustainable development within the community, demonstrating the power of collaborative efforts in creating spaces that promote environmental stewardship, community engagement, and lifelong learning.

The revitalization of Quinta do Charco at Escola Básica de Camarate stands as a testament to the transformative power of education for sustainability, fostering a culture of environmental responsibility and community collaboration that will have lasting benefits for generations to come.

Tiago Faria, IST



ECF4CLIM team

10 research partners
13 demonstration sites
(schools and universities in
Finland, Portugal, Romania and Spain)

