D6.1

Collective competences for sustainability

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WHO WE ARE

The ECF consortium consists of ten partners. The project is coordinated by Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas-CIEMAT.

Name	Country	Logo
Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas – **CIEMAT**	ES	
Instituto Superior Técnico. University of Lisbon. **IST**	PT	
Universidad de Sevilla **USE**	ES	
University of Jyväskylä **JYU**	FI	
Universitat Autònoma de Barcelona **UAB**	ES	
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ABOUT THE PROJECT

Through a multidisciplinary, transdisciplinary and participatory process, ECF4CLIM develops, tests and validates a European Competence Framework (ECF) for transformational change, which will empower the educational community to take action against climate change and towards sustainable development.

Applying a novel hybrid participatory approach, rooted in participatory action research and citizen science, ECF4CLIM co-designs the ECF in selected schools and universities, by: 1) elaborating an initial ECF, supported by crowdsourcing of ideas and analysis of existing ECFs; 2) establishing the baseline of individual and collective competences, as well as environmental performance indicators; 3) implementing practical, replicable and context adapted technical, behavioural, and organisational interventions that foster the acquisition of competences; 4) evaluating the ability of the interventions to strengthen sustainability competences and environmental performance; and 5) validating the ECF.

The proposed ECF is unique in that it encompasses the interacting STEM (Science, Technology, Engineering, and Mathematics)-related, digital and social competences, and systematically explores individual, organisational and institutional factors that enable or constrain the desired change. The novel hybrid participatory approach provides the broad educational community with an ECF adaptable to a range of settings; new ways of collaboration between public, private and third-sector bodies; and innovative organisational models of engagement and action for sustainability (Sustainability Competence Teams and Committees).

To encourage learning-by-doing, several novel tools will be co-designed with and made available to citizens, including a digital platform for crowdsourcing, IoT solutions for real-time monitoring of selected parameters, and a digital learning space. Participation of various SMEs in the consortium maximises the broad adoption and applicability of the ECF for the required transformational change towards sustainability.

LEGAL NOTICE

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1. EXECUTIVE SUMMARY

This deliverable presents a comprehensive analysis of the collective competences for sustainability across selected educational institutions—primary and secondary schools as well as universities—within the framework of the ECF4CLIM project. The project encompasses demonstration sites in four European countries: Finland, Portugal, Romania, and Spain. The analysis builds upon the baseline provided by Deliverable 4.1 (2022), while also offering new empirical insights into how institutions are engaging with the multidimensional challenges of sustainability. The framework of analysis is structured around three dimensions of collective competences: regulative competences (external laws and policies shaping institutional action), normative competences (internal organisational structures and strategies), and cultural-cognitive competences (shared understandings, internalised practices, and social norms).

The material analysed consisted of documents, workshops with key actors, and interviews with selected participants at the demonstration sites. The analysis was carried out at the thirteen ECF4CLIM demonstration sites: a school of basic education, a high school, and a university in each of the four countries participating in the study (Finland, Portugal, Romania, and Spain). In Romania, two basic schools were involved.

A)   Regulative competences:

All four countries have since 2022 passed several new laws concerning energy and environmental transitions, climate change, and other sustainability-related topics. These laws mostly affect the education system, which is tasked with promoting knowledge and attitudes appropriate for addressing sustainability. There is a trend among European governments to give priority to energy and climate issues, especially in a context of growing geopolitical instability, and armed conflicts (e.g., Ukraine and Middle East), which have threatened or undermined security of supply of vital resources. The trend is also driven by the implementation of policies derived from the European Green Deal approved in 2019, which has led to the deployment of ambitious European policies in the areas of sustainability, energy efficiency, promotion of low-carbon energy sources, circular economy, etc. The ECF4CLIM project interventions have therefore been carried out in a more favourable political climate than initially expected.

Regulative competences at the schools of basic education and high schools:

At the schools of basic education, a series of general laws governing public education establish the basic curriculum and its contents. In Finland and Portugal, municipalities and schools can introduce local adaptations. In Spain, the regions can define 40%-50% of the curriculum contents. In Romania, a new law emphasizes decision-making based on social dialogue and consultation, involving central and local authorities, educational staff, parents, students, and civil society organizations. In all four countries, teachers have significant freedom to decide whether and how to incorporate sustainability in their teaching.

In all four countries, sustainability is to be integrated in the curriculum in a transversal manner. In some cases, specific mandatory or optional courses related to sustainability (citizenship,

environmental education) are provided. This is the case in Portugal, where the PNEC 2030 and PAEC 2023–2027 now recommend explicit modules on climate change, circular economy and energy literacy, and Romania under the 2023–2030 National Strategy on Education for the Environment and Climate Change and ECCE initiative. In addition, training is provided for teachers on topics of sustainability, climate change, and the environment. In Spain, recent national laws have been aligned with EU legislation and regulation by embedding sustainability competences into secondary school curricula, covering areas such as environmental interdependence, ecological footprint analysis, and climate responsibility.

In Finland, where schools are run by the municipality, the recently introduced laws require each upper secondary school to appoint a designated "sustainability support person". The law stipulates that resources equivalent to teaching one course must be allocated for this support person to fulfil her tasks. In Portugal, schools depend on the municipalities and the Ministry of Education, an arrangement which leaves little room for the school management to decide on how to organise sustainability teaching.

In terms of available resources, in most cases, apart from the recent changes mentioned, no specific funds are allocated for the implementation of sustainability measures at schools or for joining projects that promote these measures. Teachers participate in projects usually on a voluntary basis. Training activities are available for teachers, but often time constraints limit the attractiveness of such training. Sometimes municipalities, regions, and the national ministry provide education resources on sustainability both to teachers and to students.

Regarding the content of the regulative competences, in Finland, the social dimension of sustainability is emphasised, although also the other dimensions are considered. In Portugal and in Spain, the social and the environmental dimensions are given most attention, whereas in Romania, the curriculum prioritises the environmental dimension. The economic dimension appears as the least prominent in all four countries in the regulative documents.

Regulative competences at the universities:

All four analysed universities have a high degree of autonomy to decide how to organise the studies and teaching, and, therefore, whether and how to incorporate sustainability in their teaching and other activities. Since 2022, new laws and regulations in all four countries have introduced new sustainability objectives. The leadership (rectorates and collective decision-making bodies), teaching units, and professors can include sustainability issues in their teaching and in the day-to-day operation of their departments. With the new regulations, new resources are assigned, but in all cases, human and technical resources for sustainability depend on internal reprioritisation, partnerships, and project proposals.

B)   Normative competences

Normative competences at schools of basic education and high schools:

The internal organisation of responsibilities for sustainability differs considerably from one school to another. For example, in the Finnish Juhannuskylä school, a teacher has been nominated as the

"contact person of sustainable future", and is a member of the school management team. The school's annual plan now explicitly lists "sustainable future" objectives and participation in ECF4CLIM as key goals, and the teachers are well organised to promote actions for sustainability. In other schools (such as the Romanian Nicolae Balcescu school and the CEIP Mozart school in Spain) sustainability teaching is left for the initiative of each teacher. In Portugal and Spain, the analysed schools (EB 123 Bobadela and CEIP Mozart) belong to the Eco-schools international network, a voluntary programme, which guarantees that some teachers dedicate efforts to sustainability.

Decisions concerning sustainability-related infrastructure and services, such as energy, water, and waste, usually depend on external entities such as private subcontractors, NGOs, the local municipality, or the regional authority. This also means that the schools do not have or cannot dedicate funding for these activities. The ECF4CLIM project has significantly improved the technical and financial capacities at the schools, by funding sustainability activities and offering expert support for implementation and evaluation.

In the four high schools analysed, teachers have considerable autonomy to decide on sustainability teaching. It is easier to introduce this topic in extracurricular activities than in the regular teaching.

In the studied schools of basic education, the contents of the competences depend on whether there a specific subject on sustainability is included in the curriculum. Since 2022, the schools have introduced extracurricular initiatives such as special days or weeks devoted to sustainability. The definition and integration of sustainability competences still rely on the initiative of individual teachers, as national laws do not explicitly define teacher duties related to sustainability.

Normative competences at the universities:

All four analysed universities have organisational structures and strategic plans devoted to sustainability. Since 2022, these structures have been further consolidated, with new governance roles, updated strategic frameworks, and curricular innovations. These plans are usually coordinated by an internal unit or division of the university management and mainly focus on the environmental performance in the operation of the campus infrastructure, and on achieving cost savings (in energy and water consumption, waste management, etc.). However, recent updates have broadened the scope, as universities are now increasingly linking campus operations with curricular content, research, and community engagement.

In general, responsibilities for sustainability work are attributed to the technical staff. In practice, this means that the environmental and economic dimensions of sustainability dominate, to the detriment of the social one. Nonetheless, new structures have been created to elevate leadership roles: the University of Jyväskylä has a "Sustainable and Responsible Development Team" composed of faculty experts; the IST in Portugal established a Vice-Presidency for Sustainability and Infrastructure in 2024, whereas the UAB in Spain adopted in 2023 a new 'Healthy and Sustainable Campus Plan' for the period 2023-2027, and a committee to design a new subject on sustainability for all the university students.

All four analysed universities have delegated many of their services to external companies (maintenance, cleaning services, food services, waste collection, etc.), which reduces the margin of manoeuvre of the university to improve the university's environmental performance and sustainability. Renegotiation of the service agreements is usually only possible once the agreement expires, and the legal clauses of concessions are often inflexible and difficult to modify (even if there is a political agreement to do so).

Since 2022, all four universities have created new courses, such as the "Climate Crisis and Just Transition" course at the IST, the "Sustainable Development in a Technological Society" at the UNSTPB, and the training cycle on "Eco-social Crisis" at the UAB. This demonstrates a growing willingness within these institutions to support innovations in teaching in the area of sustainability. At the Finnish university (JYU), one of the ECF4CLIM interventions offered training on sustainability to teachers from various faculties.

The importance given to sustainability varies across the participating universities. At the Finnish and Portuguese universities, sustainability seems to receive higher priority than in their Spanish and Romanian counterparts, addressing all dimensions of sustainability in a relatively balanced manner, proposing ways to measure progress, and addressing sustainability through various means (structural, organisational, curricular contents, etc.). The Romanian (Pitesti) and Spanish (UAB) universities have increased the until recently rather low priority given to sustainability. In Romania, the merger that created the UNSTPB has elevated sustainability as a strategic objective linked to national and EU frameworks, with investments in green energy and digital infrastructure. In Spain, the UAB has begun institutionalising sustainability through educational programmes like the ECF4CLIM-linked Eco-social Crisis course, which serves as a pilot to constitute basis for a future cross-curricular course on sustainability and climate change, which will be offered to all students. In sum, all four universities are gradually moving from fragmented, voluntary initiatives to more structured and integrated approaches and, especially in the cases of Romania and Spain, the interventions of the ECF4CLIM project have clearly helped to catalyse this positive change.

C)   Cultural-cognitive competences:

The analysis shows that at all demonstration sites, as already indicated in the previous report D4.1, there is a clear tension between the regulatory and normative competences on the one hand and the cultural-cognitive competences on the other. Such tension is to be expected, because discrepancies between discourse and action are rather a rule than an exception, not least in the area of sustainability.

Cultural-cognitive competences at the schools of basic education and high schools:

The ECF4CLIM interventions have led to a tangible change in the behaviours and practices of the educational community at the schools in all four countries. In general, no new organisational structures have been created in basic schools beyond the groups formed as part of this project (SCTs and SCCs). These groups (formal but not part of the school organisation) have allowed for the creation of new social relationships between students, teachers, and staff. At some schools, such as those in Portugal and Finland, these groups have been embedded in pre-existing structures such as

commissions or committees (e.g., Eco-Schools committees). In other cases, the SCTs and SCCs were set up specifically for this project. In general, the schools wish to maintain these organised groups in operation also in the future. The position of an "environmental coordinator" was created for example at a Spanish basic school. Some other schools (e.g. in Finland) plan to redesign the groups and make them mixed, to include both students and teachers.

However, despite the improvements, students sometimes still claim that they have not observed any changes in the teaching content. This indicates that the trend noted above is not equally pronounced across the different demonstration sites. Many contextual factors contribute to similar interventions having different academic outcomes. Teachers, for instance in Finland and Romania, claimed that students are not always willing to spend their time learning about sustainability. The pressure to do well in final exams outweighs their interest in learning about these topics, especially outside of class. This shows an intrinsic tension inside the schools.

Regarding the curriculum, in some cases, such as in Finland, Portugal and Romania, no new subject dedicated to sustainability was introduced, but this theme is discussed as part of other subjects (for example, in English classes). It seems that ECF4CLIM interventions have contributed to the fact that these topics are being addressed (at least on an ad hoc basis) in an increasing number of teaching subjects, although the curriculum has not changed. The ECF4CLIM interventions have helped to translate into practice some of the theoretical lessons that students learn at the classroom, and which are already included in the curriculum. Our partners at the schools also argued that curricula leave little room for new content. The teachers considered that the academic curricula typically define sustainability in an excessively narrow manner. The results of this project suggest that there is consensus neither on the conception of sustainability nor on how to teach sustainability at school.

The availability of economic and financial resources is a key factor determining the ability of educational establishments to promote sustainability, especially in a context where the topic is not a major part of the curriculum. The ECF4CLIM project has provided financial resources for the design and implementation of sustainability interventions at the demonstration sites. This has been highly valued in all cases, as it has allowed the participating schools and universities to launch pilot experiments that have provided data, context, and networks for advancing sustainability in education. One of the ways of funding has been through the "purchase" of teachers' time, and thereby allow several teachers to dedicate themselves to promoting sustainability. Time is indeed a key resource, often inseparable from economic and financial resources.

Often, the problems in implementation of the sustainability interventions have stemmed from the lack of time on the part of students and teachers, who are often overworked and constrained by rigid schedules that leave little time for unscheduled activities. In particular, the participatory process that constituted the heart of the project's methodology has been extremely time-consuming. At some of the participating schools and universities, it has been very difficult to find time for students and teachers to attend the group meetings (SCTs and SCCs). In order not to overburden the students and teachers, the methodology should therefore not be applied in isolation but should instead be integrated into the school's organisation and strategy.

Sustainability has been integrated into more spaces in the schools, but it does not seem to reach all students, only those who are the most committed, such as the students directly involved in the ECF4CLIM interventions. Therefore, greater communication and awareness efforts are needed, as well as the design of strategies to transmit this knowledge and attitudes to future generations of students. These strategies could include joining green-school networks or similar. At many demonstrations sites, the participants expressed concern about how to sustain interventions and activities over time. Suggestions included that of linking the interventions to strategies and activities that encompass actors outside of the organisation (such as eco-school networks or similar), as well as ensuring effective leadership and promoting volunteerism.

Experience from the interventions at our participating schools, shows that sustainability can be effectively promoted, maintained, and become part of everyday learning if teaching is connected with the world outside of the school. Collaboration with key actors such as municipalities, neighbourhoods, local communities, families, local businesses, and industries appears as essential. Our data includes several examples that demonstrate how such relationships can help to improve sustainability within the school, but student activities can likewise improve sustainability in the neighbourhood, municipality, and even in the region. Working with actors who often have different languages, knowledge, interests, etc., requires developing transdisciplinary strategies. Sustainability interventions require this combination of knowledge and perspectives, as well as flexible project organisation. It is therefore essential for schools to have strategies and the requisite knowhow for organising interdisciplinary projects.

Several of the project's interventions have generated data on electricity and water consumption, air quality, waste generation, and more. This has allowed the schools to estimate certain environmental impacts of the participating schools and universities. These data made it possible to assess the effectiveness of the interventions and raise awareness, which can help to trigger change in behaviours and practices. The data obtained through the interventions have also been used as teaching material in the classrooms. However, in some schools this transformative potential was undermined by the fact that the collected data either was not disseminated at all or was distributed very selectively. Making data on environmental impacts visible can guide action, notably by spurring the involved actors to seek further improvements or at least maintain the improvements achieved. Generating data on the school's or university's environmental impacts has helped raise awareness among the teachers and staff members, and has also allowed them to broaden their views on what sustainability entails.

One of the difficulties encountered with some of the interventions, especially those requiring the installation of equipment or devices, was the lack of provisions for repair and maintenance. Addressing this problem will require additional financial resources and systematic scheduling, yet the power to decide on these aspects often lies outside of the school.

Cultural-cognitive competences at the universities:

Suggestions were made that the ECF4CLIM deliberative groups (SCTs and SCCs) and the organisation of periodic workshops be institutionalised, for example in the form of sustainability committees.

However, in some cases (such as at the Finnish university), it was noted that it can be difficult to set up these deliberative groups and workshops, and ensure that they persist over time, because they conflict with the other university's structures. This points to the need to ensure sufficient resources for the organisation and maintenance of such deliberative practices and institutions.

At the universities, the participatory design of the interventions was considered as attractive to students already concerned about sustainability. The teamwork, with the inclusive processes of listening, co-creation, and co-decision that it involved, was fundamental in this regard. The problem with this type of participatory process is that they tend to attract those who are already the most convinced, whereas those who would most need the benefits of participation, remain absent. Another problem with long-lasting participatory processes is the high turnover of staff (teachers, students, etc.), which means that the process constantly has to start from scratch.

Sustainability is increasingly present in university classes. The theme is not normally part of the curriculum, but both the students and professors in our participating universities considered that sustainability was to an increasing extent addressed in course teaching and, sometimes, through events outside of teaching, such as theme days or weeks organised by the universities. Sometimes sustainability is part of specific subjects, without affecting the rest of the teaching provided at the university. For now, these topics appear to be addressed in parallel training activities, but there is a certain demand for such contents to be incorporated into regular curricula, so as to make them a part of ordinary teaching. Some universities anticipate that, as an outcome of the recent legal reforms, sustainability principles will be included in many university courses in the future.

Some students expressed doubts whether the new content and ways of interpreting sustainability will ultimately be taught in classes. They reminded that there is often a difference between what the curriculum says and what teachers teach in the classroom. However, there were also teachers who considered that what the curriculum says is not that important; what matters is what each person does in her daily life. Sustainability could thus be taught even if it is not required in the curriculum.

Data on the university's environmental impact were discussed primarily at the deliberative workshops (SCTs and SCCs). The participants believed that the data should have been more widely disseminated and discussed among the entire university community. In some cases, the involved university institutions were reluctant to disseminate and share campus environmental data.

Although sustainability is increasingly recognized as a topic of concern at the universities, it was noted that there is no single and shared understanding of what sustainability means. Within the same university, for example, different faculties tend to each conceptualise sustainability in their own way. Furthermore, sustainability is often seen as a discourse but rarely put into practice. The way in which sustainability is defined can indeed largely determine whether the concept remains a rhetorical and discursive tool or is instead translated into practice.

Several of the participating universities have designed, approved or implemented, during the ECF4CLIM project, courses or curricular units on sustainability or climate change. The content proposed in these courses varies widely, ranging from technical-professional and business-oriented

approaches to sustainability (as in the cases of Romania or Portugal) to more holistic, philosophical, and critical approaches (e.g., at the UAB in Spain).

Some universities (such as those in Portugal and Spain) have seen a slight increase in financial resources dedicated to sustainability. However, it seems that the momentum created by the ECF4CLIM project has helped to strengthen the strategic orientations that the university had previously proposed. There was also a perception that sustainability is not a priority for universities, and that sustainability-related activities are driven by a handful of active and committed teachers and staff members, who thus bear a disproportionate and unjustified burden for tasks that should be more widely distributed across the university.

Time is another chronic limiting factor, intimately linked with financial resources. In general, universities operate within a time-based structure that makes it difficult for members of the university community to engage in participatory processes for sustainability. It often turned out to be difficult to motivate teachers, students, and staff to participate in sustainability activities and deliberative workshops. However, those who did participate, found the experience mostly very motivating and useful. Teachers who decide to get involved often do so at the cost of complicating their personal lives, devoting to the project activities time they would otherwise use for other professional or domestic tasks.

Internal cooperation among various stakeholders within the same university was not always easy. Faculty members value above all the autonomy to organise their teaching and other professional activities as they please, and are therefore not eager to accept support or advice from other colleagues, especially from those from other disciplines. This has been evident in some of the project universities, where it was difficult to establish links with professors from other departments and faculties. To achieve significant sustainability transformations at the universities, it is necessary to forge a network of alliances and collaborations that are active and powerful enough to put pressure on university institutions. From this perspective, interdisciplinarity was valued as essential for advancing toward sustainability, as well as its potential to create networks of committed actors.

D) Contribution to the ECF4CLIM Roadmap:

The ECF4CLIM Roadmap, developed in WP3, provides a conceptual and practical framework for guiding the development of sustainability competences. It is structured around four interconnected phases: Engagement, Connections, Visions, and Action. Each phase corresponds to a set of activities and processes intended to foster deeper institutional transformation. According to our analysis on collective competences, the Roadmap has a great capacity to scaffold sustainability efforts in a structured and participatory manner. It encourages the creation of new governance structures, supports curricular integration, and acknowledges the importance of adequate resource allocation. Furthermore, it promotes the involvement of external stakeholders—such as municipalities, civil society organisations, and local businesses—as critical partners in the sustainability transition. Nonetheless, our analysis identifies areas for further improvement. Interdisciplinarity, despite its centrality in addressing complex sustainability challenges, could be more encouraged. Additionally, while the roadmap emphasises the importance of impact assessment during the 'connections' step,

the need for continuous evaluation throughout the 'action' phase deserves greater attention. Institutional transformation is a non-linear, iterative process that requires adaptive feedback mechanisms and ongoing reflection.

2. OBJECTIVES

This deliverable on task 6.1 reports the results of analysis on collective competences for sustainability in schools and universities. It surveys the current practices for sustainability, the status of the integration of sustainability concerns, the responsibilities at various levels of management, and the available resources for sustainability policies, such as financial and human resources. The task also explores the ways in which a sample of schools and universities have designed and developed organisational structures to mobilise students, teachers, administrative staff, public authorities, civil society organizations, businesses, stakeholders and other existing initiatives to promote action against climate change and in favour of sustainability and environment protection.

This assessment, conducted through documentary analysis, former updated reports, deliberative workshop reports and selected interviews with key actors, identifies key institutional factors (rules, norms, curriculum, resources, values, participatory learning possibilities) that, according to our analytical framework, condition the implementation and success of the measures designed to foster sustainability in educational organisations.

3. DEFINING COLLECTIVE COMPETENCES

In this research, our framework is the GreenComp report, a proposal for educational competencies for sustainability that we intend to explore and test in real educational contexts and across different cultural settings. According to the GreenComp report 'a sustainability competence empowers learners to embody sustainability values, and embrace complex systems, in order to take or request action that restores and maintains ecosystem health and enhances justice, generating visions for sustainable futures. This definition focuses on developing sustainability knowledge, skills and attitudes for learners so they can think, plan and act with sustainability in mind, to live in tune with the planet'. [1]

However, the term 'competence' designates diverse concepts in the literature. A competence can be understood as a quality, an uncountable noun, as well as a specific attribute that might be denoted by having a competence.[2] In ECF4CLIM, we expand upon the definition of sustainability competence as 'as an ability to act in an appropriate way to achieve sustainability goals successfully and efficiently'.

Furthermore, we assume that achieving sustainability goals requires the ability to act in three interconnected spheres: the individual, the collective and the technical-material. We assume that change cannot happen without collective action, which requires individual, collective, and technical-material competences (see figure 1). To effect transformative change, we must consider these three

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[1] Bianchi, G., Pisiotis, U., Cabrera Giraldez, M. (2022). *GreenComp – The European sustainability competence framework.* Bacigalupo, M., Punie, Y. (editors), EUR 30955 EN, Publications Office of the European Union, Luxembourg; doi:10.2760/13286, JRC128040.

[2] Vare, P., Rieckmann, M. & Lausselet, N. 2022. Introduction (pp. 3 – 10). In: P. Vare, N. Lausselet & M. Rieckmann, *Competences in Education for Sustainable Development*: *Critical Perspectives*, Springer.

spheres and how they interact with each other. In other words, we believe that action depends on more than just mind-set. and that contextual, organizational, and institutional factors play a significant role in shaping individual competencies. From our perspective, for environmental improvements in schools to have an impact on students' individual competencies, a series of institutional and organizational culture factors are necessary to enable this.
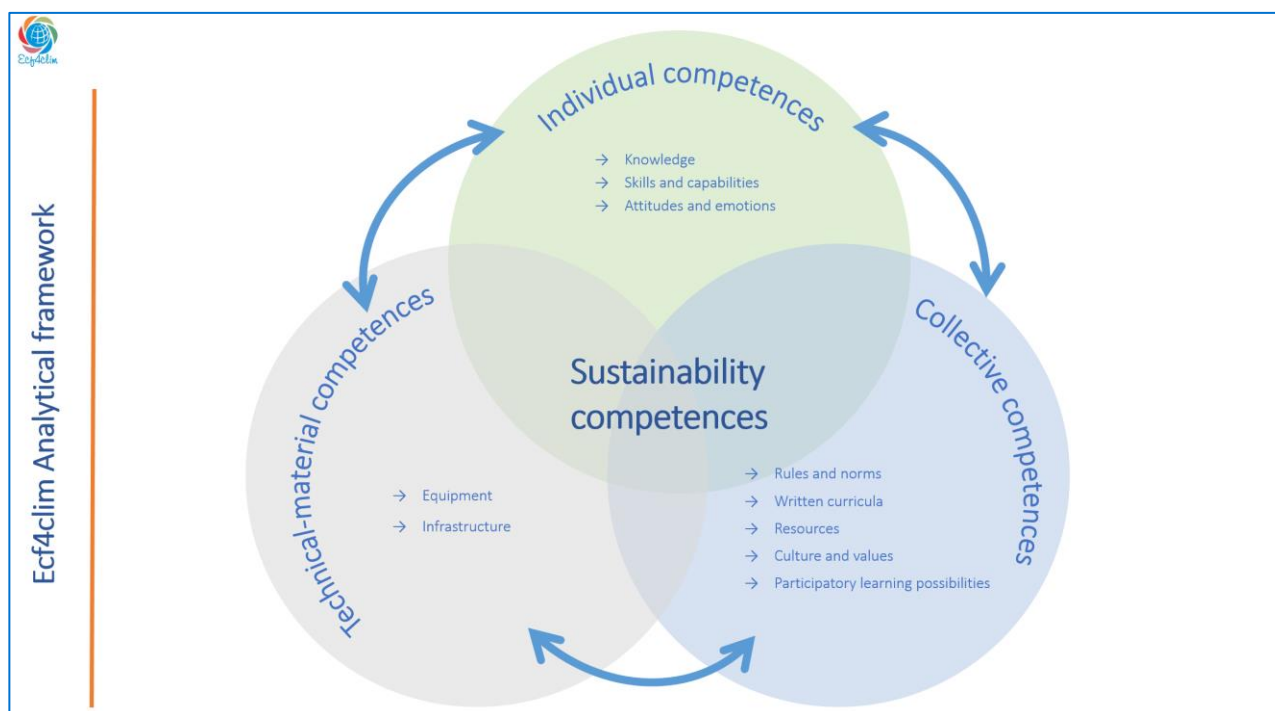
Figure 1: Analytical framework (source: authors)

This report is dedicated to the analysis of collective competences for sustainability, which can be defined as the set of enabling and constraining features that condition the capacity of a community or an organisation to function in a manner that fosters sustainability, and to prepare younger generations for behaviours advancing such an objective. Drawing on the concepts and theories of sociological institutionalism,[3] we draw on the basic distinction between (calculating) logic of consequences and the (cultural) logic of appropriateness, to classify these competences under three general categories or dimensions:

1.   **Regulative competences** (external to the organisation in question)

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[3] Scott, Richard W. 2013. *Institutions and Organizations: Ideas, Interests, and Identities*. Sage. Fourth Edition. https://us.sagepub.com/en-us/nam/institutions-and-organizations/book237665#contents

— Follows the logic of consequences

— Derives from written rules (laws, regulations) that stipulate on the ways in which sustainable development is to be considered and promoted – and by whom.

2. **Normative competences** (internal to the organisation)

— Follows the logic of appropriateness

— Norms and values reflected and institutionalised in the organisation's own strategies, programmes of action, plans, guidelines, result agreements concluded with authorities at different levels of governance, etc.

3. **Cultural-cognitive competences**

— Follows the logic of appropriateness

— internalisation of the regulative and normative competences as taken-for-granted social norms of normal and acceptable behaviours; translation of regulative and normative competences into the organisation's operating culture, daily routines, habits, and practices

   • stresses the fact that internal interpretive processes are shaped by external cultural frameworks

   • shaped also by the involved professional and broader cultures at various levels

4. METHODOLOGY

The results have been obtained by analysing the documentation of the demonstration sites (13 educational centres in 4 countries), as well as by conducting interviews and working groups with students, teachers and staff from said centres.

4.1. Sample of demonstration sites

The analysis was conducted based on a series of interventions in the 13 educational centres (schools, institutes, and universities) that have participated in the ECF4CLIM project from the beginning. The thirteen analysed educational establishments are the following (Table 1):

Table 1: Characteristics of the schools and universities participating in the project.

Educational level	Name	Place	Crew
Basic schools	**Juhannuskylän koulu**	Tampere (Finland)	831 students 90 teachers
	EB 123 Bobadela	Bobadela (Portugal)	792 students 81 teachers
	Nicolae Balcescu school	Dragasani (Romania)	500 students 30 teachers
	Sercaia school	Sercaia (Romania)	200 students 12 teachers
	CEIP Mozart	Alcalá de Henares (Madrid, Spain)	670 students 42 teachers
Intermediate / High schools	**Sammon keskuslukio (SAMKE)**	Tampere (Finland)	1,017 students 50 teachers
	E.B.2,3 Camarate	Loures (Lisbon, Portugal)	741 pupils 102 teachers
	Iulia Zamfirescu school	Mioveni (Romania)	1,300 students 60 teachers
	IES Itaca	Tomares (Sevilla, Spain)	600 students 50 teachers
Universities	**University of Jyväskylä (JYU). Faculty of Education**	Jyväskylä (Finland)	14,000 students 7,000 employees
	University of Lisbon. Instituto Superior Técnico (IST)	Lisbon (Portugal)	11,000 students 900 teachers and researchers
	University of Pitesti (UNSTPB). Faculty of Sciences	Pitesti (Romania)	9,000 students
	Universitat Autonoma de Barcelona (UAB). Faculty of Political Science and Sociology	Barcelona (Spain)	40.000 students 4,250 teachers and researchers

4.2. Document analysis

At this first stage, which consists of document analysis, we focused only on the regulative and normative competences. Analysing cultural-cognitive competences is vital for ECF4CLIM but cannot be done in a meaningful manner only by studying documents. For the identification and analysis of cultural-cognitive competences we will draw on observations and other material from the sustainability competence teams (SCT) and committees (SCC), as well as from a set of interviews.

To this end, a search was conducted for all legislation on sustainability and education affecting each of the schools and universities involved. Likewise, the internal regulations of each center related to sustainability (both in terms of the center's organization and its teaching content) were compiled.

Since a prior analysis was conducted in 2022 (D4.1), a report was prepared for each center updating the notable changes from that date to the present.

Once all the information was collected, the analysis phase began (as we mentioned, only regulative and normative competences could be gathered through document analysis).

The first step in the analysis was to see whether the competence is there in the first place, that is, whether the external regulations allow or oblige the organisation to promote sustainability. As for the regulative competences, the national regulatory framework may have a constraining role for example by obliging the schools to include sustainability in their curriculum. Likewise, the national/regional/municipal regulations may have an enabling function by allowing the schools to select their own energy provider. In a similar manner, for the analysis of the normative competences, the first step is to check whether the organisation has set up its own strategies, policies, plans, and programmes for sustainability.

The reports from the demonstration sites were structured under the following sections:

1) Identifying the SUSTAINABILITY-related documents

Which are the legislative and regulatory acts that constrain or enable the sustainability activities of schools and universities? Which strategies, plans, and programmes relating to sustainability has the school/university established for itself?

2) Main changes since 2022

We conducted an initial analysis, specifically of regulatory and policy responsibilities, in 2022. We have now updated that data, seeking to identify and understand the legislative and policy changes that have occurred in different countries and demonstration sites.

3) The key elements of competences: plan, do, check, revise

Which are the specifications in legislation, regulation, and the organisation's internal strategy documents relating to the following four categories of action?

4) Responsibilities, leadership, resources

In carrying out the analysis, attention was paid to questions of ownership, leadership, cooperation, and resource allocation. First, for a given sustainability-related aspect, it should be examined what the documents said about: who is/are empowered to act, who carries the lead responsibility, cooperation and coordination between the involved actors, and who decides. Second, in addition to the allocation of duties and responsibilities, the analysis seeks to identify whether resources have been allocated for the achievement of any given competence.

5) The contents of sustainability competences

The third layer of analysis focused on the contents of sustainability competences, that is, what, if anything, the analysed documents said about the substance of sustainable development. The aim was not to conduct an in-depth analysis, but instead to focus on two key distinctions. First, a distinction was made between competences relating to teaching objectives and methods on the one hand and the technical and organisational aspects on the other. The second key distinction concerned the dimensions and temporality of sustainability. To what extent did the documents specify and characterise sustainability as composed of interacting dimensions (environmental, social, economic) as opposed to focusing on only one (often, the environmental dimension? Were intergenerational aspects addressed explicitly (equity not only between social classes and groups but also between the present and future generations)?

4.3. Analysis of SCTs and SCCs

Sessions 5 of our Sustainability Competence Teams and Committees focused on the evaluation of a set of selected interventions, while sessions 6 focused on the evaluation of the whole project.

- Sustainability Competence Teams Session 5 (SCT5):

In preparation for SCT5, each demonstration site (DS) collaborated closely with the research team to select one or two interventions for in-depth evaluation. Ideally, these interventions were chosen to address at least two of the three competence dimensions: individual, collective, and technical-material (or environmental). Once the research team presented the selected interventions, participants took part in a role-play exercise. At the end of the session, participants engage in a plenary discussion addressing for key questions: why the intervention did or did not achieve its objectives; how and why there were unexpected outcomes; what surprises or lessons emerged; and how the intervention could be redesigned from scratch. Participants shared their personal views, noting areas of agreement and disagreement.

- Sustainability Competence Committee Session 5 (SCC5):

In SCC5, the wider education community in each DS engages in evaluating the interventions. The research team presented the key findings from the SCT5 session with a particular focus on failure and success factors, and the responsibilities of the various stakeholders. The moderator then invited each participant to reflect on their personal roles and responsibilities in light of the SCT5 outcomes, as well as any other aspects they wished to add. A summary of the SCT5 responses to the four

evaluation questions (objectives achieved, unexpected outcomes, surprises/learnings and visions for redesign) then formed the basis of a group debate on how to improve the interventions and identify other contextual factors that could drive change in their institutions.

- Sustainability Competence Team Session 6 (SCT6)

As mentioned above, SCT6 focus on the evaluation of ECF4clim as whole. To this end, after an overview of the main outputs of the project by the research teams at each DS, participants engage in reflection and deliberation on both the outcomes and the process of ECF4CLIM. Part of the debate focus on evaluating the outputs of our hybrid participatory approach and, more precisely, on whether it was successful in enhancing self/reflection and deliberation on sustainability competences, indeed including collective competences. Using Problem Structuring Methods (PSM), participants individually identified the main contributions of ECF4CLIM originating from the hybrid participatory process and then engage on a debate to prioritize its main contributions.

SAMPLE:

A total of 49 meetings of Sustainability Competence Teams (sessions 5 and 6) and Sustainability Competence Committees (session 5) have been held at the different DS, involving a total of 423 participants (including students, teachers, staff and other members of the wider educational community). Table 2 shows how many meetings were held in each SCT and SCC session, and how many people participated in each one.

Table 2: Meetings and participants in the deliberative workshops (SCT5, SCC5 and SCC6)

	Meetings	*Participants*
SCT5	23	191
SCC5	8	77
SCT6	18	155
TOTAL	**49**	**423**

4.4. Interviews

To deepen our understanding of collective competences and encourage further reflection within our educational communities, we designed an interview protocol to be used with three to five representatives from each DS who had been involved in the project from the outset.

We designed two interview protocols: one for adult participants (secondary and university students, teachers, school staff, school management, etc.) and one for elemental school students. Both protocols are based on our analytical framework and initial roadmap, and consist of open-ended questions (20 for adults and 10 for children), as well as three background questions concerning the date, the participants' roles in the project, and their gender. The following five topic areas were

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explored in all interviews: engagement, expectations, technical-material competences, individual competences and collective competences. Interview protocols are included in the Annex.

A total of 71 interviews were conducted with individuals who had been involved in the project from the outset across the four countries. In particular, 34 students, 23 teachers, 7 researchers, 4 members of staff, and 3 principals have been interviewed in our DSs.

The analysis followed a thematic analysis procedure,[4] through which the different relevant topics of each interview were coded and compared with each other, in order to identify the similarities and differences in the arguments and nuances that each actor introduced in each topic.

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[4] Terry, G., Hayfield, N., Clarke, V., & Braun, V. (2017). Thematic Analysis, p. 17-37. In C. Willig & W. Stainton-Rogers (eds.), *The SAGE Handbook of Qualitative Research in Psychology*. Los Angeles: Sage.

5. REGULATIVE COMPETENCES

The comparative analysis of the various reports from each country and demonstration site has allowed us to obtain the following results.

5.1 Schools of basic education and high schools

A specific list of sustainaibility-related legislation for basic and high schools have can be found in the Annex.

5.1.1. Main changes since 2022

This section details the legislative developments affecting the DS participating in the ECF4CLIM project.

Finland:

− Each upper secondary school will appoint a designated "sustainability support person" during spring 2025, with resources equivalent to teaching one course allocated to this role.

− Sustainability competence content is updated to advance emission compensation for mobility and implement a responsibility plan, and to investigate applying for the Eco-School (Vihreä lippu) certificate across all Tampere upper secondary schools while promoting carbon-neutral international cooperation via virtual connections and exploring the possibilities for green mobility.

Portugal:

− Three new national programs ((National Plan for Energy and Climate 2030, Action Plan for the Circular Economy in Portugal 2023-2027, and II National Youth plan 2022-2024) increased schools' responsibility in supporting climate, energy, and circular economy literacy, although not formalised as mandatory actions.

− Also, the PNEC 2030 outlines several indirect resources available to support sustainability education and the PAEC 2023-2027 opens opportunities for accessing funding for circular economy education and awareness initiatives.

− In addition, these new measures support the development of sustainability-related competences within the education system.

Romania

− The new legislative and regulatory measures reflect Romania's commitment to fostering a sustainable future through education by embedding environmental and climate change education into the curriculum and school operations, Romania aims to equip students with the knowledge and skills necessary to address environmental challenges effectively.

− The reforms in responsibilities and governance of pre-university education through the enactment of Law No. 198/2023 represent a comprehensive effort to modernize Romania's pre-university education system, focusing on inclusivity, quality, sustainability, and effective governance.

− Increase and reforms regarding the resources, reflecting Romania's commitment to modernize pre-university education system, ensuring it meets ontemporary standards of quality, inclusivity and sustainability

− Emphasis on cross-curricular sustainability, elective subjects (e.g., "Education for Climate Change"), and the implementation of the annual Green Week, a week-long series of activitites focuses on environmental protection and sustainability at all schools.

Spain:

− The modifications introduced in the curriculum, organisation and objectives of primary education are being implemented for the first, third and fifth grades in the school year beginning one year after the entry into force of this law, and for the second, fourth and sixth grades in the school year beginning two years after the entry into force of this law. These modifications do not include any changes related to sustainability issues.

− The Bioclimatization and Renewable Energy Plan launched by the Regional Government of Andalusia is an initiative that aims to improve thermal and environmental conditions in public educational establishments through sustainable techniques and the use of renewable energy, with an investmen of aproximately 140 million euros.

− Royal Decrees 217/2022 (ESO) and 243/2022 (Bachillerato) have embedded EU-aligned sustainability competences into secondary curricula, from environmental interdependence to ecological-footprint analysis and climate responsibility.

5.1.2. Responsibilities and leadership

Entering into the analysis of regulative competences, we can advance the following results for each country/region and DS.

→ **Finland**

In Finland, four national acts and decrees provide the basic regulatory framework for schools of basic education: the Basic Education Act, the Basic Education Decree, the Government Decrees on the national goals of education and hourly distribution of lessons in basic education (422/2012 and 378/2014), and the Government Decree amending the Basic Education Decree. Municipalities, schools, and possible other education providers can make minor adjustments to integrate local viewpoints or areas of emphasis to the national curriculum. Tampere has integrated many of the international and national sustainability policies in its own plans and strategies. There have been no changes regarding this aspect since 2022.

In Finland, the municipalities manage primary and lower secondary education under national regulations, with each having its own education administration. In Tampere, the Education and Culture Committee oversees primary schools, while secondary education falls under different municipal committees. The city's educational administration is split into primary and secondary units that manage daily school operations. Each school has a principal who is an employee of the municipal administration. Sustainability goals are outlined in various local strategic documents, including the Education and Culture Committee's plans, school annual plan templates, and a dedicated plan for a sustainable future in education. In this context, during spring 2025, the department for upper secondary schools in Tampere decided that every secondary school should name a support person for sustainability, and the schools should allocate resources equivalent to teaching one course for the support person.

In Tampere, support services in primary and lower-secondary schools—such as maintenance, food services, waste management, and recycling—are outsourced. Schools also depend on municipally managed district heating systems, over which they have little control. The City of Tampere is bound by procurement agreements, making it difficult for schools to renegotiate terms or include sustainability criteria. There have been no changes regarding this aspect since 2022.

Schools very seldom have specified a time and place for regular cooperation between the various local actors. Some attempts have been undertaken, for example in eco-schools, but this is difficult, because of the tight work schedules which vary from one school to another, and because of strict employment contracts, which leave little time for other than teaching activities. In Finland, teachers are free to decide whether and how to integrate sustainability in their teaching. They can follow the curriculum, which has a lot of sustainability contents, or they can go beyond the minimum requirements.

→ Portugal

In Portugal, many national regulations provide a common set of guidelines for the schools and involved education-sector actors. These include notably the Profile of Students Leaving Compulsory Schooling, which specifies the competences that pupils should possess at the end of their schooling. There have been some changes since 2022 with the introduction of three new plans. Firstly, the PNEC 2030 (National Plan for Energy and Climate 2030) includes clear recommendations to strengthen the incorporation of content related to climate change, air quality, and energy literacy within mandatory school curricula. Secondly, the PAEC 2023-2027 (Action Plan for the Circular Economy in Portugal) reinforces the importance of fostering circular economy literacy and sustainable consumption behaviours across all levels of education. Although it does not mandate specific actions for schools, it identifies education and awareness-raising as key instruments for achieving circular economy goals, recommending the integration of circular principles into educational practices and curricula. Finally, the II National Youth Plan (2022–2024) emphasizes the need to promote active citizenship and youth engagement in sustainability, aligning with SDG principles. However, no direct obligations are placed on schools.

As we have seen in the Finish case, in Portugal the school staff have little control over the technical and organisational aspects, given that the key decisions are made by the local and national authorities (municipalities and the Ministry of Education). The definition of the curriculum, end-of-the cycle evaluation, recruitment of teachers, and the generation of income remain prerogatives of the central government. The principal or school director has in public schools mainly a role of a manager.

The situation in Loures, as in many municipalities in Portugal, is again very similar to that of Tampere. Outsourcing of services limits the possibilities of the school staff to influence sustainability-related activities. In this aspect, the three new plans implemented since 2022 constitute an improvement, as they assign new resources and extend the schools' responsibilities in supporting students' literacy in matters relating to climate, energy and circular economy, even if these are not formalised as mandatory actions. As in the case of Finland, in Portugal, teachers are free to decide whether and how to integrate sustainability in their teaching. They can follow the curriculum, which has a lot of sustainability contents, or go beyond the minimum requirements.

→ **Romania**

In Romania, the Ministry of Education sets the national framework for sustainability in education, while county-level school inspectorates oversee implementation and suggest improvements. The Sustainable Development Department tracks national progress and manages international relations. Sustainability is integrated across school subjects, and schools have flexibility in how they teach it. Teachers can propose and design sustainability-related courses with input from students, parents, and communities, provided that the proposals are approved by the school leadership and inspectorates. However, the evaluation of such courses is limited due to their interdisciplinary nature and short duration. The "Education on Climate Change and the Environment" (ECCE) initiative supports sustainability education by proposing a teacher guide, a county-level network of trainers, and appointing a sustainability liaison teacher at each school. There have been no significant changes since 2022 in this respect.

Since 2021, Romania has implemented some changes in the responsibilities and governance of pre-university education, primarily through the enactment of Law No. 198/2023 on Pre-University Education. These reforms aim to enhance educational quality, inclusivity, and sustainability. Schools must now establish administrative councils—made up of the director and 7–13 other members—to oversee budgets, staffing, curricula, and professional development, thereby strengthening accountability and stakeholder involvement. The law promotes decision-making through social dialogue, engaging central and local authorities, educators, parents, students, and civil society. School Network Optimization to optimise resources, especially in rural and disadvantaged areas, schools are encouraged to form consortia for sharing teachers and facilities. Regarding the curriculum and assessment reforms, admission procedures have been liberalized: high schools may organise entrance exams for up to half of their places, with at least 10 percent reserved for students with disabilities, special needs, or of ethnic Roma origin. Finally, starting in the 2025–2026 academic year, the baccalaureate reform will be restructured to align more closely with educational profiles and to include a formal assessment of basic competences. These reforms represent a

comprehensive effort to modernise Romania's pre-university education system, focusing on inclusivity, quality, sustainability, and effective governance.

In Romania the energy and water supply of the schools are managed at the level of local council and mayor, in consultation with the school principal. The administration of school buildings and financing of the services is the responsibility of the municipality. The principal can make proposals but needs the approvals from municipal authorities. There have been no changes related to sustainability since 2022 in this regard.

The teachers have great autonomy in designing the form and contents of their sustainability teaching, provided that the teaching respects the legislative frameworks, internal norms, and established practices. This freedom is greater in the area of sustainability than in mandatory courses specified in the curriculum. There have been no changes since 2022 in this regard.

→ **Spain**

In Spain, education-sector governance consists of a hierarchy, whereby the central government, after consultations with the autonomous communities, establishes the curriculum that defines the minimum requirements for the objectives, competences, content, and evaluation criteria. Following these requirements, the educational authorities of the Autonomous Communities define the curriculum for their own jurisdiction. The recent revised Education Act 3/2020 (LOMLOE) includes for the first-time specific references to Education for Sustainable Development, the UN 2030 Agenda, and pursuing the target 4.7 (relating to SD education) of the UN Sustainable Development Goals. The Action Plan for Environmental Education for Sustainability (2021-2025) emphasises the need to integrate sustainability into the curriculum and teacher training. Since 2022 there have not been any changes related to sustainability issues in primary education.

The Pedagogical Coordination Commission, the Faculty of Teachers, and the School Council hold the main responsibilities for integrating sustainability in primary school teaching. The design of the school curriculum is supervised by the head of studies and the director, under the supervision of the Educational Inspection Service. The legislation and regulation do not stipulate on the organisation and responsibilities in the area of sustainability education. Since 2022 there have not been any changes related to sustainability in primary and secondary education.

Regarding secondary and high schools, the legislation explicitly evokes a few competences relevant to sustainability. The education reform is to be implemented in a stepwise manner, in 2022-2024, yet the process has faced delays, as some regions are late in elaborating the curricula and adapting their textbooks to align with the new regulations. There have been no significant changes since autumn 2022 in this regard.

In Spain, the Action Plan for Environmental Education for Sustainability (2021-25) mentions the governance and financing of sustainability measures as a responsibility shared among national, regional, and local administrations, and welcomes public-private partnerships. Since 2022, in the Action Plan for Environmental Education for Sustainability (2021-25), the actions planned for the ECF4CLIM project for primary education at the CEIP Mozart in Alcalá de Henares (Madrid), for

secondary education at the IES Ítaca in Seville and at the Autonomous University of Barcelona are included in the section "Actions programmed by other administrations" in the report of the Spanish Ministry for Ecological Transition and the Demographic Challenge (MITECO).[5] In the year 2025, the actions developed in 2024 were included in the section "Actions by other entities" by the MITECO.[6]

Teaching contents are defined in a top-down manner: the state consults with the autonomous communities, which then elaborate the community-wide curriculum, on the basis of which the educational establishments specify their own educational programmes for the school year. LOMLOE (Article 110) indirectly refers to elements of sustainability by entrusting the schools with the task of coordinating and fostering collaboration with the administrations and stakeholders in their immediate environment, in view of social and community transformation. There have not been changes related to sustainability issues in primary and secondary education since 2022.

The teacher is free to choose the teaching methods and approaches within the bounds of the curricula and financing by Autonomous Community, under the responsibility of the school's Pedagogical Coordinating Commission, guided by the school's annual general programming, and under the supervision of the Educational Inspection Service, since 2022 there have not been changes in primary and secondary education in this regard.

5.1.3. Resources

The **Finnish** national laws and regulations do not specify the resources that need to be made available for planning, implementing, evaluating, and revising the school's sustainability-related activities. The city of Tampere has a Nature School, which offers for schools (including the Juhannuskylä school) practical group-based teaching on topics such as forest education, water analysis, and sustainable lifestyles. For those schools wishing to participate in the Eco-Schools programme, the city provides an incentive by returning the participation fee once the school reaches a certain level of sustainability certificate granted within the programme. There have been no changes in resources since 2022.

In **Portugal**, the national laws and regulations do not specify the resources that need to be made available for planning, implementing, evaluating, and revising the school's sustainability-related activities. There were no dedicated funds for the implementation of sustainability measures at schools or for joining projects that promote these measures. Teachers therefore participated in

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[5] MITECO (2024) *Plan de Acción de Educación Ambiental para la Sostenibilidad. Contribuciones de otras administraciones al programa de trabajo para el año 2024* [Environmental Education Action Plan for Sustainability. Contributions from other administrations to the work programme for 2024] (pages 85-91) *https://www.miteco.gob.es/content/dam/miteco/es/ceneam/plan-accion-educacion-ambiental/PAEAS_otras_administraciones.pdf*

[6] MITECO (2025) Plan de Acción de Educación Ambiental para la Sostenibilidad. Contribuciones de otras administraciones al programa de trabajo para el año 2025 [Environmental Education Action Plan for Sustainability. Contributions from other administrations to the work programme for 2025] (pages 155-161) *https://www.miteco.gob.es/content/dam/miteco/es/ceneam/plan-accion-educacion-ambiental/2024/evaluacion_2024_0424_PAEAS.pdf*

projects on a voluntary basis during their non-teaching hours. Since 2022, the three new plans have brought some significant changes in this regard. Firstly, the **PNEC 2030** outlines several indirect resources available to support sustainability education such as funding that includes the Recovery and Resilience Plan (PRR), LIFE, PO SEUR, Portugal 2030, and specific training programmes such as *Green Jobs and Skills*. Furthermore, the support for teacher training and other actors through sustainability-related training is implicitly recommended. The PNEC highlights identifying and promoting capacity-building and qualification programmes for the climate transition and carbon neutrality, such as the *Green Jobs and Skills* initiative—potentially including continuous professional development for teachers and education professionals. Secondly, the **PAEC 2023–2027** further opens opportunities for obtaining funding for circular economy education and awareness initiatives, particularly when schools or municipalities collaborate with local or national partners. Finally, the **II PNJ** does not allocate specific resources for schools but emphasizes cross-sectoral collaboration, which may foster partnerships. These points suggest new cognitive resources (content) and potential access to financial and technical support—provided that schools or municipalities take the initiative to mobilize them.

In **Romania**, education for sustainability is financed via the general education budget, and no dedicated funding is provided. However, the ECCE identifies as viable financing sources the existing funds in the national and European programmes. These include the Recovery and Resilience Plan (RRP) to fund green schools, the Environment Fund (EF) to finance educational programmes, the Operational Programme Education and Occupations (OPEO) for teacher training, and international projects and partnerships for the exchange of knowledge and expertise. Since 2021, **Romania** has overhauled its pre-university sector by bolstering financial, human, technical, and cognitive resources to improve quality, inclusivity, and resilience. Financially, the new law guarantees that at least 15 percent of the consolidated budget goes to education, teacher salaries were increased by roughly 25 percent in 2023 (with further hikes in 2024), and student scholarships were more than doubled. On the human-resource front, all new teachers must now complete a Master's in pedagogy, whereas a national didactic training centre and mentoring system support ongoing professional development, and rural educators receive a tax-free bonus equivalent to five minimum salaries for a five-year commitment. Technically, the reforms mandate digital competence development across schools and channel Recovery and Resilience Plan funds to modernising facilities—from dormitories to canteens—under a unified digital-learning ecosystem. Finally, as for the cognitive resources, Romania is launching a "green schools" network to embed sustainability into infrastructure and curricula, collaborating with the European Commission and the OECD on curriculum redesign, and moving all national assessments to a fully digital format by 2027–2028.

In **Spain**, financing for the elaboration of courses come from the state and the autonomous community in question. However, there is no dedicated funding for sustainability-related teaching. A school can freely decide to allocate a share of its budget to teaching and other activities related to sustainability. Similarly, the human resources available are those allocated according to the number of classes provided by the school. The regional government of the Autonomous Community of Madrid provides educational material through the Centre for Environmental Resources, which

also works with private entities and NGOs. Since 2022, there have not been changes related to sustainability issues in primary education.

Regarding secondary education, covering changes implemented since 2022, the Regional Government of Andalusia launched the Bioclimatization and Renewable Energy Plan as a pioneer initiative that aims to improve thermal and environmental conditions in public educational centres through sustainable techniques and the use of renewable energy. The plan, with an investment of approximately €140 million, is being implemented by the Department of Educational Development and Vocational Training through the Andalusian Public Agency for Education. The main objectives are to improve thermal comfort by installing adiabatic cooling systems—an eco-friendly, zero-CO_2 alternative to conventional air conditioning that consumes up to 80 % less electricity—and to use renewable energy, achieving energy self-sufficiency through the deployment of photovoltaic panels. Also, broader coverage with 430 public centres across Andalusia (214 nursery, primary and special-education schools, and 216 secondary, baccalaureate and vocational training institutions in 169 municipalities).

5.1.4. Contents of sustainability competences

In **Finland**, there have been some changes since 2022. Firstly, in the new Plan for Global and International Education in upper secondary schools 2024 – 2025 in Tampere, one goal is "Responsible Mobility and Project Activities", as in the plan 2022-2023. Key objectives include responsible and environmentally conscious travel. The new statement introduced to the plan reads: "The development of emission compensation for mobility is promoted, and a responsibility plan is implemented." Secondly, upper secondary schools like Samke are part of the organisation of Tampere municipality and its Growth, Innovation and Competitiveness Services -department. The annual plan of this department for 2025 states that the principles of the Eco School certificate (in Finnish, Vihreä lippu) are used when promoting carbon-neutral practices. The same objective was stated already in the annual plan 2023, but according to the new objective, during the year 2025, the possibilities to apply for the certificate for the whole network of upper secondary schools in Tampere are investigated. Also, upper secondary schools should consider carbon neutrality in their international cooperation by promoting virtual connections and exploring the possibilities for green mobility.

In **Portugal**, the National Strategy for Education for Citizenship (ENEC) stipulates that the citizenship education provided at the primary school level must address sustainability in all its dimensions but prioritises the social dimension. Since 2022, the three new plans add more support to the sustainability-related competences within the education system. The **PNEC 2023** promotes low-carbon behaviours, energy literacy as a key transversal competence and the empowerment for active citizenship in the energy transition, trough content related to climate change mitigation and adaptation, circular economy and carbon neutrality and air quality and energy efficiency. The **PAEC 2023–2027** explicitly promotes circular economy awareness and literacy, encouraging the inclusion of circular thinking, sustainable resource management, and waste reduction in education. The **II PNJ**

promotes sustainability competences within the broader framework of active citizenship, including the economic, social, and environmental pillars of sustainable development. These competences are expected to be developed from the early stages of compulsory education, leading to changes in both curricular content and educational goals within schools.

In **Romania**, the curricula of primary and secondary education have a transversal approach to sustainable development. Since 2021, Romania has made substantial changes in embedding sustainability competencies throughout its pre-university system, anchored by the launch of the National Strategy on Education for the Environment and Climate Change (2023–2030). The main improvements include: curriculum enhancements, introducing new sustainability themes into the national curriculum (cross-curricular topics in school subjects, optional courses and the Green Week Iniciative); teacher professional development, improving teacher competencies in sustainability education through training programs and resource platforms; green school infrastructure including energy efficiency, eco-friendly services and facilities such as green spaces and waste management systems and, finally, transportation with electric minibuses; development of green competencies among students in the form of knowledge, skills and attitudes.

In **Spain**, the regulatory framework governing primary education addresses mostly the environmental and social dimensions of sustainable development. The key competences for the pupils at the end of their primary education career defined in the Royal Decree 157/2022 focuses on eco-social sustainability. Among the 12 sustainability competences specified in GreenComp, the Royal Decree 157/2022 prioritises those relating to "embodying sustainability values" and "embracing complexity in sustainability". While there have been no sustainability-related updates in primary education since 2022, secondary education has seen significant changes such as the Development of Curricula with a Sustainability Focus which establishes a minimum educational standard for different stages of education integrating sustainability as a central pillar. Also, in Compulsory Secondary Education (ESO), the Royal Decree 2017/2022 emphasises the understanding of the interdependence between human activity and the environment, promoting habits that reflect a commitment to sustainability. Finally, the Royal Decree 243/2022 for Bachillerato (baccalaureate) incorporates critical analysis of the ecological footprint and fosters a responsible attitude towards climate change. These curricula are aligned with the European framework of sustainability competences (GreenComp).

5.2   Universities

A specific list of sustainability-related legislation for universities have can be found in the Annex.

5.2.1. *Main changes since 2022*

The main changes compared to the previous report (D4.1), based on 2022 data, are as follows:

Finland:

− The ministry's decision to cut resources for universities in Finland could also affect sustainability work.

Portugal:

− The Strategic Plan 2020–2030 was adopted, placing sustainability as a central pillar across education, research, campus operations, and community engagement. A new Vice-President for Sustainability and Infrastructure was appointed, formalizing sustainability leadership at the government level.

− The curriculum has evolved with the introduction of new courses addressing sustainability challenges, most notably the creation of the "Climate Crisis and Just Transition" course unit, which provides students with interdisciplinary knowledge and skills related to environmental sustainability and social justice.

− At the campus level, solar panels have been installed, and other infrastructure improvements were implemented as part of the ongoing effort to promote energy efficiency and reduce the institution's carbon footprint. The Técnico Sustentável platform continues to support sustainability initiatives, although many of its responsibilities have been integrated into the new institutional sustainability strategy.

− IST has strengthened its participation in national and international sustainability networks, including by contributing to the national educational model for sustainability in the energy transition, which promotes interdisciplinary education and skills development aligned with national and European green transition goals.

Romania:

− The new legislative and strategic measures reflect Romania's commitment to fostering a sustainable future through higher education. By embedding environmental and climate change education into university curricula and operations, Romania aims to equip students with the competencies necessary to address environmental challenges effectively.

Spain:

− New laws have been passed requiring the introduction of sustainability and climate change mitigation elements into university management and, to a lesser extent, into undergraduate degree programmes (whose curricula are currently under review).

5.2.2. Responsibilities and leadership

The universities have significant autonomy in all four countries. In **Finland**, the government Decree on Universities defines for each university those disciplines in which the university must have degree programmes. Within this framework, the university has full freedom to decide on its teaching methods, technical and organisational aspects, and teacher responsibilities. Teachers have autonomy, within the limits established by the university curriculum. Since 2022, a new agreement has been established between the University of Jyväskylä and the Ministry of Education and Culture for the period 2025-2028.

In **Portugal**, the legal regime for higher education vests the public universities with statutory, pedagogical, administrative, financial, and patrimonial autonomy from the State. The way in which sustainability is addressed is defined in the university's curriculum and sustainability policy, withing which the teachers are free to choose whether and how to introduce sustainability teaching.

Since 2022, several national strategies relevant to sustainability in higher education have been updated. The revised National Plan for Energy and Climate 2030 (updated in 2024) sets more ambitious renewable energy targets and reinforces the role of education in promoting climate literacy and low-carbon behaviours, it engages in pedagogical and research initiatives focused on climate changle mitigation and air quality improvement. The Action Plan for the Circular Economy in Portugal (PAEC 2023–2027) highlights the importance of education in fostering circular economy principles, including in higher education. It calls on HEIs (Higher Education Institutions) to integrate circular economy principles into curricula, campus management, research activities and knowledge transfer. The II National Youth Plan (PNJ 2022–2024), adopted in September 2022, promotes sustainability and youth engagement. It also identifies HEIs as potential partners in promoting active citizenship and sustainability education among young people. While not imposing direct obligations on higher education institutions, these measures encourage cross-sectorial cooperation involving universities and research centres. These updates increase HEIs responsibility for advancing in sustainability competences.

In **Romania**, the key responsibilities in the area of education for sustainability rest with the Ministry of Education (ME), school inspectorates, and all educational units (school and universities). The Sustainable Development Department (Ministry) monitors and reports on the progress and ensures the respect for Romania's international commitments. The Romanian universities enjoy full freedom to manage their budgets, as well as to design and implement their teaching programmes and courses, within the bounds of the national objectives established in government documents. Since 2021, Romania has enacted several significant legislative reforms impacting the governance, quality assurance, inclusivity, and sustainability of higher education. These changes are primarily encapsulated in Law No. 199/2023 on Higher Education, which modernizes the legal framework and aligns it with European Union objectives.

Firstly, under the National Recovery and Resilience Plan (PNRR), 61 universities have received grants to upgrade digital infrastructure, revise curricula, and boost digital skills among staff and students;

simultaneously, investments in modernising student housing, canteens, and recreation facilities foster a more sustainable and inclusive campus environment (Education and Training Monitor 2024). Moreover, governance and transparency have been enhanced: decisions by governing bodies (senates, ethics committees, faculty councils) are now made public and published online, and student representatives are formally included at all decision-making levels. In parallel, academic ethics and quality assurance have been strengthened: university ethics commissions gain clearer independence and operational frameworks with specified sanctions for violations, while ARACIS updates evaluation methodologies for doctoral and joint degree programmes to align with European standards (Higher Education Legislation - ARACIS).

Furthermore, curriculum and examination reforms standardize graduation requirements from 2025–2026 by mandating both a written exam and thesis defence for bachelor's degrees, and introduce accelerated study options for exceptional students, allowing two years' worth of coursework in one year under strict criteria to meet labour-market needs in areas like engineering and IT. Finally, inclusivity and access are promoted through targeted measures: the "First Student in the Family" program offers scholarships, counselling, and remedial support for those from low-education backgrounds, and pilot dual-education consortia link universities, vocational schools, and employers to enhance relevance to the job market (Education and Training Monitor 2024). These legislative reforms reflect Romania's commitment to modernizing its higher education system, ensuring it meets contemporary standards of quality, inclusivity, and sustainability.

In **Spain**, the key legislation governing university activities vests universities with the responsibility to undertake measures in favour of "sustainable development" as "an essential component of social progress". The university rectorate is responsible for ensuring the achievement of these objectives, the design of strategies and allocation of resources. At the UAB, the CRUE (an organism mediating between the government and the universities) guidelines have led to the establishment of units such as the environmental office, the Mobility Board, and the Energy Unit. However, these units deal only with issues relating to university infrastructure and management. The teachers have broad autonomy in deciding on whether and how to introduce sustainability-related aspects in their teaching and degree programmes. Regarding the changes since 2022, the Organic Law 2/2023 (LOSU) in its article 18 (on social and territorial cohesion), establishes that "Universities will ensure that their campuses are climate-sustainable by developing a Climate Change Mitigation and Adaptation Strategy, and will share their knowledge with society to address the climate emergency and its effects". Article 46 establishes that the university's Governing Council must be responsible for "Defining and promoting a Climate Change Mitigation Strategy that includes plans for energy efficiency and replacement with renewable energy, sustainable and local food, and mobility."

5.2.3. Resources

The **Finnish** legislation does not specify the resources that need to be made available for university's sustainability-related activities, but the targets specified in the agreement between the university and the education ministry guide the allocation of government resources to the university. The

legislation does not specify the needed human or knowledge resources concerning sustainability, either. However, the ministry's decision to cut resources for universities could also affect sustainability work. Likewise, in **Spain** and **Portugal** the university has the right and responsibility to decide on the allocation of resources for sustainability-related activities.

At the UAB, most of the sustainability-related human and organisational resources rest in the hands of the units in charge of the on-campus environmental aspects (Environment Office, Mobility Board, Energy Unit). Since 2022, under the new regulations, the Organic Law 2/2023 (LOSU), in its article 56 about financing of universities, establishes that there must be sufficient "Basic Structural Funding" to provide a quality public service and to cover multi-year staff expenditure needs, including, among other things, investments to ensure the environmental sustainability of universities. However, this applies only to the infrastructure of universities, not to other organizational or content-related aspects that could be key for fostering educational sustainability competences.

Regarding the updates since 2022, in **Portugal**, at the IST, the PNEC 2030 and PAEC 2023-2027 identify potential funding opportunities and support mechanisms that can be leveraged by HEIs. Financial resources are available through the Recovery and Resilience Plan (PRR), Portugal 2030, PO SEUR, LIFE, and specific programmes supporting green skills, research and innovation. Also, circular economy initiatives may attract national and European funding streams aligned with the PAEC and EU Green Deal Objectives. As for the human and technical resources both the PNEC and PAEC encourage capacity-building and universities are expected to create interdisciplinarity teams that embrace sustainability principles. Regarding the cognitive resources, the PAEC stresses the importance of promoting circular economy awareness. Funding for these activities is not automatically allocated to the HEIs, which must instead actively seek and mobilise these resources through partnerships and project proposals.

In **Romania**, the public universities receive funding from the national budget via the Ministry of Education. The decisions on if and how to allocate resources to sustainability-related activities are in the hands of the university senate. Since 2021, **Romania** has implemented substantial reforms in higher education, focusing on enhancing financial, human, technical, and cognitive resources. These initiatives aim to modernize the university system, align it with European standards, and prepare graduates for contemporary challenges.

In terms of financial resources, Romanian universities have seen significant investments—especially through the National Recovery and Resilience Plan (PNRR), which allocated over €200 million in 2022 to 61 institutions for digitalization. Moreover, recent reforms introduce performance-based funding tied to social equity and institutional quality, incentivizing inclusivity and excellence.

Regarding human resources, the "Educated Romania" initiative prioritizes continuous professional development for academic staff to improve teaching and meet modern needs. At the same time, inclusivity policies have expanded support for disadvantaged groups and facilitated integration of Ukrainian students and staff via Erasmus+ projects.

For technical resources, the SMART-Edu 2021–2027 initiative enhances digital infrastructure by closing connectivity gaps and providing equipment and support across HEIs. Concurrently, universities have broadened access to specialized software and online tools, aiding research and independent study.

Finally, concerning cognitive resources, curricula have been modernised towards competence-based education, digital literacy, and transversal skills like critical thinking and problem-solving (Ongoing reforms and policy developments - Europa). Growing emphasis is placed on sustainability in the education sector, embedding green competences and fostering education for sustainable development.

5.2.4. Contents of sustainability competences

The **Finnish** Universities Act and Government Decree on Universities does not explicitly mention sustainability. The new agreement between the University of Jyväskylä and the Ministry of Education and Culture states: "The university will increase multidisciplinary basic education and continuous learning offerings that enhance societal security and sustainability. The university will offer basic studies in the sustainability transition in all university curricula starting from 2025 and will make these studies widely available to students from other higher education institutions and as part of continuous learning offerings by 2028". The ECF4CLIM project has contributed to the planning of this multidisciplinary sustainability transitions study module. The plan also notes: "The university will strengthen research in planetary well-being and establish expertise based on climate and nature footprint calculations". Unlike the previous agreement, the new plan does not mention JYU.Wisdom or include specific sustainability indicators. "Responsible and impactful university" is no longer a strategic objective; instead, sustainability is integrated into the broader goal of strengthening the university's research profile. The university's commitment to carbon neutrality by 2030 remains in force.

In **Portugal**, the new mentioned national strategies reinforce and expand the sustainability competences expected within higher education. Firstly, PNEC 2030 promotes low-carbon behaviours and responsible consumption, energy literacy as a transversal competence and active citizenship in the energy transition, including knowledge of climate change mitigation and adaptation, circular economy, and carbon neutrality. Secondly, PAEC 2023-2027 emphasizes the circular economy literacy (including sustainable resource management, waste prevention and product life-cycle thinking) and innovation and entrepreneurship skills linked to sustainability challenges. Thirdly, the II National Youth Plan supports youth engagement and leadership in sustainability actions and the development of transversal competences such as critical thinking and problem solving, For HEIs like the IST, this implies enhancing curricular content, promoting interdisciplinary sustainability education, and integrating these competences into both formal and informal learning experiences.

In **Romania**, university autonomy is seen as a key factor in allowing the university to respond to the needs and demands of the local community, economy, and job market. The education ministry

establishes only the general framework for university education, with the Romanian Agency for Quality in Higher Education (ARACIS) exercising a control and supervisory function. At the University of Pitesti, there is a course entitled "sustainable development", whereas many degree programmes integrate sustainability issues in a transversal manner.

Since 2021, Romanian higher education institutions have made significant strides in integrating sustainability competencies into their curricula, aligning with national strategies and international frameworks. These developments encompass curriculum reforms, pedagogical advancements, and collaborative initiatives aimed at fostering a culture of sustainability within universities.

In January 2023, **Romania** adopted its first comprehensive National Strategy on Education for the Environment and Climate Change (2023–2030), which sets objectives across four key areas: (1) Curriculum Integration—embedding environmental and climate education as standalone subjects and cross-cutting themes; (2) Educational Resources—developing digital platforms and materials to support learning; (3) Infrastructure Development—upgrading facilities to meet sustainable standards; and (4) Teacher Training—enhancing educators' ability to deliver sustainability content effectively.

Curriculum enhancements and pedagogical reforms have been introduced: universities incorporate sustainability topics cross-disciplinarily (e.g., in economics, management, engineering), offer dedicated courses on sustainable development and environmental management, and foster research initiatives tackling sustainability challenges. These reforms are complemented by training programmes that equip faculty with the skills and methods needed for effective sustainability teaching.

The overarching aim is to develop among students a set of sustainability competencies: (1) Knowledge of environmental challenges and core concepts; (2) Skills for engaging in sustainable practices and problem-solving; and (3) Attitudes that foster environmental stewardship and responsibility. By embedding these competencies, Romania prepares graduates to contribute effectively to sustainable development goals.

In **Spain**, before 2023, when these new laws were introduced, the key laws and guidelines addressed sustainability in a very broad manner, at our demonstration site (the faculty of Political Science and Sociology) the teaching contents (defined through a participatory process in 2009) included one compulsory and one optional environment-related courses integrated into the sociology degree and one optional course in the political science degree. As a result of the new regulations, at the end of 2022, the Royal Decree 822/2021, of September 28, came in force, thus "establishing the organization of university education and the quality assurance procedure", outlining the guiding principles for the design of curricula for official university degrees in Spain. This legislation requires all Spanish universities to reform their curricula to include democratic principles and values and the Sustainable Development Goals as a reference, and, in particular "the treatment of sustainability and climate change, in accordance with the provisions of Article 35.2 of Law 7/2021, of May 20, on Climate Change and Energy Transition". For this reason, several reform committees for the three existing degrees (Sociology, Political Science, and International Relations) were established in 2023

at the Faculty of Political Science and Sociology (our demonstration site). These committees have developed new curricula that, to a greater or lesser extent, have included elements of sustainability and climate change. The fact that the ECF4CLIM project was underway during this period has contributed to the inclusion of recommendations on how to incorporate these topics into future curricula. This process is still ongoing and will conclude in 2026.

6. NORMATIVE COMPETENCES

6.1 Schools of basic education

6.1.1. Main changes since 2022

Finland:

No changes since 2022.

Portugal:

There have been no changes since 2022, with the previously stipulated strategies and action plans remaining in force.

Romania:

− Adapting the strategic vision of school to follow the "Green School" program with the target to obtain the certification (all 3 schools, Nicolae Bălcescu Drăgășani, Șercaia, and "Iulia Zamfirescu" Mioveni). The schools began the process of certification under the new "Green School" national program, initiated in 2023. The adaptation supposes: (1) modernization of infrastructure, (2) integration of environmental and climate-related contents across various subjects, (3) adopting teaching methods to promote interdisciplinarity.

− **Implementation of the "Green Week" in the school's activity and adapting to the local context:** During this period, students engage in activities that promote environmental awareness and responsibility, including outdoor activities like lessons in nature, thematic visit, acting for the environmental protection.

.   **Nicolae Balcescu School Dragasani**: (1) **Recycling Workshops -** Students participated in hands-on sessions where they learned about sorting waste and the benefits of recycling, (2) **Environmental Art Projects -** Art classes were dedicated to creating pieces from recycled materials, encouraging creativity and environmental consciousness, (3) **Community Clean-Up Drives** - Collaborative efforts between students, teachers, and local community members led to successful clean-up campaigns in nearby areas., (4) **Educational Seminars** - Experts were invited to speak about climate change, biodiversity, and sustainable practices, providing students with in-depth knowledge on these topics.

.   **Sercaia School**: (1) **Outdoor Activities** - Engaging students in nature walks, gardening, and ecological clean-up campaigns to foster a connection with the environment, (2) **Educational Workshops**: Conducting sessions on topics like recycling, climate change, and biodiversity to raise awareness and promote sustainable practices., (3) **Creative Projects**: Encouraging students to create art from recycled materials or organize eco-themed exhibitions to express their understanding of environmental issues.

− Implementation of updated curricula with an increased focus on sustainability and environmental education, including cross-curricular themes and optional courses on climate change.
− Increased investment in digital infrastructure and equipment, notably in informatics and robotics at Mioveni and computer networks at Șercaia.
− Structural interventions (installation of PV systems, water sensors) introduced sustainability practices into daily school operations.
− Administrative modernization following the new Education Law No. 198/2023, including the establishment of Administrative Councils and promotion of participatory governance.

Spain:

Resources and collaborations for sustainability have increased: the ECF4CLIM project provided additional technical and financial support (including a dedicated budget for interventions and CIEMAT's technical/methodological guidance); the gradual implementation of Spain's LOMLOE 2020 across all primary grades (2023–2024) introduced new educational contents, though changes in sustainability competencies align with those legally required; and the school continues external partnerships (e.g., Ecoescuelas, achieving the Green Flag for the second year, and the LIFE TERRA project) to promote and enrich sustainability competences.

As a result of the participation and experience with the ECF4CLIM project, several of the interventions carried out within this project will be included in the school's annual action plan. Participants from the school consider that the interventions carried out have proven to have very positive influence on the environmental behaviour and awareness of the educational community, as well as those of the families. Therefore, the inclusion of the following interventions as annual school activities is planned:

- Flea market for the reduction of the environmental footprint thanks to the reuse of clothes.
- Workshops on sustainable and healthy eating
- Improvement in the waste treatment
- Installation of solar panels to reduce greenhouse gas emissions and electricity consumption. The didactic units associated with solar installation will allow children to understand how solar energy works and become aware of its environmental benefits.
- Continued maintenance of the garden, and activities to teach about its relationship with sustainable and healthy food, as well as the environmental benefits associated with planting native species. These two spaces can be used to raise awareness and develop individual and collective skills and competences among the school community.

The school community also showed great interest in continued application of the participatory methodology of the ECF4CLIM project centred around the activities of the sustainability competence teams and committees. These have proven to have helped to improve the sustainability of the school. By participating in the SCTs and SCCs, the various stakeholders feel like active agents of change, fostering a culture of sustainability that can be maintained over time.

6.1.2 *Responsibilities and leadership*

Responsibilities for sustainability are shared and attributed in somewhat distinct ways depending on the school and the country. In some cases, teachers are very well organised to promote action for sustainability, while in others, sustainability activities depend solely on the initiative of each teacher. In all cases, the commitment of the leadership and management of the organisation appears as an essential requirement. Furthermore, decisions on energy consumption, water, etc., usually depend on external actors (either companies in charge of offering these services, or the municipalities responsible for managing the school).

In **Finland**, the primary school has a "Sustainable Future team", chaired by the "contact person of a sustainable future", who is a teacher and member of the school management team, and is responsible for championing sustainability amongst the staff, and attending possible meetings organised by the municipality on a sustainable future. The annual plan of the Juhannuskylä school includes some goals and activities concerning a sustainable future. Participation in the ECF4CLIM project is among those.

In **Portugal**, the primary school has an educational project that defines the school's mission, vision, principles, values, purposes, goals, and action strategy. This educational project includes goals related to sustainability, such as those relating to attitudes towards UN Sustainable Development Goals and respect for the environment. Escola EB 2.3 Mário de Sá Carneiro has participated in the Eco-schools' international programme since 2015. There have been no changes since 2022.

In **Romania**, the principal of the primary school is responsible for the planning, implementation and revision of the teaching objectives in the area of sustainable development. The plans and monitoring reports are discussed and approved by the school council and are supervised by the county inspectorates. The funding from national budget is channelled through the municipalities, which are responsible for the budgeting of the schools. The schools are therefore highly dependent on the municipality's decisions. Regarding the changes since 2022, all the three pre-university schools have now Administrative Councils, and implemented the social dialogue in DMP.

In **Spain**, the Pedagogical Coordination Commission, the Teachers' Council and the School Council define the objectives and teaching methods on SD by elaborating the pedagogical proposal on sustainability that is included in the Annual General Plan. However, final decisions on environmental aspects are made by the city council, the Autonomous Community (region) and the school. Every teacher has autonomy to develop the teaching units within the bounds of what is stipulated by the regional government (Autonomous Community), and in the Annual General Plan of the school. Since 2022, no changes have been made concerning sustainability in primary education.

6.1.3 Resources

In **Finland,** no resources are dedicated to sustainability in the budget of the Juhannuskylä school, but the Sustainable Future Team can be considered a resource, as one of the eight thematic teams of which each teacher must choose one as his/her "home base". Teachers can spend 38 hours per school year for meetings, that is, one hour/week. Tampere provides schools with sustainability resources like practical workshops, teacher training, curriculum agents, and the Art Arc program. Schools, including Juhannuskylä, can join with costs covered by the city.

In **Portugal,** there are no financial resources specified for sustainability. Human resources are the teachers' own, who undertake activities and projects during their non-teaching hours. Cognitive resources are attributed for the "Citizenship and Development" course. Several types of cognitive resources are provided by the ABAE or by the municipality. There have been no changes since 2022.

In **Romania**, the funding for a sustainable development (CSD) course comes directly from the regular national or local education budget, covering salaries and room expenses as part of the annual allocation. However, additional costs are hard to accommodate and typically require partnerships with local stakeholders or alternative project funds. Human resources are limited to existing school staff. Since 2022, the budget has become increasingly insufficient, as resources ave been allocated to other areas considered as higher priorities, such as defence (in the context of the Russian invasion of Ukraine) and pensions. However, the teachers and staff were given a pay raises in 2023 and 2024. The schools are implementing the mandatory measure that requires all new teachers to complete a master's programme in pedagogy. Excellent progress was made in improving technology (computer, informatics, and robotics at Iulia Zamfirescu school, and computer networks at Sercaia school). The three structural interventions (installing PVs at Sercaia and Dragasani, installing water sensors at Mioveni) supported by ECF4CLIM provided a basis for the development of new projects.

In **Spain**, the schools have no specific resources for this topic but rely on the existing available financial and human resources. The regional government (Autonomous Community of Madrid) provides educational material through the Centre for Environmental Resources, which also works with private entities and NGOs. The central government also provides educational material on sustainability and the environment. Since 2022, the ECF4CLIM project has brought additional technical and financial resources for sustainability education and the improvement of competences. The project has provided the school with a budget for the interventions carried out. The CIEMAT team has collaborated in designing, implementing and evaluating all these activities, providing all the necessary technical and methodological knowledge.

6.1.4 Contents of sustainability competences

In **Finland**, sustainability is included in the national curriculum, but there are no specific local sustainability contents at the Juhannuskylä school, except through participation in the ECF4CLIM project.

In **Portugal**, the "Citizenship and Development" subject, which is mandatory for pupils at several grades (as said above in the regulatory competences section), provides various contents of sustainability competences. There have been no changes since 2022.

In **Romania**, the optional subject "Ecological and environmental education" was included in the educational programme. According to the guidelines provided by the Ministry of Education, the course is designed for one hour a week for grades 1 to 7. Since 2022, the extra-curricular activities organised in the Green Weeks has become a priority. The cross-curricular topics were stimulated by the educational programmes developed by ECF4CLIM in the context of the implemented structural interventions. For Dragasani and Sercaia schools, dedicated materials to understand solar energy were produced and the teachers used it in different lessons. Key decisions affecting sustainability competences are made at the school level. The ability and willingness of teachers to engage in interdisciplinary teaching is a major precondition for success, given that their duties and responsibilities are not defined in a detailed manner in the national legislation. Teachers are expected to integrate sustainability in their teaching, but they are free to choose the methods and level of ambition of such teaching. Schools like Iulia Zamfirescu Mioveni, Șercaia, and Nicolae Bălcescu Drăgășani have incorporated sustainability into their annual and strategic plans, mainly through activities linked to the "Green Week," recycling projects, and infrastructure improvement (e.g., solar panels). However, formal internal documents specifying mandatory teacher actions or specific sustainability-related teaching responsibilities are absent or limited. Most initiatives rely on voluntary teacher engagement rather than on formal obligations.

In **Spain**, sustainability is a transversal topic in the curricula. Environmental sustainability is mainly taught in natural science subjects, social sustainability in social science subjects, and economic sustainability is covered to some extent in education for responsible consumption. Hence, sustainability appears to be distributed throughout the entire curriculum. The school can complement teaching in sustainability through collaborations with external entities as part of activities included in the Annual General Programme.

Since 2022 the Spanish education law LOMLOE 2020 has been gradually implemented at schools, first in odd-numbered grades and then in even-numbered grades. During the 2023-2024 school year, LOMLOE was already implemented in all primary grades. The only changes in sustainability competencies have been those related to the new educational contents proposed by the law, which has meant a significant change in textbooks. The school actively collaborates, apart from the ECF4CLIM project, with other entities with which it develops activities that promote sustainability competences, such as the collaboration within the LIFE TERRA project (https://www.lifeterra.eu/es), and Ecoescuelas (https://www.ecoescuelas.org/), a network within which the school has received the green flag for the second consecutive year.

6.2   High schools

6.2.1. Main changes since 2022

Finland:

− Samke's sustainability responsibilities have expanded: there is now one main person in charge plus two additional teachers sharing responsibilities (one leading the teachers' climate team and two jointly leading the students' team).

− Resources for sustainability have increased during the ECF4CLIM project: the principal has allocated more funding from Samke's own budget (the student climate action team leader now receives compensation from the school budget instead of relying only on funds from the National Board of Education).

− Sustainability competence content has been significantly enhanced: the 2024–2025 annual plan highlights SamkeCO2 activities as one of four curriculum priority areas, with detailed descriptions (where previously the student team was only briefly mentioned); a living planning-cycle document with monthly themes co-created by students and teachers; an updated SamkeCO2 webpage with richer information; an established action model (e.g., recycled t-shirt workshops) continuing year to year; and from spring 2025 onward, SamkeCO2 teachers will always meet jointly with the student team (a change from earlier separate meetings) to more effectively engage students in sustainability action.

− New rules:

  . Annual plan of SAMKE based on the curriculum 2024-2025
  . Updated web page for SamkeCO2 team https://www.tampere.fi/sammon-keskuslukio/opiskelijalle/ilmastotoiminta-samkeco2
  . Annual planning cycle for SamkeCO2 team

Portugal:

− Both documents, the Educational Project (2022-2025) and the Internal Regulation (2023-2027), explicitly highlight sustainability as a guiding principle in educational practices and school management.
− The school continues its strong commitment to sustainability through the ongoing implementation of initiatives such as the Eco-Schools programme, partnerships with local authorities, and active community engagement.
− The introduction of clearer responsibilities related to environmental behaviours, improved resource management, and a deeper integration of sustainability competences into the curriculum marks a significant progression in the school's sustainability strategy since 2022.
− New rules:
  . Educational Project - 2022 – 2025 (Projeto Educativo - 2022 – 2025): http://www.aec.edu.pt/wp-

content/uploads/2023/07/Projeto_Educativo_Agrupamento_22_25.pdf - It replaced the previous educational project (2018-2021), reported in D4. 1
- . Internal Regulations Of The Camarate School Group D. Nuno Álvares Pereira 2023 – 2027 – **NEW** - http://www.aec.edu.pt/wp-content/uploads/2024/06/RIA-AEC-2023_2027.pdf

Romania:

- The schools "Iulia Zamfirescu" (Mioveni) began the process of certification under the new "Green School" national programme, initiated in 2023.
- Implementation of updated curricula with an enhanced focus on sustainability and environmental education, including cross-curricular themes and optional courses on climate change.
- Increased investment in digital infrastructure and equipment, notably in informatics and robotics at Mioveni school.
- Structural interventions (installation of PV systems, water sensors) introduced sustainability practices into daily school operations.
- Administrative modernisation following the new Education Law No. 198/2023, including the establishment of Administrative Councils and promotion of participatory governance.

Spain:

Although not formally written, normative regarding waste management, selection of environmental coordinators and environmental department functions has been developed since 2022 at the IES Itaca (Seville):

- Implementation of specific regulations for waste management and cleanliness at the school, with a system of weekly audits and reporting to students.

- Nomination of environmental coordinators and the establishment of a sustainability department, which have improved coordination and communication at all educational levels.

- Change of the waste management company and the adaptation of its waste separation system to the new regulations, as well as an improved awareness in the educational community about correct separation and treatment of waste.

- Introduction of a new subject focused on teaching sustainability issues.

- Formalisation of internal regulations for waste management and the roles of environmental coordinators and the sustainability department.

- Development of a revegetation plan in which students were actively involved in decision-making. Awareness-raising and training campaigns have also been carried out to promote more sustainable habits and improve communication on sustainability within the educational community.

- Incorporation of sustainability projects in the 'Young Researchers' programme and the creation of a new subject focused on the development of research skills in sustainability issues.

- The intervention SP-DS01-IN05, which is specifically aimed at developing and enforcing an internal mechanism related to waste management and the cleanliness of public spaces in the school, has produced significant outcomes. The intervention involves weekly audits conducted by a teacher, who evaluates classroom performance according to various cleanliness and order-related indicators. Based on the average score, a color-coded flag is assigned to each classroom. Every week, all students receive a report via email containing the results for all classrooms. The results are communicated once a year to the entire school community through the school council.

6.2.2. Responsibilities and leadership

Responsibilities for sustainability are shared and attributed in somewhat distinct ways depending on the school and the country. In some cases, teachers are very well organised to promote action for sustainability, while in others, sustainability activities depend solely on the initiative of each teacher. In all cases, the commitment of the leadership and management of the organisation appears as an essential requirement

In **Finland**, the SamkeCO2 team (which includes at least one school-teacher) can elaborate plans and suggestions for sustainability, and either the principal, the management team, or teacher meeting has the power to decide about extracurricular pedagogical activities. Since 2022, one person has carried the main responsability for sustainability in Samke, but also two other teachers have become more active in promoting sustainability. One person leads the teachers' climate team and two other teachers share the responsability of leading the students' team.

In **Portugal**, the Educational Project document establishes the guidelines and defines the school mission, vision, principles, values, purposes, goals, and action strategy. The analysed school is part of the UNESCO Associated Schools Network, which is one of the policies to raise awareness of the educational community in the adoption of strategies that promote sustainable development, contributing to environmental and ethical awareness. Since 2022, with the introduction of the new normative documents, EB Camarate has significantly reinforced its sustainability activities, for instance through the implementation of the Eco-Schools Programme (with the school assuming direct responsibility for promoting active citizenship and environmentally sustainable behaviours), and strengthening of local partnerships (with the Loures Municipal Council and other community entities). Sustainability has been integrated into the daily management of the school cluster and the planning of school activities, and has been made a mandatory guiding principle clearly established in the internal regulation.

In **Romania**, the principal of the primary school is responsible for the planning, implementation and revision of the teaching objectives in the area of sustainable development. The plans and monitoring

reports are discussed and approved by the school council, and are supervised by the county inspectorates. The funding from national budget is channelled through the municipalities, which are responsible for the budgeting of the schools. The schools are therefore highly dependent on the municipality's decisions. Regarding the changes since 2022, all the three pre-university schools have now Administrative Councils, and implemented social dialogue and consultation, involving central and local authorities, educational staff, parents, students, and civil society organizations.

In **Spain**, the management team and the school council decide whether to participate in environmental education programmes (such as the ALDEA program), as well as which teacher will coordinate the activities to be undertaken and manage the programme at the school. Since 2022, the entities of environmental coordinators and the creation of the sustainability department in the school have been the most relevant changes, which improve coordination and help to maintain the efforts across the school as a whole. Also, the environmental coordinators serve as a communication channel between students at all levels and the activities that the school has been developing during the project.

6.2.3. Resources

In **Finland**, a person in charge of SamkeCO2-activities receives a salary bonus for organising extracurricular sustainability activities. Initially, no other resources were allocated to sustainability in the regular budget of the Sampo upper secondary school. However, the school received funding from the National Board of Education to enhance student engagement in sustainability education. Since 2022 there have been some improvements. During the ECF4CLIM project, sustainability has become established among priority areas in Samke. For example, during this project, the principal has allocated additional funds for sustainability action. The teacher leading the students' climate action team gets compensation for his/her work from the school's own budget.

In **Portugal,** initially no dedicated financial or human resources were allocated to sustainability work. Since 2022, the resources available for sustainability have been expanded and better defined in EB Camarate's new documents. This has involved in particular the development of local and external partnerships—such as those with the Loures Municipal Council, the Camarate Parish Council, and the Associação Bandeira Azul da Europa (ABAE)—which bring in additional financial and technical resources; clearer and more targeted deployment of internal human resources, achieved by coordinating sustainability-related school activities and better defining supervisory and monitoring roles within the Enrichment Curriculum Activities (AEC); and the strengthening of continuous training for both teachers and students, notably via active participation in the Eco-Schools programme, which enhances the school community's cognitive resources and internal competences.

In **Romania**, the funding for a CSD course comes directly from the regular national or local education budget, covering salaries and room expenses as part of the annual allocation. However, additional costs are hard to accommodate and typically require partnerships with local stakeholders or alternative project funds. Human resources are limited to existing school staff, with the initiating

teacher responsible for gathering all course materials. Since 2022, the budget remained insufficient due to other priorities for example the increasing of the defence budget (context of the conflict in Ukraine) and difficulties in the feed of the pension budget. However, the increasing of the salary of the teachers and staff was implemented in 2023 and 2024. The schools are implementing the mandatory measure for a complete Master's program in pedagogy for all new teachers. The schools introduced administrative measures to follow the continuous professional development measures. In terms of infrastructure an excellent development was observed: for computer technology, informatics, and robotics (Iulia Zamfirescu), computer network (Sercaia). At the same time the 3 structural interventions (installing PVs at Sercaia and Dragasani, installing water sensors at Mioveni) supported by ECF4CLIM created significant stimulation to develop new projects.

In **Spain**, the secondary schools that apply to the Aldea programme in Andalusia, can receive human and knowledge resources but not financial ones. Regarding human resources, the teachers involved in the programme benefit from a reduction in teaching hours. The regional government (Junta de Andalucía) itself produces the educational material for the Aldea program as well as training and support material for teachers. Since 2022, there has been some changes in this aspect. Regarding the financial resources, there have been savings due to energy production through the new photovoltaic panels and decrease in electricity consumption for cooling the classroom, due to the evaporative cooler system just installed. About the technical resources, there was a change regarding the company in charge of manage the wastes in the school. Also, the new company adapted their waste separation system to adapt it to the school requirements. The school has developed a revegetation plan in which students participated and made decisions regarding the tree's species, localisation of the most needed outdoor spaces, and the proper process of the planting supported by a company contracted by the school. Finally, about the human resources we would highlight the conscience of the educational community towards the right way to waste separation and treatment, with the development of awareness campaigns to encourage and motivate educational community into a more sustainable habit and carry out formation camps to learn more specifically how to communicate and how to arise awareness regarding sustainability.

6.2.4. *Contents of sustainability competences*

In general, the contents of the competencies are defined by the general curriculum programs, although at the level of each centre, each teacher gives the final content adapted to local circumstances.

In **Finland**, the National Core Curriculum for General Upper Secondary Education includes a large variety of sustainability issues, and some local courses are available. Initially, the annual plan based on curriculum (PESU) mentioned SamkeCO2 activities, including cooperation with the ECF4CLIM project. Since 2022, the annual plan of SAMKE based on the curriculum for 2024-2025 now includes some improvements from a sustainability viewpoint. For example, the curriculum emphasis outlined in the plan has changed, and now the SamkeCO2 activities (sustainable future, climate change, concrete actions) are one of the four emphases. The activities of the SamkeCO2 team are described

in detail in the plan, whereas in the previous plans, the students' team was only mentioned briefly. Furthermore, during the ECF4CLIM project, a planning cycle document for SamkeCO2 activities was created, and it will be updated frequently. In Spring 2025, students and teachers agreed themes for each month during the year. Each year, the SamkeCO2 students and teachers decide what kind of activities they will do, according to the themes. Another improvement is the actualisation of the main web page for the Samke CO2 team, now it includes more detailed information about sustainability action in Samke.

During the ECF4CLIM project, the action model for the SamkeCO2 students' team, which includes recycled t-shirt workshops for primary and lower secondary schools, has been created and established, and the activity now continues year by year. In Spring 2025, the teachers of the SamkeCO2 team decided that from now on, the SamkeCO2 teachers will not meet alone but always together with the student team. This is a great step forward because before the ECF4CLIM project, teachers met only together, and couldn´t engage students to activities. During the ECF4CLIM, they have had mostly separate meetings, but now they find cooperative meetings with students most effective way to promote sustainability in Samke.

In **Portugal**, the secondary school includes the "Citizenship and Development" subject, which is mandatory for several secondary school grades, and provides various contents of sustainability competences. Since 2022, the new documents reinforce the presence of sustainability within the school's curriculum and pedagogical practices. First, sustainability is clearly assumed as an integral curricular dimension, promoting the holistic development of students across environmental, social and civic dimensions. Second, the implementation of specific school projects with explicit objectives to improve environmental performance, including waste reduction and increased energy efficiency. Third, there is a greater integration and deepening of environmental education and sustainability in transversal educational projects, such as "Science in School", which directly address content related to good environmental practices, environmental science, and educational and community engagement.

In **Romania** (Iulia Zamfirescu school, Mioveni), sustainability-related extracurricular activities can be specified in the CSD. The school is involved currently in actions for environmental protection, thus contributing to the formation of capacities to act in a sustainable manner. Furthermore, in the last years the subject "Ecological education" has been a part of the educational programme for higher-secondary level (9 to 12 grades), within the CSD programme.

Since 2022, the extra-curricular activities organised in the Green Weeks was a priority. The cross-curricular topics were stimulated by the educational programmes developed by ECF4CLIM in the context of the implemented structural interventions. For Mioveni school, a dedicated educational material for water was developed by ECF4CLIM team and used by the teachers. The sustainable competences remain at the school decision level with important influence of the teacher's initiative and the capacity of teachers to launch interdisciplinary lessons, their specific duties and responsibilities are not explicitly defined in the national law. Teachers are expected to integrate sustainability themes, but the method and extent are largely left to local interpretation.

In **Spain,** initially there were not specific sustainability competences in IES Ítaca secondary school. Since 2022, there is the development of sustainability projects into the program "Young with Researchers" and the design and implementation of a new subject (FAB-IDI program) dedicated to educating students on topics related to research in sustainability and sustainable development.

6.3 Universities

6.3.1 Main changes since 2022

Finland:

− The initiatives mentioned in the previous Agreement between the University of Jyväskylä and the Ministry of Education and Culture have been realised: the curricula include more sustainability issues than before. Also, the new agreement has topics concerning sustainability, although the subject is not any more a strategic target of its own or among follow-up indicators.

− Through the new web page, the sustainability work of JYU is more clearly communicated than before. All students and teachers can easily find all the documents and modes of action, so they can be followed more easily than before.

− New rules:

  . Curricula of the University of Jyväskylä 2024-2028

  . "Sustainable and responsible university" web page https://www.jyu.fi/en/about-us/organisation-and-management/regulations-and-principles/sustainable-and-responsible-university

Portugal:

− National level: updated strategies such as the PNEC 2030 and the PAEX 2023-2027 have reinforced the role of education in promoting climate literacy, circular economy principles, and low-carbon behaviors.

− Within IST, the adoption of the Strategic Plan 2020–2030 has integrated sustainability as a central pillar across education, research, and operations. The creation of the Vice-Presidency for Sustainability and Infrastructure has further formalized institutional leadership in this area. Curricular innovations include the introduction of the "Climate Crisis and Just Transition" course unit and participation in the national educational model for sustainability in the energy transition. Additionally, campus sustainability initiatives, including the installation of solar panels and green infrastructure projects, have continued to advance.

− New rules:

- Strategic Plan 2020–2030 (updated) - A new Strategic Plan was adopted, replacing the previous 2015 strategy. The updated plan places <u>sustainability as a core pillar</u>, emphasizing the integration of sustainable practices across education, research, and campus management. It reflects a broader alignment with national and EU sustainability agendas.
- Creation of a Vice-President for Sustainability and Infrastructure The formal creation of the Vice-Presidency for Sustainability and Infrastructure was established through Despacho n.º 1109/2024 (published in the *Diário da República*). This new governance role reinforces the institution's leadership and accountability for sustainability policies, campus operations, and strategic partnerships.
- Curricula (programmes and course offerings) - Sustainability content continues to be integrated into various programmes and courses. IST has also expanded access to sustainability knowledge through online courses (MOOCs) and the new course unit "Climate Crisis and Just Transition", specifically designed to address sustainability challenges, environmental justice, and the skills needed for leading the energy and environmental transition. This course represents a significant step towards embedding sustainability competences across disciplines and student profiles.

Romania:

- In the autumn of 2023, the University of Pitești (UPIT) officially merged with the University Politehnica of Bucharest, one of Romania's most prestigious technical institutions. This strategic unification resulted in the formation of a new, larger academic entity: the University of Science and Technology Politehnica Bucharest (UNSTPB). The merger aimed to consolidate educational resources, enhance research capabilities, and expand academic offerings across a wider range of disciplines. By combining the strengths of both institutions, UNSTPB aspires to become a leading hub for innovation, technological advancement, and interdisciplinary education in Romania and the wider European academic space. In such context, UPIT was transformed into Centre University of Pitesti (CUPIT).

- The University of Science and Technology Politehnica Bucharest (UNSTPB) aligns its sustainable development strategy with the objectives of the 2030 Agenda and Romania's National Strategy for Sustainable Development. This strategy aims to integrate sustainability into all aspects of university activities, from education and research to infrastructure and community involvement.

- Strategic Objectives in Sustainable Development (upb.ro): (1) Strengthening Competencies in Fundamental Sciences and Engineering: UNSTPB aims to maintain and develop skills in fundamental sciences and engineering, which are essential for supporting sustainable technological development, (2) Fostering Transversal Competencies (Soft Skills)**.** The university encourages the development of students' social and relational skills, promoting foreign language learning, participation in mobility programs, and engagement in extracurricular and volunteer activities, (3) Promoting Green Energy and Energy Efficiency.

− Through projects such as integrating photovoltaic stations on campus, UNSTPB demonstrates its commitment to using renewable energy sources and reducing its carbon footprint.

− UNSTPB's strategy is fully aligned with Romania's National Strategy for Sustainable Development 2030, which focuses on implementing the 17 Sustainable Development Goals of the 2030 Agenda, adapted to the national context. (sgg.gov.ro)

Spain:

− Within the university, the services dedicated to sustainability issues (mobility, waste, biodiversity, energy, water, etc.) have been restructured to bring them under the umbrella of a single office (called the "Sustainability Office"). A new institutional architecture has been designed to regulate the relationships between the Vice-Rector's Office for Campuses, the Department of Architecture and Logistics, and the Sustainability Office. This affected the on-going ECF4CLIM activities.

− In parallel, there was a change in the university's governing team (there were elections), so all the ECF4CLIM project partners changed, and all the bonds of trust had to be rebuilt. This took a long time, but it was achieved.

− In 2023 a new 'Healthy and Sustainable Campus Plan' for the period 2023-2027 (Campus SiS) was approved. This Plan is framed within the Sustainable Development Goals (SDGs) of the United Nations (UN) 2030 Agenda and reinforces the contribution of the Universitat Autònoma de Barcelona (UAB) to their achievement, especially in the areas of health and sustainability. This new edition tries to promote synergies between teaching, research and campus management in order to develop innovative, interdisciplinary and participatory projects that have a direct and applied impact on the entire university community, as well as on the physical space of the UAB. The Plan is structured in 8 strategic lines that consider the areas of 'community' (active lifestyle, emotional wellbeing, healthy eating and leisure), 'campus' (mobility, resources, waste, energy, water, territory and biodiversity), and 'knowledge' (research, teaching, communication and learning).

− The ECF4CLIM project was chosen as an example of the type of actions that could be carried out at the university under the frame of this Healthy and Sustainable Plan, attempting to link research with action and teaching. Various actions implemented by our project have been adopted by the university as pilot tests that will be extrapolated to other faculties (such as the change in the waste management system) or will be continued in the future (such as the training cycle on the eco-social crisis).

− The UAB has taken the ECF4CLIM-linked Eco-social Crisis course as pilot to design a future cross-curricular course on sustainability and climate change, which will be offered to all University students. The UAB Rector's Office has currently created a committee made up of professors from different faculties to address this issue. The new course is expected to count 3 ECTS and to be launched in the 2027-2028 academic year.

6.3.2 Responsibilities and leadership

In this section, we highlight aspects related to the organisational structures, the implication of outsourcing of a number of environment-related services, and the curricula.

First, the universities have introduced several organisational measures and strategic plans to promote sustainability.

In **Finland**, JYU has a "Sustainable and responsible University" development group, which presents needs and suggests actions to be considered in the development and strategy work for Division of Policy & Planning. The members of the team consist of experts from various units of the university. Regarding the actualisations, since 2022, the new curricula of the JYU 2024-2028 was conducted during the ECF4CLIM project. The ECF4CLIM project was active in the process, all degree programmes should have included sustainability in their programmes.

In **Portugal**, since 2022 there have been several updates regarding the internal strategies and frameworks related to sustainability. Firstly, a new Strategic Plan was adopted, replacing the previous 2015 strategy. The Strategic Plan 2020-2030 places sustainability as a core pillar, emphasizing the integration of sustainable practices across education, research, and campus management. It reflects a broader alignment with national and EU sustainability agendas. Secondly, there was the formal creation of the Vice-Presidency for Sustainability and Infrastructure established through Despacho n.º 1109/2024 (published in the *Diário da República*). This new governance role reinforces the institution's leadership and accountability for sustainability policies, campus operations, and strategic partnerships. Thirdly, regarding the curricula (programmes and course offerings) sustainability content continues to be integrated into various programmes and courses. IST has also expanded access to sustainability knowledge through online courses (MOOCs) and the new course unit "Climate Crisis and Just Transition", specifically designed to address sustainability challenges, environmental justice, and the skills needed for leading the energy and environmental transition. This course represents a significant step towards embedding sustainability competences across disciplines and student profiles. Additionally, IST actively contributes to the development of the new national educational model for sustainability in the energy transition. This initiative, launched after 2022, aims to create interdisciplinary educational pathways that address the skills and knowledge needed for the energy transition, further strengthening IST's leadership role in sustainability education.

In **Romania,** a "Statement of the Rector Regarding the Quality Policy" is a part of the Strategic Plan of the university of Pitesti. The plan is coordinated by a vice-Rector in charge of the quality of education. The Rectorate and the Administration Council collaborate with the municipality in order to identify and implement the best ways to improve the performance in the operation of the buildings (from the point of view of energy, water, waste, etc.). The activities are implemented by the General Administrative Directorate. A new aspect to highlight is that following the 2023 merger of the University of Pitești and the University POLITEHNICA of Bucharest, University Center Pitesti (CUPIT) became an integral part of UNSTPB, continuing its legacy while contributing to the unified university's objectives.

In **Spain**, the UAB has a "Sustainable and healthy campus Plan" managed jointly by various administrative units (the Environment Office, the Mobility Office, the Energy Unit, Health care Service, Occupational risk prevention service, etc.), under the coordination of the University Social Responsibility unit. The Plan focuses on the sustainable management of the campus, but initially it didn't intend to influence the curriculum content and teaching methodologies. Since October 2022, there have been several changes affecting the project: on the one hand, during 2023 campus services dedicated to sustainability (energy, biodiversity, water, waste, mobility, etc.) were reorganized into a large department called the "Sustainability Office". A new person has been appointed to lead this office. This had consequences because it slowed down many of the agreements previously made with our project. It took a lot of work to rebuild relationships with that office and its associated services, but we finally succeeded. There's now a head of the Sustainability Office, who reports to the Logistics and Architecture Department, which in turn reports to the Vice-Rector of Campuses.

On the other hand, in October 2024, there were elections for the university government, and a new rectoral team assumed the governance. This entailed a series of changes in key people and interlocutors for our project, which also caused a delay in all our activities. In the end, the new vice-rector was informed of all the ECF4CLIM agreements and proposals, and we were able to reestablish trust with the vice-rectorate.

Second, the universities have delegated several of their services to external service providers, which limits the freedom of the choice that the university and its staff have in certain sustainability-related areas. The outsourced services include notably maintenance, cleaning services, food services, waste collection and recycling. The universities make agreements with specialised companies or independent ventures, and it is therefore difficult for them to renegotiate the terms and conditions for example to enhance sustainability before the agreement period has come to an end.

In **Finland**, the JYU is a co-owner of these companies, but these agreements tend to be established for a long period of time, and introducing changes is therefore possible only seldom, at the expiration of the agreement. In **Spain**, the UAB has great difficulties to improve waste management, which is the responsibility of the city council, and not of the university itself.

Third, teachers in all four universities have considerable freedom to introduce sustainability topics in their courses, but always within the framework of the general curriculum approved by the relevant educational authorities (the university, the quality control agencies, etc.). Therefore, whether teachers can actually use this possibility depends on whether the legally approved study plan allows it or not. Usually, the teachers can decide on what and how to teach on sustainable development, on the condition that the suggested teaching approach and contents align with the educational objectives outlined in the course description approved by the university, and supervised by the quality control bodies.

6.3.3   Resources

In **Finland**, the University of Jyväskylä has employed specialists for sustainability and responsibility. Furthermore, human resources are allocated to a teamwork and curriculum planning concerning sustainability, while knowledge-creation (cognitive resources) are provided through a project related to the cross-faculty community of sustainability experts, JYU.Wisdom. Since 2022, some extra resources were allocated to the planning work of the new study module "The basic studies of Multidisciplinary Sustainability Transitions". This new module is open to all the students in the university.

In **Portugal**, the period since 2022 has also seen an expansion of resources supporting sustainability at IST. Human resources were reinforced with the appointment of the Vice-President for Sustainability, whose mandate includes coordinating sustainability initiatives and overseeing the integration of sustainability objectives across education, research, and operations. Technical and financial resources have been mobilized through the Strategic Plan's infrastructure and innovation priorities. These include campus sustainability projects such as the installation of renewable energy systems, green infrastructure initiatives like the *Pensar Verde* programme (featuring green roofs, walls, and water recycling systems), and improvements to energy efficiency. Cognitive resources have expanded with the introduction of new curricular content, particularly the "Climate Crisis and Just Transition" course. Additionally, IST participates in the new national educational model for sustainability in the energy transition, providing students and faculty with access to innovative educational frameworks and practical experiences. Although the Técnico Sustentável platform continues to exist and supports sustainability projects, its role has been somewhat integrated into the broader institutional sustainability strategy led by the Vice-President. This transition reflects a move from project-based sustainability efforts to a more centralized and strategic approach.

In **Romania**, the Pitesti University can use the funds from the national budget (from the Ministry of Education) or its own funds (from student fees, research funding, contracts, etc) for courses related to sustainability. Since 2022, UNSTPB accessed funds for modernization from PNRR (digital tools, experimental infrastructure, development of HR). A course for sustainability dedicated to students form technical faculties was developed in the frame of ECF4CLIM project.

In **Spain**, most of the human and organisational resources rest within the administrative units of the UAB in charge of the environmental aspects of the campus (Environment Office, Mobility Table, Energy Unit). Some of the employees in these services have been specifically hired for sustainability-related projects. There are no remarkable changes due since autumn 2022.

6.3.4   Contents of sustainability competences

In **Finland**, JYU aims to be a leader in sustainable development and responsibility in Finland as well as internationally. To certify the quality of its sustainability work, JYU has received a number of green certificates (such as the WWF Green Office Certificate since 2013 and Fair-Trade University label since 2014), and is committed to promoting the principles and actions on sustainable

development and responsibility (such as those defined by the Council of Finnish Universities, UNIFI). Importantly, JYU has an environmental programme called "Roadmap of planetary well-being", and a campus development programme 2019-2030 which, among other things, proposes goals towards a 'responsible and sustainable campus'. An actualisation in this aspect is the "Sustainable and responsible university" web page (https://www.jyu.fi/en/about-us/organisation-and-management/regulations-and-principles/sustainable-and-responsible-university), which collects all information about sustainability at the university and it is a much celarer presentation than before, and also it includes links to all the norms and agreements of the university concerning sustainability, sustainability reports and persons in charge. The ECF4CLIM project didn´t have the resources to assess the new curricula through a systematic analysis, but we had a meeting with students from different faculties and had an exercise of looking at their own curriculum from a sustainability perspective. The student assessed that the contents include more sustainability issues than the previous curriculum.

In **Portugal**, the strategy for the future of IST gives priority to the implementation of a long-term sustainable strategy and to improving sustainability at the three IST campuses. Changes in the contents of sustainability competences at IST since 2022 have been both substantial and multi-dimensional. The new course "Climate Crisis and Just Transition" provides students with interdisciplinary knowledge covering climate science, the social dimensions of environmental challenges, and practical skills for driving sustainable transitions in various sectors. The Strategic Plan emphasizes the development of transversal competences such as critical thinking, problem-solving, responsible innovation, and active citizenship, all within the context of sustainability. Research and campus operations now offer additional opportunities for experiential learning, allowing students to engage with real-world sustainability projects addressing climate change mitigation and adaptation, energy efficiency, and circular economy principles.

Beyond the formal curriculum, IST continues to promote sustainability awareness and literacy through workshops, campus campaigns, and student-led initiatives. These activities complement the academic programmes and foster a culture of sustainability across the IST community. Overall, these changes position IST as an institution committed not only to teaching sustainability but also to embodying sustainable practices and fostering leadership in the transition towards a more sustainable society.

In **Romania**, the University of Pitesti has a course addressed to the students of the Faculty of Sciences on "Sustainable development". Environmental and economic dimensions seem to receive more attention than the social dimension. The course envisaged competences for graduates to apply the sustainability policies and strategies in public and private organisations. Since 2022 there has been some new measures regarding the contents of sustainability competences inside the university. Firstly, the ECF4CLIM team created a course titled "Sustainable Development in a Technological Society" for technical faculty students, organized into eight modules: (1) Introduction to Sustainable Development, (2) Technical Aspects of Sustainable Development, (3) Sustainable Resource Management, (4) Responsible Technological Development, (5) Green and Renewable Technologies, (6) Climate Change and Technical Adaptation, (7) Global Collaboration and the Future

of Technical Sustainability, and (8) Practical Sustainable Development Projects. Secondly, UNSTPB's strategic planning includes sustainability objectives—such as promoting green energy and sustainability education—yet it does not impose mandatory sustainability duties on individual professors, leaving their engagement flexible.

Overall, Romanian schools and universities enjoy broad autonomy to interpret and implement sustainability education; national legislation and institutional rules do not set strict obligations for individual educators. Instead, an encouragement-based approach provides opportunities, projects, and recommended practices, with actual cultivation of sustainability competences depending largely on individual initiative. This dual dynamic—national encouragement without rigid mandates—grants considerable freedom but also leads to variability in how effectively sustainability competences are addressed across institutions.

In **Spain**, UAB is well placed in the Greenmetrics ranking of universities, most of the objectives of the Campus Plan deal with the environmental dimension of sustainability. So far, there have been few changes in this area. Perhaps in the future, new curricula (which are currently being designed) will include sustainability competencies. However, we have managed to promote sustainability competencies through the course we organized within the framework of the ECF4CLIM project on the Ecosocial Crisis. Fifty-six students from across campus (from various faculties) enrolled, attended a series of lectures, and participated in various environmental volunteering activities (tutored by the course coordinators). The students were awarded 2 ECTS credits. The UAB Rector's Office has currently created a special Committee made up of teachers from different faculties to address this issue. The new course is expected to have 3 ECTS and to be launched in the 2027-2028 academic year.

7. CULTURAL-COGNITIVE COLLECTIVE COMPETENCES

In general terms, cultural-cognitive collective competences reflect the degree to which the primarily formal regulative and normative competences (laws, regulations, strategies, action plans, etc.) are internalised and have become an integral part of the dominant discourses, taken-for-granted collective norms, beliefs, and daily routines within the organisation.

Cultural-cognitive competences translate the regulative and normative competences into the organisation's operating culture and daily practices. Tey stress the fact that internal interpretive processes are shaped by the cultural, institutional, political, and economic settings within which they are embedded, including for instance the professional, disciplinary, and country-specific cultures.

Drawing on the categorisation presented in the initial ECF4CLIM Roadmap for sustainability competences, and in the analytical framework that we elaborated to conceptualise the interrelations between the three types of educational competencies that we have distinguished here (individual, collective and technical-material), we structure the following presentation of the findings from the SCTs and SCCs under five headings: rules and norms; curricula; resources; culture and values; and participatory learning possibilities. Here we offer an analysis based on the available evidence mainly from the interviews and deliberative workshops (SCTs meetings) (some excerpts from these sources are included as examples).

7.1. Rules and norms

7.1.1. New formal rules in the educational establishment in question

As already illustrated earlier, as a result of the interventions promoted by the ECF4CLIM project, most of participating schools and universities have developed new internal operating rules.

New regulations, programs, and strategic plans have been approved in (almost) all DS, giving greater emphasis to sustainability, energy savings, the circular economy, and the climate emergency. However, what the regulations propose not always can be done in practice, as there are several institutional obstacles, both internal and external, that prevent or hinder the application of these rules.

Here we provide qualitative evidence from the interviews and iterative focus group (SCTs) meetings. These are results that go beyond mere formal rules, as we analyse also perceptions about informal rules and the possible new organizational structures that the schools and universities have developed.

Basic schools:

The interventions have allowed for pilot tests that can generate different types of operating standards for the school, more adapted to sustainability. In this way, the interventions have led to new rules for the management of environmental and sustainability issues, such as waste separation

(including new rules for dealing with the collection company), plant care, and the organization of school trips. These rules vary in degree and are usually agreed upon by students and teachers.

Interview Teacher 2 (F), Basic school, Romania:

"As for the norms implemented in the school, they are mainly related to the reduction of unnecessary energy consumption, selective collection and the intention to increase the green area of the school. A series of actions were organized within the Green Week."

At the EB Bobadela school (Portugal), for example, a waste recycling competition was organised between classes, the best recycler class receiving an award. However, this action was not alone sufficient to improve the school's sustainability culture.

Interview Teacher 1 (F), Basic School, Portugal:

A school-wide contest was created with clear rules, but beyond that, no other rules were implemented. This alone did not improve the school's sustainability culture.

Intermediate / High schools:

Like in basic schools, the interventions in the intermediate and high schools have allowed for the introduction of new standards of behaviour in the educational community, including new daily norms, primarily related to environmental or sustainability issues promoted by the schools. In some cases, such as that of IES Itaca (Spain), these rules have been to a great degree formalised, for instance in the form of specific rewards for certain classes or students. The Samke high school in Finland changed its calendar for the next academic year, in response to ideas emerging during the pilot project on sustainability.

Student 1 (F), high school, Romania:

At the school, new rules were introduced for the selective collection of waste, as well as for saving resources.

Principal (F), high school, Spain:

Well, the environmental audits of each classroom are a norm that we have, where according to the flag each class has, there are then rewards or sanctions. So, if there is a red flag, the students will go out during a break to pick up the trash that others have left, and if there is a green flag for a long time, the winning class will win a trip, as a prize. So, that has changed the school a lot because it has become a norm to maintain one's classroom in a good position in terms of sustainability, energy consumption, turning off appliances, things that before... now there is an audit that didn't exist before.

Universities:

In some cases, sustainability has been formally incorporated into the university's strategic standards (as at the IST in Portugal), although it is not clear whether this is a consequence of our project's interventions or a legal or regulatory obligation. However, the two possibilities may complement

each other. In the case of the UAB (Spain), on the one hand, participants in the SCT student meetings noted that the Faculty had made changes in the internal organisation (mainly in relation to waste management), but, on the other hand, the teacher SCT expressed doubts about whether to establish standards of sustainable behaviour or instead rely on non-binding recommendations. Teachers are somewhat afraid that sustainability standards will force them to change their everyday behaviour patterns, which may not always be welcome (it may involve more effort and discomfort).

7.1.2. New informal rules

Basic schools:

Although explicit rules have not been drafted, the interventions have led to a visible change in the behaviours and practices of the educational community at the schools in the four countries.

> *Interview Teacher 3 (F), Basic School, Portugal:*
>
> The installation of recycling stations and a new internal waste collection circuit will continue and be improved. Training increased knowledge and led to practice changes.
>
> *Interview Student 2 (M), Basic school, Finland:*
>
> Chefs will hopefully take care of the vegetarian menu.
>
> *Interview Teacher 1 (F), Basic school 2, Romania:*
>
> Even if no formal rules were introduced, there has been a visible shift in informal behaviors—recycling, saving energy, and engaging in environmental discussions have become more common.
>
> *Interview Teacher 2 (F), Basic school, Spain:*
>
> Overall (including other activities) recycling has increased, paper consumption has decreased, children are aware of the light issue (they only turn on lights that are far from windows and turn them off when they leave), they no longer bring plastic bottles to school, sandwich wrappers are free of plastic and aluminum (not all of them).

Intermediate / High schools:

The situation is the same in the secondary school, as mentioned by one of the students interviewed in Finland, who expressed the idea that sorting trash has become 'normal'.

> *Student 2 (O), High school, Finland:*
>
> Recycling bottles and sorting waste has become normal at school.

Universities:

In Finland, the participating university appears to have strengthened certain existing practices rather than introducing new regulations.

Student 2 (F), University*, Finland:*

The project has supported what existed before, that is, strengthened the foundation of the previously existing practices, I would say.

Also in Spain, there were suggestions that the interventions carried out may have spurred internal changes, but these were expressed as assumptions rather than firm statements.

Teacher 1 (M), University, Spain:

Maybe the way we manage the garbage is different now, and it may have led to changes in internal behaviour. But I don't know for sure.

Even in this instance, where there is a significant lack of awareness about the Faculty's standards, participation in the ECF4CLIM project is believed to have help promote changes in the "culture of sustainability" at the educational establishment in question, by keeping the issue in debate for a period of several months.

Student 1 (F), University, Spain:

I can't say, because I don't know. I do know that the faculty has a line of action related to sustainability, but I don't know if new rules or guidelines have been created as a result of the interventions carried out. I think the changes in the "culture of sustainability" of the faculty are related to what I mentioned earlier about putting the issue on the table, talking about it, showing that it is necessary to act with visible actions and, ultimately, incorporating the issue into the agenda.

7.1.3. New organisational structures

Although not many new organizational structures have been created, some new developments have been observed, such as the creation of a "sustainability coordinator," the intention to create sustainability committees, and the intention to maintain the SCTs in operation also in the future.

Basic schools:

In general, no new organisational structures have been created, other than the SCTs and SCCs. Yet, our informants argued that these groups (formal but not part of the school's organisational structure) have allowed for the creation of new social relationships between students, teachers, and staff.

Interview Teacher 1 (F), Basic school 2, Romania:

Beyond the SCTs and SCCs, no formal structures were created, but collaboration between students, teachers, and school leadership improved significantly, paving the way for future joint initiatives.

In some cases, such as in the Portuguese and Finnish schools, these groups were embedded in pre-existing structures (committees, commissions, etc.), or pre-existing committees relating to Eco-Schools or similar. In other cases, they were formed specifically for this project.

Interview Principal (M), Basic school, Spain:

A network of students who collaborate in the garden (during lunch or recess), in the eco-code, and waste management awareness brigades. This didn't exist before. Some structures have been created based on the project (waste). The goal is to make them formal, stable, and long-lasting.

Basic school (Juhannuskylä, Finland, SCT6 for Students):

Participation in ECF4CLIM has been meaningful. The SCT participants expressed positive impact of the participation and of the interventions. Participation and collaboration with teachers have been meaningful. This collaboration started because of ECF4CLIM.

Intermediate and High schools:

At the intermediate and high schools, the creation of student and teacher groups has been highly valued, as these have seen to promote teamwork, which is considered a highly useful means of fostering learning and improving the school's performance in the area of sustainability.

Student 2 (O), High school, Finland:

The project resulted in the creation of a student environmental group.

Teacher 2 (F), High school, Romania:

At the school level, a working group (teachers and students) was formed who got and engaged in the activities of the ECF4CLIM project and popularized the objectives of this project.

In some cases, our informants expressed a desire to maintain these organised groups also in the future. For instance, in a high school in Spain, even a position of an "environmental coordinator" was created. In other cases, there are plans to redesign the groups and make them mixed (to include both students and teachers).

Principal (F), High school, Spain:

In the new organizational structure, the environmental coordinator (a teacher) also coordinates the environmental coordinators of the classrooms (students). That didn't exist before.(…) In that committee, I participate as director and [another teacher] as secretary, we have weekly meetings with the environmental coordinator to control everything that happens. So, there is a committee with students too and another only with the management, and the coordinator acts as the link.

Intermediate/High school (Samke, Finland, SCT6 for Students & Teachers):

In the future, the teachers' and students' sustainability teams will work together, not as separate groups, The annual plan for sustainability in SAMKE will be realized during the next year(s). Each month has a specific theme, and the members of the sustainability team will participate.

Universities:

As was the case in primary and secondary schools, the deliberative groups and workshops created during the ECF4CLIM project (SCTs and SCCs) are considered as new structures that can be sustained over time, given that they have helped create new networks of interrelationships among stakeholders interested in sustainability. Although they lack formal status, they are perceived as new organizational structures ideal for promoting sustainability and learning in this area.

Student 1 (M), University, Portugal:

I wouldn't say new structures were created, but the project established relationships that wouldn't have happened otherwise.

Teacher 2 (M), University, Romania:

The project contributed meaningfully to the emergence of new forms of collaboration and coordination within the university, particularly through the creation and implementation of the SCT and SCC. While these structures were developed in the context of the project and do not yet have formal status within the institution's organizational chart, they offered a valuable and replicable model for interdisciplinary, cross-functional cooperation in the field of sustainability. Even if these structures were initially developed as project-specific frameworks, their legacy can extend beyond the life of the project. They demonstrated the value of working in mixed teams and laid the groundwork for potential permanent structures that the university could choose to formalize in the future. Their function went beyond coordination: they served as platforms for co-creation, experimentation, and shared responsibility.

Teacher 2 (M), University, Spain:

It has consolidated a working group, or at least an informal network, among teachers who want to introduce the topic into our courses.

In some cases, it is suggested that these periodic groups or workshops be institutionalized in the form of sustainability committees or something similar.

Teacher 1 (M), University, Spain:

I don't know, but I think the Dean's Office should integrate these debates in some way, perhaps by creating a new 'sustainability committee' or similar.

However, in some cases (such as the University of Jyväskylä, in Finland), it turned out to be difficult for these deliberative groups and workshops to establish and maintain themselves over time, as

they conflict with the rest of the university's structures. This is an interesting warning, as it points to the need for sufficient resources to organise and maintain this type of ad hoc structures.

University (Jyväskylä, Finland, SCT6 for Students, Teachers & Staff):

Some participants raised the question of how this kind of international short-term projects can promote sustainability, because the structures of the university are so strong and it is hard to reach the goals of the projects in this context.

7.2. Written curricula

One way to observe changes in collective competencies is through the potential influence that the interventions had on teaching curricula. This can occur by introducing new sustainability content into existing courses, or by creating new courses on the topic.

7.2.1. Integration and harmonization

Basic schools:

In some cases, such as in the Finnish, Portuguese and Romanian schools, no new subject was introduced, but sustainability issues were integrated in the teaching of other subjects (for example, in English classes). As a result of our project's interventions, it seems that these topics are being addressed (intermittently) in an increasing number of teaching subjects. Thus, although the curriculum has not changed, sustainability appears to be increasingly discussed in the classroom.

Student 1 (F), Basic school, Finland:

Not in individual classes, but as part of theme days. In English class, for example, recycling issues are discussed in more detail. It seems that they are now seen as more important than before.

Teacher 1 (F), Basic school 2, Romania:

Yes, sustainability topics have been introduced in several lessons, even in cross-curricular ways. We hope this will become a permanent practice and that the positive outcomes will foster continuity.

The ECF4CLIM project's interventions have also helped to introduce practical sustainability work into subjects that already included theoretical sustainability content. In this way, the content already included in the curriculum is reinforced.

Teacher 1 (F), Basic school, Portugal:

The project helped put the natural sciences curriculum into practice, especially in the 8th grade, where the focus is on Earth's sustainability.

The interventions appear to have in many cases encouraged teachers to introduce theoretical and practical sustainability content into their teaching. However, this appears to be the case only in some courses, or among some of the most conscientious teachers.

Student 4 (F), Basic school, Romania:

I believe that the project and the interventions encouraged the environmental theme. Teachers have become more open in approaching these elements in lessons, more inclined towards the practical part, useful in everyday life.

Teacher 2 (F), Basic school, Spain:

There are no changes. The new law's textbooks are very focused on sustainability topics (SDGs, projects, etc.), but only the most conscientious teachers include them in the current curriculum. In the fifth grade, there's a values subject that includes sustainability. In the other grades, there's less emphasis on it.

This is also related to the perception that curricula leave little room for new content. Raising awareness among teachers not yet engaged in sustainability work will require long-term efforts to incorporate sustainability more forcefully and rigorously into the classroom teaching.

Student 3 (M), Basic school, Romania:
No, the project has not changed the way of teaching. It is possible that this will occur in the long term. The practical activities are very interesting. ECF4CLIM provided a working model.

However, this will not be easy without a significant investment in teacher training.

Basic school (Sercaia, Romania) (SCT5, Teachers & Staff):

While renewable energy topics were introduced, the intervention highlighted the need for broader curriculum adaptation and teacher training to ensure effective and lasting educational benefits.

Intermediate and high schools:

There are examples of schools where sustainability seems to be more frequently discussed and incorporated in the teaching activities. It seems that curricula have not changed, but there is a greater prominence of these issues. Romania's high school presents many examples of this.

Student 1 (F), High school, Romania:

During the classes, in various disciplines, discussions about sustainability, the environment and climate change are more present. Based on the elements provided by the project, changes have gradually emerged that will be consolidated in the coming period, taking into account the current promising results.

Principal (M), High school, Romania:

During school and extracurricular activities, sustainability and sustainable development were often addressed. Over time, this knowledge about sustainability and sustainable development will be present in the contents of most school subjects.

Yet, there are still cases in which students acknowledge that they have not observed any changes in the teaching content. This would indicate that progress has not been equal across the different demonstration sites. Undoubtedly, many contextual factors can explain why similar interventions have different academic outcomes at different demonstration sites.

Student 1 (F), High school, Finland:

I haven't noticed this affecting the content of the teaching.

Teachers, in some cases (such as the Finnish one), tend to claim that students aren't always willing to spend their time learning more about sustainability. The pressure to do well on final exams outweighs their interest in learning about these topics, especially outside of class.

Intermediate/High school (Samke, Finland) (SCT5, Teachers):

The remarks from teachers reflected their experience of students not being interested in sustainability. They claimed that students' main interest is graduation exams. Teachers planned and suggested a climate course for the extra study week, where students had to participate, but could choose a course they liked or found relevant for themselves. Only one student from whole Tampere region wanted to participate in the climate course. The students from Samke either applied for an English course as they would have their English graduation exams next or they chose theme courses that were outdoor excursions and sports like slalom and skiing. The course in mother tongue was not chosen either, as they will have their graduation exams of this subject only later, in a year's time.

The comments from our informants also included the notion that the concept of sustainability typically included in the academic curricula is too narrow, and that a broader concept is needed. The findings from ECF4CLIM suggest that there is a dispute over how to teach sustainability at the intermediate and high schools.

Intermediate/High school (Samke, Finland) (SCT5, Teachers):

The curriculum both enables subject-oriented and subject-based sustainability education, but constrains holistic education and possibilities of gaining a bigger picture and systematic perspectives of climate change, for example.

Universities:

Sustainability content, as at the other educational levels, is increasingly present in university classes. It is not normally part of the curriculum, but both students and professors perceive that class topics are shifting in this direction. Sometimes, this is driven by events that take place outside of normal teaching, such as themed days or weeks organised by the universities.

Teacher 1 (F), University, Portugal:

As promoter of the Flash Week activity, it introduced sustainability themes in the Architecture course. Although not permanent in the curriculum, it raised awareness among students and teachers.

University (Jyväskylä, Finland) (SCT5 report):

There are still not many mandatory courses, but optional courses have increased. Some aspects of sustainability competence were missing, like political agency, critical thinking and adaptability, or in some faculties, the descriptions were quite general, without references to specific competences described in GreenComp.

Sometimes, sustainability is introduced as part of very specific subjects, without affecting the rest of the teaching provided at the Faculty.

Student 2 (M), University, Spain:

This [the introduction of sustainability contents in the curriculum] has not happened, except for the Environmental Sociology subject.

For now, these topics appear to be addressed in parallel training activities, but there is a certain demand for the incorporation of these contents into regular curricula, to ensure that they would not be seen as exceptional but rather as part of normal teaching practices.

Some universities anticipate that, as a result of recent legal reforms, sustainability principles will be included in many university courses in the future.

University (UNSTPB Pitesti, Romania) (SCT5, Teachers & Staff):

There is a clear intention to expand the integration of sustainability principles across all engineering programs, building on the successful practices introduced during the project.

At the Finnish university, the ECF4CLIM project interventions took place at a time when the school's future curriculum was being redefined. These interventions therefore influenced the curriculum design by helping to incorporate a broader perspective on sustainability.

University (Jyväskylä, Finland) (SCT5 report):

At the meeting on 2 December 2024, students assessed their new curriculum. They recognised improvements in the curriculum from a sustainability viewpoint. Sustainable development themes are mentioned in almost all subject courses, part of the course content. Students find incorporating sustainability in studies still challenging.

University (Jyväskylä, Finland) (SCT5 report):

One interviewee said that the ECF4CLIM project changed the process of curriculum reform towards sustainability, or at least strongly contributed to the change, and there was a

permanent change in curricula. The ways of doing things (regarding climate change, etc.) have broadened.

However, the students are sceptical that these new content and ways of interpreting sustainability will ultimately be integrated in classroom teaching. They believe that what the curriculum says is one thing and what teachers teach in the classroom is another.

University (Jyväskylä, Finland) (SCT5 report):

Students felt that the intervention with curriculum reform and sustainability was fruitful, and the new curriculum has more sustainability content than the last curriculum before it. There is still much to do: the whole courses in sustainability in different faculties are rare, and there were also suspicions of whether the written curriculum will also be the lived curriculum in the classes.

This concern was also expressed by some teachers, who believed there should be some type of study or monitoring to confirm that what is decided in the curriculum reaches the classrooms.

University (Jyväskylä, Finland) (SCT5, Teachers):

At the meeting, there was a discussion that during the curriculum reform process, some sustainability issues were included in the curriculum in all faculties, and that is important, because the curriculum is like a law book, you must obey it. Some teachers said that we must remember that besides the objectives in the curriculum, there are more specific contents, and it would be very interesting to conduct research on how objectives and sustainability is implemented there. She has a hunch that there is less than in objectives, and teachers have too big responsibility in implementing the sustainability issues into their teaching.

However, and conversely, there are also teachers who believe that what the curriculum says isn't that important; what matters is what people do in their daily lives. Therefore, sustainability can be taught even if the curriculum does not oblige teachers to do so.

University (Jyväskylä, Finland) (SCT5, Teachers):

One teacher said though that it is important to live sustainability, but not so important to write it into the curriculum.

7.2.2. New curricular units or courses

Basic schools:

Although no new subjects have been created in general, there are indications that some attempts to this effect have been made. For example, in one of the schools in Romania, as a result of our project's interventions, it appears that a subject on "environmental education" will be introduced into one of the courses.

Teacher 1 (F), Basic school, Romania:

Through this project, we managed to introduce "Education for the environment" in the fifth grade, by CDD. In this course, students also come into contact with photovoltaic panels, their role and their advantages. I think the changes will not stop here as the actions can be diverse.

Teacher 2 (F), Basic school, Romania:

The project had, in my opinion, notable effects in improving the teaching plans, because the teachers carried out activities in which they addressed aspects of sustainability. The curriculum of the optional "Education for" in the fifth grade was also created.

Intermediate and High schools:

At the Spanish secondary school (IES Itaca), our informants noted that thanks to an external research project on sustainability, a subject that didn't previously exist was introduced. The ECF4CLIM project has served to strengthen and maintain it. This is a good example of how a project of this type can contribute to transforming teaching, and even influence the school's curriculum.

Principal (F), High school, Spain:

Well, the curriculum has changed because we have many projects that have been introduced into the subjects. In Young Researchers, a lot has been done, each year a part of sustainability has been investigated and it has had effects on the school. (…) In fact, there is a specific subject associated with that project, which didn't exist before. And it will last over time.

Universities:

Several of the participating universities have designed, approved and/or implemented, during the project, courses or curricular units on sustainability or climate change. At the Finnish university, one of the interventions of the ECF4CLIM project was the design of training activities for teachers and the organization of a seminar to discuss the future contents of the degrees in terms of sustainability. At the ITS in Portugal, a new course on climate crisis was introduced during the project (although the decision had already been made before).

Teacher 2 (F), University, Portugal:

A new curricular unit, "Climate Crisis and Fair Transition", was introduced in 2023–24 for all first-year undergraduates across every IST degree program. This course embeds core sustainability topics from the very start of students' academic journeys and is formally listed in the course catalogue. With broad faculty backing, it is expected to remain a permanent offering.

The UNSTPB Pitesti University in Romania has designed a specialized course on sustainability. Although the course has not yet started, the programme is available for consultation and is ready to be implemented soon. In this case, the design is a direct product of one of the ECF4CLIM project interventions.

Teacher 2 (M), University, Romania:

The project has brought a meaningful and lasting contribution to the improvement of academic teaching plans, particularly through the development and integration of a dedicated course on sustainability. (…) One of the key strengths of the course is its modular structure, which provides both flexibility and adaptability. This design allows it to be tailored to different academic contexts, specializations, and teaching methods. (…)

University (UNSTPB Pitesti, Romania) (SCT5, Students):

The good planning allowed the successful completion of the stages consisting of defining the contents and writing the text of the course. At the moment the course is available to be consulted by those interested. In this way, a foundation was made for its future introduction in the school curriculum, after going through the necessary approvals and approvals.

It should be noted that this course has a professional orientation, focusing on how to interpret and manage sustainability in a business organisation. The course therefore reflects a management-focused concept of sustainability.

University (UNSTPB Pitesti, Romania) (SCT6, Teachers & Staff):

The intervention [the designed course] is mainly focused on the aspects of the sustainability connected with the activity of companies and other economic units. The aspects at the level of society are treated in a secondary way.

At the UAB (Spain), one of the interventions was the design and implementation of a 2-credit course aimed at students from any teaching programme offered by the university. The course focused on a critical view of the eco-social crisis, with a very broad and philosophical concept of sustainability. It included expert speakers, generated debates on campus sustainability, and established interconnection networks between students and teachers from various faculties.

University (UAB, Spain) (SCT6 report):

Educational offering of the training course on eco-social crisis, listening to and learning from the aware population and the generation of new frameworks and new questions to ask oneself.

University (UAB, Spain) (SCT6 report):

Eco-social course as a 2-credit subject for the entire campus, fosters the creation of networks and involved professionals to exert institutional pressure

7.3.   Resources

Although analytically they can be distinguished, in practice it is difficult to separate the concepts of human, economic-financial, and time resources, as they appear to be constantly interrelated.

7.3.1.   Human

Basic schools:

One of the factors that seem to favour learning about sustainability is the presence of teachers who are aware of and willing to innovate and put those teachings into practice. Typically, each school has a small number of teachers who are very active in fostering sustainability, who do extra work additional to their work obligations, and who manage to carry out projects and teach with a commitment to these issues. Generally, all schools are calling for more resources for sustainability, especially people willing to teach from this perspective.

Our informants underlined that the key is not only to have more teachers, but also to ensure the contribution made by these teachers is adequately recognised.

> *Principal (F), Basic school, Romania:*
>
> In order to continue to get involved, it would be necessary to have a clear sustainability strategy, support from the management team and recognition of the efforts made.

In schools where this happens, it's often because the school leadership is committed to promoting sustainability, caring for teachers, and influencing students.

> *Basic school (CEIP Mozard, Spain) (SCT5, Students):*
>
> There was a general consensus that the intervention was successful because participants were organized, dedicated time to the activities, and enjoyed the planting process. The presence of the school director was a motivating factor.

Intermediate and high schools:

Some schools associated with eco-school or green school networks already have commitments to dedicate teacher hours to coordinating and ensuring compliance with sustainability goals.

> *Student 1 (F), High school, Romania:*
>
> The school currently allocates human resources and funds to promote sustainability. It is a school that follows the pattern of green schools.

Participation in our project has allowed some schools to free up teacher hours and dedicate them to interventions to improve sustainability.

> *Principal (M), High school, Romania:*
>
> Participation in this project led to the allocation of more human resources and time to promote sustainability and to a small extent of financial resources.

Some schools have created the role of an "environmental coordinator," a teacher who can dedicate a certain number of working hours to promoting sustainability at the school.

> *Principal (F), High school, Spain:*

Human resources is that to create the figure of the environmental coordinator, we have to dedicate specific weekly hours to it, which is... from the entire distribution of hours in the center, we have allocated those figures. So, those are indeed human resources because we could dedicate them to other activities in the center, and they have been dedicated...

Universities:

There is a feeling at the universities that it is very difficult to obtain additional resources, whether these be human or other, and that it is therefore unlikely that major changes would occur. However, projects like ECF4CLIM help create a sense of urgency and opportunity around sustainability, which in the long term can push the universities to dedicate more resources to sustainability. However, so far, this has not happened.

Teacher 2 (M), University, Romania:

At this stage, the project has not directly led to a significant increase in the allocation of resources—whether financial, human, or time—dedicated specifically to sustainability initiatives within the university. The institutional budget and staffing levels have remained largely unchanged during the project's implementation period. However, it is important to view this in the broader context of a gradual cultural and strategic shift. The project helped create a shared sense of urgency and opportunity around sustainability, which can motivate decision-makers to allocate more resources in the near future.

At the universities, the precarious contractual conditions of a significant part of the professors are cited to justify the limited sustainability demands they make. It is not that they would not be concerned or committed to sustainability, but rather that their position within the institution makes it difficult for them to make these demands.

University (Jyväskylä, Finland) (SCT5, Teachers):

Teachers also don't want to be too difficult employees with big demands, because they don´t have permanent jobs and they have a mortgage to pay and a family to support. The university hierarchy makes making a change difficult.

7.3.2. *Economic, financial support*

Basic Schools:

The availability and the lack of economic and financial resources are key factors in promoting sustainability, at least in a context where sustainability is not a major part of the curriculum. The ECF4CLIM project has provided financial resources to design and implement several sustainability interventions at each demonstration site. This has been highly valued in all cases, as it has allowed for the launch of pilot tests that have provided data, context, and networks for advancing sustainability in education.

Student 2 (M), Basic school, Finland:

The project has brought in money. More time has been spent on this. The students have been able to do things even after class.

Teacher 2, Basic school, Romania:

I think the project has led the school to allocate more resources, especially time and human, because sustainability was seen as a priority.

One of the ways we have funded our project has been by "purchasing" working hours of teachers, to enable them to dedicate themselves to the project. Time is the other key variable, often inseparable from economic and financial resources.

Basic school (Juhannuskylä, Finland, SCT5, Teachers & Staff)

The division of the resources should be different, and more resources allocated to projects. Enthusiastic teachers do really much, and at the same time, some teachers don´t do their part. In this project, money has been used to buy working time and to compensate extra work, and it has motivated teachers to do things.

The cost of interventions to improve the sustainability of educational establishments is often too high to be borne by the schools themselves. Therefore, our informants suggested to seek additional funding from public administrations or local industries.

Basic school (Dragasani, Romania) (SCT5, Students):

Financial resources were restricted to the project's budget. Greater collaboration with the city hall and local industries could have secured additional funding, allowing for a more extensive intervention.

Intermediate and high schools:

The economic issue is a barrier also for most high schools, as is the lack of time and human resources. However, some consider the lack of economic and financial resources to be more problematic, an obstacle that requires constant search for solutions.

Teacher 1 (F), High school, Romania:

Human resources and time are always easy to find. To a lesser extent, financial resources, but solutions are constantly being sought.

Even in schools that are part of eco-school networks, it is observed that funding is never sufficient to meet the proposed objectives. This is the case even though these schools tend to be the ones investing the most in sustainability.

Student 3 (F), High school, Romania:

The school always allocates resources to improve the performance of the infrastructure and to education for sustainability, being an eco-school and wanting to be certified as a

green school. Sometimes the needs of the school are high enough and the funds insufficient.

From the schools' perspective, investment in sustainability often has positive impacts on energy use and water savings, etc. It is not conceived as an expense, but rather as an investment.

The lack of financial resources means that even the most dedicated teachers have to take on additional tasks to implement sustainability interventions.

Intermediate/High school (Samke, Finland, SCT5, Teachers):

If there is too little money and restrictions on how to use money. That constrains sustainability action. No money for e.g. emptying bottle recycling bins, but teachers need to do it as extra duty with their own cars.

In this sense, the small contributions from the ECF4CLIM project have been essential to enable the pilot interventions.

Certain interventions require greater financial resources, hence our informants suggested that collaboration between public administrations and sponsoring companies be sought.

Intermediate/High school (Mioveni, Romania) (SCT5, Students):

The complete modernization of the sanitary groups requires significant funds, only through the contribution of the municipality and sponsors could be made.

Universities:

Some universities (such as those in Portugal and Spain) have seen a slight increase in financial (non-human) resources dedicated to sustainability. However, it seems that the momentum of the ECF4CLIM project has been used to strengthen strategic orientations that the university had previously proposed.

There is also a perception that sustainability is not a priority for universities, and that many activities are carried out because some teachers and staff members are committed to it, which can place an unjustified burden on these individuals. Many informants considered that instead of leaving the issue at the mercy of individual initiative, the university should assume the responsibility for promoting sustainability, and allocate adequate budget funding to the purpose. Unfortunately, the context of scarce economic and financial resources in which universities operate seems to hinder this commitment.

University (Jyväskylä, Finland) (SCT5, Teachers):

Leaders can allocate some money, but this is hard because there are also many other priorities besides sustainability. Teachers and lower administration do not have the resources, mainly time, to make big reforms, and some think that it is not even their responsibility, with lower salaries compared to deans and rectors. Some also feel that they

don't have a mandate to make decisions or changes. (…) The weak economic situation and decreasing government grants don't promise good news for sustainability efforts.

7.3.3.   Time

Basic school:

The key to implementing most of the interventions derived from our project has been that the involved schools have been willing to allocate teacher and student time to carry them out. Often, the problems in implementing these interventions have stemmed from the lack of time on the part of students and teachers, who are often overworked or have very rigid and strict schedules, leaving little time for activities outside of the school curricula.

In some of the interventions, we observed that teachers and students complained about the large amount of time they had to dedicate to the activity, which was often voluntary and unrecognised.

Basic school (Bobadela, Portugal) (SCT5, Teachers & Staff):

The time that the waste counting required from the teachers who participated was excessive.

In particular, the participatory process introduced by ECF4CLIM has also been extremely time-consuming. At some schools, it has been very difficult to find time for students and teachers to attend group meetings (SCTs and SCCs).

Basic school (Juhannuskylä, Finland) (SCT5, Teachers & Staff):

Hectic school and working life, difficulties to organise time for meetings.

Basic school (Juhannuskylä, Finland) (SCT5, Teachers & Staff):

Teachers have used time more than regular working hours for the project. Available team meeting times haven´t been enough for organizing things. Many things are going on simultaneously: swimming swifts for classes, teacher's own projects, and so on. The teachers in the sustainability team are very active with many things. There is not enough time. Teachers do too much work in their free time, but at the same time, they have a bad consciousness that they don´t do enough.

Our informants noted that teachers are often involved in numerous school activities, and that it is therefore often difficult to count on them to commit themselves to a process involving multiple meetings over an extended period of time.

Basic school (Juhannuskylä, Finland) (SCT6, Teachers & Staff)

There are too many extra projects and goals given to the schools and teachers. There is a real risk of not being able to concentrate properly on anything -> frustration and decreased learning. The extra goals and projects/ goals of education should be critically scrutinized. Main recommendation: To reach the goals of sustainability education in the curriculum, extra time

needs to be allocated to its implementation, planning and collaboration, without time resources it is not possible.

All this shows that this methodology should not be applied in isolation but rather should be part of the school's strategy and organisation. Otherwise, there is a risk of overburdening students and teachers.

In the Romanian case, not only were there no delays, but the intervention was aligned with a previously planned infrastructure renovation at the school, which made things much easier (something the school's management appreciated). This reinforces the idea that it is better to have an overarching strategy into which this methodology fits.

Basic school (Sercaia, Romania) (SCT5, Students):

The entire process, from installation to completion, was carried out within the planned timeframe, showcasing effective project management and coordination. This timely execution was crucial, ensuring minimal disruption to the school's regular activities and demonstrating that with careful planning and collaboration, complex projects can be completed efficiently and on schedule.

In this case, not only were there no delays, but the intervention was aligned with a previously planned infrastructure renovation at the center, which made things much easier (something the center's management appreciated). This reinforces the idea that it is better to have a global strategy into which this methodology fits.

Intermediate / High schools:

In some cases, lack of time made it difficult to spend the resources provided by the project. For example, although it had been planned to free up some teaching hours to allow teachers to participate in project interventions, work overload and lack of time prevented this.

Intermediate/High school (Samke, Finland) (SCT5, Teachers):

But there are also restrictions that cause problems in the use of money from ECF4CLIM. This has been a challenge, as teachers are not willing to having substitute teachers for their work, thus e.g. participate in further education events. Time limits restrict the use of money for further development of sustainability education in the school.

However, among the students there was a perception that teachers had devoted more time to promoting sustainability.

Interview Student 2 (O), High school, Finland:

I'm not familiar with the school's use of resources, but at least the teachers are spending time at the school promoting sustainability through the project.

Universities:

In general, universities operate within a time-based structure that makes it difficult for members of the university community to engage in participatory processes for sustainability. It's often difficult to include teachers, students, and staff in deliberative groups and workshops, although when they do manage to participate, they often found the experience motivating and useful.

University (UAB, Spain) (SCT6, Students):

The group has highlighted, in particular, the lack of time in daily university life to ensure the success of the implementations

University (Jyväskylä, Finland) (SCT5, Students):

A student stated that time management challenges have been an obstacle in students' engagement.

Teachers who decide to get involved often do so at the cost of complicating their personal lives, taking time away from other professional or domestic tasks.

University (Jyväskylä, Finland) (SCT6, Students, Teachers & Staff):

In the curriculum reform, new sustainability contents were planned. There aren't though new resources to implement those plans, so they mean even more busyness in the lives of teachers. Busyness was seen to be the most relevant barrier to promoting sustainability.

7.4. Culture and values

7.4.1. *Sustainability in all activities*

Basic schools:

According to some students, thanks to the ECF4CLIM project activities (interventions and group meetings), sustainability seems to be addressed in more areas and teaching spaces than before.

Student 2 (M), Basic school 2, Romania:

I believe so. Some teachers started including more sustainability topics in their lessons, even when it's not directly related to science. And now we have more discussions in class about how to improve things in school, which didn't happen so often before.

Teacher 5 (F), Basic school, Portugal:

It helped improve coordination across subjects and promoted development proposals [related to sustainability].

Sustainability has been integrated into more spaces in the schools, but it doesn't seem to reach all students, only those most directly involved. The rest of them seem to remain on the sidelines. Therefore, greater communication and awareness efforts are needed, as well as the design of

strategies to transmit this knowledge and attitudes to future generations of students. These strategies may involve incentivising students to join green-school networks or similar initiatives.

Basic school (Sercaia, Romania) (SCT5, Teachers & staff):

There is a limited student involvement and knowledge transfer. While some students benefited, others were not engaged, leading to gaps in skill development and understanding of solar energy concepts. Future generations of students also need structured ways to inherit this knowledge.

Concern about how to sustain interventions and activities over time was expressed at several demonstration sites. It was suggested that they should be linked to strategies that go beyond the school (such as eco-school networks or similar), as well as ensuring effective leadership and promoting volunteerism.

Basic school (CEIP Mozart, Spain) (SCT5, Teachers & Staff):

However, the main challenge identified was the difficulty in maintaining activities in the long term. It is crucial to ensure the presence of the leadership team, promote volunteerism, and reinforce environmental awareness discourse and climate change education.

The interventions designed through the ECF4CLIM project have managed to extend sustainability to more spaces and times within schools. However, they were not always seen as effective, either because students did not embrace the principles of sustainability or because teachers did not recognise its importance.

Basic school (Bobadela, Portugal) (SCT5, Students):

The way the competition was designed doesn't work, even though it had some results.

Basic school (Juhannuskylä, Finland) (SCT6, Teachers & Staff):

They [the teachers] however expressed how they had not always considered the team meetings as relevant and the process had been not well integrated in schools' life.

A certain tension was detected between the rhetorics and practice – between what would have to be done and what actually is or could be done. This was already one of the findings of the preliminary analysis on collective competences conducted in 2022 (D4.1), and is confirmed by the evidence collected so far.

Intermediate / High schools:

As was the case in primary schools, teachers in secondary schools also perceive that sustainability has a greater presence and is a topic of debate in today's schools. This is not attributable to our project, but the pilot tests may have contributed to reinforcing this trend.

Teacher 1 (F), High school, Romania:

In the past, themes such as sustainability or environmental protection, responsible use of resources, awareness of environmental problems received little attention. Today they are recurring themes in daily discussions.

However, it is also said that sustainability is not usually a priority for schools, which are often more concerned with ensuring that students achieve good academic results.

Intermediate/High school (Mioveni, Romania) (SCT5, Students):

Sustainability is not the main priority of school. The school is focused on students' results in tests and exams, a condition for success in life in Romania.

Universities:

Although sustainability is increasingly recognised as a topic of concern in educational settings, it was noted that there are diverse and partly conflicting understandings of what "sustainability" means. It was noted that there are multiple concurrent meanings, and that in the educational field, it is common that different people to refer to different things when they talk about sustainability. Within the same university, for example, different concepts of sustainability are taught and implemented in different faculties. Furthermore, sustainability often remains only a discourse and is rarely put into practice. The definition of sustainability also conditions the extent to which the notion can be translated into practice.

University (Jyväskylä, Finland) (SCT5, Teachers):

It is not even clear what sustainability means in JYU. There are different interpretations and definitions. Many times, sustainability is rhetoric and not applied in practice. There is some research on sustainability, but still, in different faculties, they implement sustainability goals differently. In the initial assessment of faculties before the curriculum reform, the assessments varied a lot: some faculties stated that sustainability issues are strong in their faculty, but compared with some others, those were just at the beginning stage. Some other faculty members said that there is still much to do, but when compared with others, they had done much more than most of the others.

University (Jyväskylä, Finland) (SCT5, Teachers):

One participant at a meeting said that if there are demands for including sustainability in the curriculum, the teachers can stretch the definition or the concept of sustainability, and after that, everything is sustainability, and real change doesn't happen. Sustainability will be only rhetoric.

7.4.2. *Openness (links with the outside world)*

Basic schools:

Our findings suggest that sustainability can only be achieved, maintained, and become part of learning if the school community connects with the outside world. Collaboration with municipalities, neighbourhoods, local communities, students' families, local businesses, industries, etc., seems to be essential.

In some cases, such as the school in Portugal, collaboration (or lack thereof) with the cleaning company and the municipality has been a key factor in explaining the success or failure of the interventions.

Basic school (Bobadela, Portugal) (SCT5 report):

Waste management by the company responsible for it also faces problems, with staff having to go outside to dispose of all the waste produced, as the company does not enter the school premises.

These relationships can not only serve to improve sustainability within the school, but the benefits go also in the opposite direction: student activities can improve sustainability in the neighbourhood, municipality, and surrounding area.

Basic school (Sercaia, Romania) (SCT6 report):

Students discussed the formation of a working group during the summer to focus on sustainability efforts in their village, aiming to reinforce their environmental impact beyond the school setting.

These external relationships can also contribute to finding financial resources to finance certain school activities (related to sustainability).

Basic school (Dragasani, Romania) (SCT5, Students):

To enhance the impact of such interventions: Engaging sponsors and raising awareness within the local community to secure financial support for a larger-scale implementation.

Relationships with families appear also to be key to creating these bonds. Expanding school learning into the family environment is perceived as both beneficial and potentially fruitful.

Student 1 (F), Basic school 2, Romania:

Yes, the project didn't stay only at school. I shared, is useful in life. Part of what I learned influenced, to some extent, the family. My parents are now interested in solar panels and they pay attention to recycling. Also, discussions with colleagues and friends may have created some elements of change.

Basic school (CEIP Mozart, Spain) (SCT5, Teachers & Staff):

It is important to raise awareness among parents to get them involved in the initiative. And increase publicity and involve the external community in schools.

In fact, there is evidence to suggest that when sustainability habits are not cultivated within the family, it is more difficult to do so in the school setting (although the causal relationship of this hypothesis is difficult to confirm, because causality can operate in both directions).

Basic school (Bobadela, Portugal) (SCT5, Students):

Changing habits remains a challenge, particularly when not cultivated at home.

A proposal was made to replicate experiences (interventions) at other schools in the region, so as to allow for sharing good practices and achieving economies of scale to improve and facilitate the necessary investments.

Basic school (Sercaia, Romania) (SCT5, Students):

In order to maximize the impact of the intervention, it would be beneficial to expand the implementation to additional schools. By replicating the project in multiple schools, we could take advantage of economies of scale, lowering costs per installation and increasing the overall environmental impact. This would also foster a broader community of practice, where schools could share best practices, learnings, and challenges. The possibility of a networked approach could also enhance student engagement by creating a sense of shared purpose and interconnectedness between schools.

Intermediate / High schools:

Here, too, there are signs of links with actors outside the school, such as families and local communities, with whom efforts are made to share knowledge, information, and practices. However, teachers and school principals, considered these links with families still too few, and regretted not being able to reach more families.

Principal (F), High school, Spain:

Thanks to the project, the environmental awareness of the educational community has improved (…) in general, yes, but it is true that we haven't reached families as much as I would have liked.

In some cases, such as in Finland, meetings have been organised with the deliberative groups (SCTs) of several schools, as well as with other stakeholders such as city councils, utility companies, etc.

Intermediate/High school (Samke, Finland) (SCT6, Students & Teachers):

In the committee meetings, it was great to have the meetings with another demonstration site, Juhannuskylä school, and have members from outside their own school (like lunch services, the administration of the Tampere municipality, the advisory board of ECF4CLIM).

Links with external stakeholders are perceived as a potential way of ensuring the continuity of the project. The school commitments seem to be better expressed when external stakeholders are involved.

Intermediate/High school (Camarate, Portugal) (SCT5, Teachers):

A strong reliance on external actors and partnerships (e.g., municipality, research teams) also revealed the importance of institutional commitment for long-term continuity.

Similarly, relationships with external actors can hinder certain interventions that exceed the school's own powers. In the Portuguese case, for example, an intervention could not be carried out as planned due to long delays caused by bureaucratic procedures on the part of the city council. It is therefore not enough to design good ideas; it is also necessary to forge the social and institutional connections necessary to carry them out.

Intermediate/High school (Camarate, Portugal) (SCT5, Teachers):

Students were surprised by how much time and bureaucracy the process involved. Many had assumed the project would be implemented quickly and hadn't anticipated that external actors, like the municipality, would have such a strong impact on the timeline. One important learning point was that having a good idea is not enough—support, planning, and resources are crucial. They also learned about their own limitations as students in influencing institutional processes and recognised the importance of partnership and persistence.

Universities:

Just as in primary and secondary schools, our informants and partners at the universities also believed that sustainability projects would be more powerful, more likely to be sustained over time, and more effective if they could count on the support of external entities, such as city councils, local communities, or businesses. This is believed to enhance the learning experience for students.

Teacher 2 (M), University, Romania:

My participation in the project has definitely influenced my perspective and encouraged me to think beyond the boundaries of the university when it comes to promoting sustainability. I am considering establishing a stronger and more efficient collaboration with the local organisations. This would help create a supportive network that can facilitate the practical implementation of the sustainability course and enhance its real-world impact.

Some teachers acknowledge that, in some ways, their participation in the ECF4CLIM project has taught them the importance of establishing relationships with external stakeholders.

7.4.3. Partnerships and cooperation

Basic schools:

Cooperation between different types of stakeholders, both internal and external to the school, was perceived as desirable and necessary for promoting sustainability at the schools. On the one hand, in the interventions carried out under the ECF4CLIM project, there has been close cooperation between students, teachers, and staff.

Teacher 6 (F), Basic school, Portugal:

Project activities were shared with the educational community.

Basic school (Dragasani, Romania) (SCT5, Teachers & staff):

A high level of cooperation between the project's team and the school administration was instrumental in ensuring the smooth execution and overall success of the initiative. This partnership facilitated efficient decision-making and problem-solving throughout the project.

Basic school (Juhannuskylä, Finland) (SCT6, Teachers & Staff):

The teachers reflected that the role of ECF4CLIM has been remarkable enabler of all the activities. It has made the work more meaningful, awareness of being a part of a bigger "movement", work for sustainability education and that their work can contribute even on EU level. (…) They also considered researchers' presence and facilitation as very positive and relevant enabler.

On the other hand, there were also been examples of cooperation with stakeholders outside the school, as they are often necessary for the functioning of the school itself. This is the case for example in Finland, where primary and secondary schools operate as part of the municipal management structures.

Basic school (Juhannuskylä, Finland) (SCT5, Students):

Municipality owns the schools in Finland and the municipality has a a significant role at schools, enabling infrastructure for sustainable behaviour like recycling and school canteens.

Cooperation with private companies can be vital, as well, as was the case in Portugal, with the waste collection company as a necessary actor in establishing the new mutually agreed rules and implementing them in practice.

Basic school (Bobadela, Portugal) (SCT5, Teachers & Staff):

The placement of containers to separate waste continues and will be accompanied by more training for the school community and meetings with the management company (which belongs to the Municipality of Loures) to facilitate the waste separation process.

Different actors often have different languages, different knowledge, diverging interests, etc. Hence, it is necessary to design interdisciplinary or transdisciplinary strategies.

Teacher 6 (F), Basic school, Portugal:

The project was discussed and developed in an interdisciplinary way. I believe it will continue that way.

Intermediate / High schools:

Close cooperation among various stakeholders is essential. This requires fostering interdisciplinarity, to foster dialogue between the perceptions, knowledge, and interests of these various stakeholders. Sustainability interventions require combining various types of knowledge

and perspectives, as well as flexible project organisation. In this regard, it is essential for schools to have strategies and knowhow necessary for the organisation and management of interdisciplinary projects.

Intermediate/High school (Mioveni, Romania) (SCT6, Teachers & Staff):

One of the most notable outcomes was the significant improvement in collaboration across both pedagogical and administrative domains. The method fostered stronger teamwork, encouraging cross-disciplinary cooperation. It also supported structured and detailed planning—essential for identifying barriers, assessing enabling factors, and formulating practical, context-sensitive solutions.

Universities:

Internal cooperation among various stakeholders within the same university is not easy. Although such cooperation was considered necessary for carrying out interdisciplinary sustainability projects, its practical application encounters several institutional barriers, including those defining the roles of faculty members. Our informants noted that faculty members value above all autonomy, that is, the freedom of the professor to decide how to organise her teaching and other professional activities. Faculty members are therefore not highly open to support and advice from their colleagues. This has been evident in some of our partner universities, where it has been difficult to establish links with professors from other departments or faculties.

University (Jyväskylä, Finland) (SCT5, Teachers):

Even though it was clear that participating in curriculum reform at other faculties would not be easy, it turned out to be even more difficult than we had anticipated. We created a substantial amount of material for faculties to use and offered free workshops of various lengths to support their curriculum planning around sustainability. However, no one requested our services—we had to "invite ourselves" to some events. Some staff members were suspicious, wondering who we were, what we wanted from them, and whether we had the competence to support them. One teacher even confirmed this by saying he had googled us to assess our expertise in sustainability and education. One explanation offered was that teachers value their autonomy. They feel they must create their own materials and content in order to maintain their professional identity as educators—no one else can do it for them.

University (UAB, Spain) (SCT5, Students):

The intervention has operated as we expected, but we believe there are still many aspects to improve for it to be fully effective. There are many stakeholders to consider within the faculty, a network that has become more visible with this measure.

It was suggested that to achieve significant sustainability transformations on campuses, it would be necessary to forge networks of alliances and collaborations that are active and powerful enough to put pressure on university institutions.

From this perspective, interdisciplinarity was seen as essential for progress toward sustainability, and valued for its potential to create networks of committed actors.

University (UNSTPB Pitesti, Romania) (SCT6, Students):

Students also appreciated the interdisciplinary nature of the project, with one highlighting "We worked interdisciplinary" and another noting: "It opened up new project ideas and directions". This exposure to diverse perspectives and collaborative approaches helped broaden their thinking and sparked new academic and professional interests.

University (UAB, Spain) (SCT6, Students):

On the other hand, we find that the group of the training course on the socio-ecological crisis is very powerful, and they are keen to do things, the fact of opening it to other faculties and seeking this interdisciplinarity could generate an even more powerful network.

7.5. Participatory learning possibilities

7.5.1. Seminars, events, theme days or weeks, etc.

Basic schools:

Participatory events related to sustainability are held in almost all schools. These are usually special days or weeks dedicated to environmental issues. They are often a good opportunity to showcase data, share knowledge, and raise awareness among students, teachers, and families. Sometimes these are periodic events such as the Green Week, organised by external organisations, to which the school participates.

Basic school (Sercaia, Romania) (SCT6, Teachers & Staff):

The participants are focused on the next action, the Green Week dedicated to environmental awareness and sustainability education. This event is intended to involve students, staff, and the wider school community in activities such as clean-up campaigns, competitions, and debates.

Also the schools sometimes organise sustainability-related activities.

Basic school (Juhannuskylä, Finland) (SCT6, Students):

Sustainability is more talked about and more visible at our school due to ECF4CLIM. Campaigns, especially the 'Earth Hour' and 'Recycled Toys' received very positive feedback and more participants than expected. During the campaign days teachers raise more sustainability issues in their classes. Friends have been interested as well.

Basic school (Juhannuskylä, Finland) (SCT6, Teachers & Staff)):

The campaign for the Vegetarian Food and Recipe Contest has been a success. Students have been asking about the results and recipes during the lessons. The impact of the intervention spread to the families. The students have been asking if the tasting of vegan food and sweets could be repeated.

Our informants noted that these activities are planned well in advance, may involve the entire school or only a few classes, and require significant organisational and logistical effort. They are considered key moments for the dissemination of sustainable ideas and practices, although their impact is not always widespread. For example, a waste recycling event organised by a Portuguese school was very successful among the participating classes but was ignored by the rest of the school.

Basic school (Bobadela, Portugal) (SCT5, Teachers & Staff):

Widespread participation from all eighth-grade classes. But little interest from the classes that did not participate in the competition.

Intermediate / High schools:

No reference to this type of events was found in the high schools SCT/SCC report sources or in the interviews. This does not mean that such events would not have taken place – simply that they have not been mentioned in the indicated sources.

Universities:

Events to disseminate and discuss sustainability issues are common at universities. Project participants mentioned examples such as seminars to discuss the role of sustainability in curricula, and a lecture series on sustainability and climate change. These types of events appear to have a broad impact on the institutions, both among those who attend and those who do not, as publicity about the event helps to raise awareness of the topic.

University (Jyväskylä, Finland) (SCT5, Teachers):

The main obstacle was that the faculties didn't have time or interest to cooperate with researchers with the sustainability in the curriculum. The researchers were outsiders. The greatest success was the cooperation with students. The students invited and got all the faculties to the Curriculum and Sustainability seminar to discuss about sustainability in curricula, and that was a huge success.

University (UAB, Spain) (SCT6, Teachers):

The organization of a series of talks on sustainability and climate change has served to raise awareness and raise awareness of these issues among students and faculty. Even those who didn't attend were able to see the posters around the Faculty, giving the impression that this was a relevant topic that someone was addressing appropriately.

7.5.2.   *Visibility, information campaigns, social media*

Basic schools:

The visibility of sustainability interventions is considered highly important. Several schools reported that they have carried out information and awareness campaigns using both analog and digital media.

Student 2 (M), Basic school, Finland:

Worm teams and campaign days have been established.

Basic school (CEIP Mozart, Spain) (SCT5, Teachers & Staff):

Using digital posters or increasing the digitalization of the project would improve the intervention impact. Also expanding information dissemination to all courses.

In some cases, it was believed that communication should also be directed to the local community and families, to gain support and allow for more ambitious and longer-term interventions.

Basic school (Dragasani, Romania) (SCT5, Teachers & staff):

Another area for improvement involves enhancing the school's public recognition and reputation by improving communication efforts. Despite the success of the initiative, its full potential could be further leveraged through more strategic outreach and promotion. Raising awareness about the project—both within the school community and beyond—could help attract additional support, encourage more student engagement, and position the school as a leader in sustainability initiatives. This could be achieved through: (1) stronger media presence, (2) educational outreach, (3) networking and partnerships.

Internal communication among the organisation implementing the interventions is also important, because poor communication can generate, for example, false expectations among students and teachers.

Basic school (CEIP Mozart, Spain) (SCT5, Students):

Communication strategies were not as effective as expected, which negatively impacted the organization of the event. (Students thought they would plant in an urban garden, but instead, they planted at the school, leading to confusion).

Intermediate / High schools:

Newsletters containing the information collected were distributed among the school communities, and information about the project was in some cases spread also in other schools. Another means of disseminating information were posters hung on the toilet walls.

Student 2 (O), High school, Finland:

Because of the project, the environmental group has made bulletins about sustainability-related information and has also gone to other schools to teach sustainability.

Student 1 (F), High school, Romania:

Yes. To a large extent, for example, thanks to the posters placed in the toilets, the whole school found out quickly and efficiently about the intervention. In an extremely simple way, the interest in sustainability has increased for many students.

The project's interventions have also helped to improve the school's visibility in its surrounding area. This appears to have an impact on the school's prestige in its surroundings. This could help, for instance, to attract students. In this way, sustainability could be used as a tool that allows schools to distinguish themselves from others, and to attract students from certain youth categories. This could perhaps also be interpreted as a mechanism of school segregation.

Principal (M), High school, Romania:

By carrying out the project, the prestige of the school has increased and implicitly the visibility of sustainability information in the school and in the school community has improved.

Universities:

The environmental impact data produced as part of the interventions have been disseminated throughout the universities. This can help create conditions for positive transformation, and could help guide action.

Teacher 1 (M), University, Spain:

In a way, yes. Data has been disseminated on waste, pollution, etc.

University (Jyväskylä, Finland) (SCT5, Students):

Announcements, bulletins, discussions, and platforms on the curriculum reform and the seminar were important for this intervention to succeed

In some cases, it was reported that delays in certain interventions prevented them for being properly visualized.

Teacher 2 (F), University, Portugal:

I hope visibility improves greatly, hence the construction of the green sustainability showcase space. It's taking longer than planned but once completed it will play a key role in communicating our work.

7.5.3. Activities and encouragement for students

Basic schools:

The participatory design of the ECF4CLIM project is perceived as a very powerful mechanism for student engagement, as it generates a sense of belonging, shared responsibilities, and

identification with the objectives of the activities. It also serves as a space for expression and deliberation, something considered important for learning.

Basic school (Bobadela, Portugal) (SCT6, Teachers & Staff):

The participatory approach was seen as essential in developing a culture of shared responsibility. Rather than assigning tasks to specific individuals or departments, the process fostered a collective sense of ownership and engagement with sustainability goals.

Basic school (Dragasani, Romania) (SCT6, Students):

Everyone had a voice, the sessions made participation easier and more inclusive. Teachers and students worked together as equals; we learned from each other. These activities allowed us to stay better engaged.

The project's participatory design has also helped to create a collaborative relationship between students and teachers, distinct from the purely hierarchical one typically found in the classroom.

Basic school (Sercaia, Romania) (SCT6, Students):

A central theme was the collaborative relationship between students and teachers. Reflections such as "students and teachers learned together" and "group work became real teamwork" reflect a shift toward shared learning experiences. Listening to others before deciding, valuing different perspectives, and acknowledging that adults trusted students more over time contributed to stronger, more inclusive decision-making.

Basic school (CEIP Mozart, Spain) (SCT6, Teachers & Staff):

They (teachers) emphasise collaborative and community-wide processes, underscoring that an effective teamwork grounded in active listening, transparent communication and inclusive participation encompassing the whole educational community is the bedrock on which meaningful environmental action must rest.

It was suggested that one way to increase the interest of students in sustainability, and to thereby improve learning, is to promote better coordination of their various academic projects and work, within a framework consistent with the tenets of sustainability.

Teacher 1 (F), Basic school, Portugal:

The project helped to highlight the need to coordinate students' work across various school projects with complementary objectives.

Also the teaching style significantly affects students' ability and willingness to engage in sustainability issues. It was mentioned that as a result of their experience from participating in the ECF4CLIM project, some teachers have changed their teaching style, which has been highly appreciated by students.

Student 1 (F), Basic school 2, Romania:

I think some of the teachers were impressed by what can be done and changed their teaching style. I hope that these changes will be lasting, that they will not disappear after the end of the project.

The educational innovation represented by the participatory interventions within the ECF4CLIM project has only reached a limited number of students. Efforts could be made to reach the majority of the students, who currently seem to be somewhat marginalised by sustainability projects.

In addition to efforts at involving all students, it is necessary to create mechanisms to transfer the acquired knowledge to future students. In some cases, it was suggested that older students serve as sustainability mentors for younger students.

Basic school (Sercaia, Romania) (SCT5, Teachers & staff):

There is a need for inclusive student engagement and knowledge transfer – Develop structured programs to involve all students, not just a select group, and create mechanisms for passing knowledge to future generations through mentorship, peer teaching, or dedicated sustainability clubs.

Basic school (Bobadela, Portugal) (SCT5, Teachers & Staff):

Put the students who participated in previous years to train the younger ones before the competition begins.

Most of the ECF4CLIM project interventions have involved some degree of transformation in the school practices. This seems to have contributed to a greater engagement of the participating students, who have learned to better use of the available educational resources.

Basic school (Dragasani, Romania) (SCT5, Students):

One of the most remarkable aspects of the project was witnessing the transformation of a mere idea into a tangible reality. Not only was the implementation successful, but it also followed the planned timeline, proving that with strong collaboration and clear direction, such initiatives are achievable.

Some interventions have managed to engage students and spur some changes in habits, but it is unclear whether this is because the students have internalised the principles of sustainability or for other, more instrumental reasons (such as winning a competition).

Basic school (Bobadela, Portugal) (SCT5, Teachers & Staff):

It remains to be seen whether the students' commitment is due to a desire to recycle, which would mean it will continue, or if it was driven by the goal of winning the competition, in which case it ended with the competition. The competition intervention will not be repeated in the same format, and the school is evaluating how it will create a new version. The

competition being based on the weight per recycled bag was an idea that seemed to be a success, but was an error.

Intermediate / High schools:

In general, there is agreement that the students who participated in the SCTs and SCCs were highly and actively involved. In this sense, the participatory and inclusive design of the interventions was key to encouraging students to take part and take ownership of the results. Group work was one of the aspects most valued by students in the deliberative workshops.

Intermediate/High school (Samke, Finland) (SCT6, Students & Teachers):

One of the key contributions of the hybrid participatory methodology is its inclusive nature. Rather than targeting a single group—such as only students or only teachers—it actively involves all segments of the school community: students, teachers, staff, management, and sometimes even parents. This inclusiveness has fostered a stronger sense of shared purpose and belonging among participants.

Intermediate/High school (Mioveni, Romania) (SCT6, Students):

"Teamwork" (6 votes) emerged as the top-ranked contribution, expressing the collaborative spirit fostered by the ECF4CLIM project. It highlights how essential cooperation, mutual support, and shared responsibilities were in achieving meaningful outcomes. (…) "Building a cooperative work environment, based on openness in discussion and mutual trust" (5 votes) is the most meaningful outcomes of the ECF4CLIM project. This collaborative spirit not only strengthened relationships among peers but also created the right context for deeper learning and shared responsibility. Within this supportive environment, the participants were able to explore and understand what a sustainable future is.

However, it was noted that not all students were able to participate, but only those who were part of the SCTs and SCCs. There is regret that students from other courses, as well as teachers, could not be included.

The interventions appear to have fostered greater understanding of sustainability, and the practical activities carried out may have helped improve the sustainability culture in the school.

Student 3 (F), High school, Romania:

The culture of sustainability has improved through a deeper understanding of the phenomena and through the practical activities carried out.

An observation was made that the interventions have acted as pilot test cases demonstrating what can be done, and thus convincing the students about the possibility of change.

Intermediate/High school (Mioveni, Romania) (SCT6, Students)

"Demonstration as a relevant example for others" (3 votes) underscores the students' awareness of their role as changemakers within their communities. It reflects a strong sense of

responsibility to lead by example, showing that the solutions and behaviors developed during the ECF4CLIM project can inspire others to act.

Universities:

The participatory design of the interventions was considered to have attracted some students namely those that were concerned about sustainability. The group work it entailed, as well as the inclusive processes of listening, co-creation, and co-decision, were fundamental in this regard.

University (UNSTPB Pitesti, Romania) (SCT6, Teachers & Staff):

The most appreciated aspects were the collaborative problem-solving, interdisciplinary teamwork, and students' ability to stay aligned on shared sustainability goals. Respectful dialogue and valuing diverse opinions were seen as essential to these outcomes

Some universities offer credits (ECTS) to students who participate in activities or training related to sustainability. This is also a good way to engage students.

Student 1 (M), University, Portugal:

In my master's course 'Environmental Design I (DAmb-I), I developed the garden project, and thus earned credits. Repeating this in more courses would engage the community in sustainability.

University (UAB, Spain) (SCT6, Students):

Enrolling in the ecosocial crisis course entitles you to two credits. This is very attractive for students in their final years.

Sustainability is a topic so transversal that it can be learned and practiced both within the school and beyond. This is appealing especially to those students, who are already considering taking action in their neighbourhood or city.

Student 1 (F), University, Romania:

Not yet, but probably after the graduation I will be more involved in the efforts of the local community for sustainability.

Student 1 (F), University, Spain:

Yes. Participation in the project has pushed me to look for other forms of participation in this line. Specifically, I will most likely participate in a project on the sustainability of the food system in the city of Barcelona (lasting approximately one and a half years). And it has also motivated me to see that the field of ecosocial transition is of particular interest to me in terms of guiding my future academic and work plans.

A common problem with this type of participatory process, observed also in ECF4CLIM, is that the people who sign up tend to be those who are already convinced about the importance of the topic, not those who would most benefit from participation.

University (Jyväskylä, Finland) (SCT5, Students):

One challenge is that those already most aware of sustainability are the ones who are most motivated and will engage with these kinds of projects and interventions, so the audience doesn´t get wider easily.

Another problem with participatory processes that have a long duration is the high turnover of staff, teachers, and students. Often this means that the process has to start from scratch time and again.

University (Jyväskylä, Finland) (SCT5, Students):

The students in the administration and representatives in the students' union change regularly, so with this kind of long-term projects, it is hard to keep on permanent teams with them.

7.5.4. *Accounting and monitoring*

Basic schools:

Several of the project's interventions have generated data on electricity and water consumption, air quality, waste generation, etc. This has allowed us to estimate the environmental performance of the participating schools and universities, according to selected indicators. These data allow us to assess the effectiveness of the interventions and constitute a powerful means of awareness-raising, which can spur changes in behaviours and practices. Making data on environmental impacts visible is not neutral; rather, it guides action (either improving or maintaining the improvements achieved).

Teacher 3 (F), Basic school, Portugal:

Sharing of data collected through audits and surveys made environmental impacts more visible.

Principal (M), Basic school, Spain:

The eco-audit found that 80% (of CO_2 emissions) were due to heating and the impact of transportation. It was surprising. The project helps put the impacts of the project's activities in black and white, thus raising awareness. It's important to provide examples that children can understand (swimming pools, trees, etc.); the accuracy of the data isn't as important.

The data obtained through the interventions have also been used as teaching material in the classrooms.

Teacher 1 (F), Basic school 2, Romania:

Yes, through monitoring activities. Students discussed energy production, and data was analyzed during lessons. Awareness and transparency increased among both students and teachers.

In some schools, the collected data appears not to have been disseminated at all, or was distributed very selectively. This may undermine the transformative power of the intervention.

Student 1 (F), Basic school, Finland:

It is not. [No data available].

Student 2 (M), Basic school, Finland:

There is a little more. No statistical data is displayed.

Teacher 4 (F), Basic school, Portugal:

There was no noticeable improvement.

Teacher 2 (F), Basic school, Spain:

The data hasn't been widely visible; it hasn't been presented to the teachers. The clothing data has been widely publicized and has had more impact.

Finally, one of the difficulties encountered with some of the interventions, especially those requiring the installation of equipment or devices, was the lack of provisions for their maintenance and repair. This was perceived as a problem that the schools should address, requiring more financial resources and systematic scheduling.

Basic school (Dragasani, Romania) (SCT5, Teachers & staff):

Although the initial installation was successfully completed, long-term maintenance and potential technical malfunctions were not yet addressed within the project framework. Establishing clear maintenance protocols and assigning responsibilities for system upkeep will be essential for ensuring the project's longevity.

Intermediate / High schools:

Generating data on the school's environmental impacts has improved the awareness of teachers and staff members of the situation of their school in terms of its environmental performance. This has allowed them to learn that sustainability encompasses a much broader range of areas than they had previously thought.

Principal (F), High school, Spain:

Well, it has contributed a lot because it has allowed us to realize, for example, that particles in air quality are also important, classroom comfort is important, not just recycling. Sustainability, recycling, well, we have learned that sustainability is many things.

Our partners at secondary schools also expressed doubts about how the long-term maintenance of the projects will be carried out, as this currently appears to be neither planned nor budgeted for. In one case, it was reported that the trees that were planted had not grown as expected because no one watered them during the summer.

Intermediate/High school (Mioveni, Romania) (SCT5, Teachers & Staff):

Fears on the maintenance (cost, difficulties) – In particular, the administrative staff looked at the change with suspicion, having fears about the costs of maintenance and who does it.

Intermediate/High school (IES Itaca, Spain) (Students):

Lack of care during the summer slows down tree growth

Universities:

Generating data to evaluate the university's environmental performance is something that students and teachers value highly.

University (UAB, Spain) (SCT6, Teachers):

One of the results is the visibility and awareness of the impacts of our eating habits, something very important in an institution like the university. Among the results, it is also worth highlighting the visibility of other environmental impacts of the university community (use of transportation, water use, etc.), as well as certain environmental aspects that the university suffers from (such as air pollution).

Data on the university's environmental impact have been discussed primarily at deliberative workshops (SCTs and SCCs). It was noted that the data should have been more widely disseminated and discussed among the entire university community.

Teacher 2 (M), University, Romania:

I would say the project contributed to improving the visibility of environmental data and sustainability information, but to a relatively small extent so far. Most of the discussions and sharing of data related to environmental assessments and sustainability indicators took place within the internal frameworks of the SCT and SCC. The visibility of such data beyond these groups—to the wider university community including students, faculty outside the involved departments, and administrative staff—remains limited.

In some cases, there was a lack of transparency among university institutions, which are not always willing to disseminate and share campus environmental data.

University (UAB, Spain) (SCT5, Students):

Among some of the proposals or reactions from the participants regarding the intervention, we can highlight: the need for data transparency from the faculty, the importance of conducting pilot tests like this one (of the intervention), and that although there are aspects to improve (such as the size of the plastic bags or the material the bins are made of), it is a very good starting point to bring to the table and make visible the need for selective waste collection at the faculty.

The importance of having the university's environmental and sustainability data and understanding its implications became clear at a meeting with faculty members at the UAB (Spain). They had not given much thought to the issue of waste management until they learned the magnitude of the

data. From then on, the faculty members were able to understand its environmental, social, economic, and other implications.

University (UAB, Spain) (SCT5, Teachers):

The discussion was relaxed and the participants expressed themselves freely, but there was a sense that they were being asked about things that didn't interest them. The issue of waste didn't seem to be among their concerns. Only after learning about the data generated by the project, they did begin to take a slight interest.

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Framework for a Low Carbon Economy and Sustainability through Education
Task 6.1: Collective competences for sustainability

8. CONTRIBUTION TO THE EFC4CLIM ROADMAP

The ECF4CLIM Roadmap outlines a four-step process: Engagement, Connections, Visions, and Action, each of which requires specific collective competences. In this section, we explore how the evidence on collective competences gathered through our hybrid participatory approach aligns with the competences- suggested in the initial roadmap.
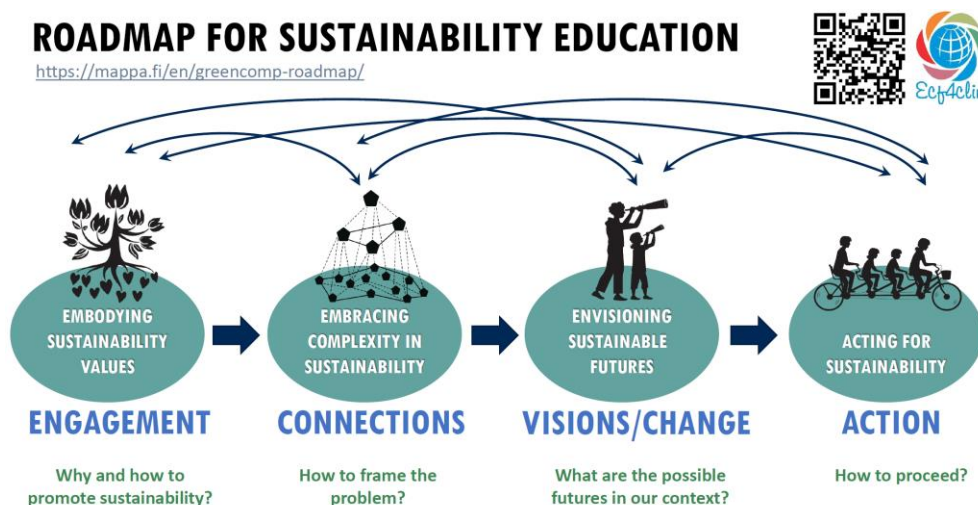
As detailed in the methods section, during sessions 5 of the SCTs and SCCs, each Demonstration Site (DS) collaborated closely with the research team to select one or two interventions for in-depth evaluation, and participants were invited to reflect on the factors that facilitated and those that hindered the development of the selected intervention, with particular emphasis on the interrelationship between the three analytical dimensions of sustainability – the environmental, the social, and the economic dimension. In the SCT6, similar questions were addressed on the project in general, both on the results obtained and on the iterative participatory process applied throughout the project. The evidence presented here comes from the analysis of the reports from the last two SCTs (SCT5 and SCT6) and from the interviews conducted with students and faculty from each SD.

8.1. Engagement

This step of the roadmap aims at promoting collective understanding of the meaning of sustainability and engaging wide audiences by facilitating inclusive dialogue on sustainability. Moreover, the aim is to foreground fairness and critical awareness of how our practices can

promote sustainability. This phase of engaging and involving people is essential for strengthening their motivation to participate and work together for sustainability.

Table 3: Proposed content for the 'engagement' step of the Roadmap

ENGAGEMENT	
Engagement through a participative approach	- Time and place for joint discussions in the community - Engaged management - Involving and engaging a diverse range of people
Sustainability knowledge as a common ground for discussion	- Incorporating sustainability in every discipline and subject (curriculum) - Maintaining collective discussions on the normative nature of sustainability science compared to other disciplines
Inclusive value reflection and dialogue	- Identifying and analysing how the shared values are materialised in regulations, documents, norms, etc., and reflected in everyday practices - Defining the principles of respectful and inclusive discussion

Source: ECF4CLIM Roadmap (preliminary)

Engagement through a participative approach

At the level of collective competences, as established in our preliminary definitions of the roadmap, on the project website, it is essential to allocate resources – most notably time and a place – for the design of the participatory process through which the roadmap would be created. The management of the organisations in question therefore has a crucial role in allocating resources for the needed collective process. It is important to identify the already existing principles, processes and practices and those that would have to be established for the roadmap process. This "mapping" process continues in the step 2. Involving and engaging people with a diverse range of perspectives and skills and recognising them as valuable in the collective development process is in and of itself a collective competence.

- *Time and place for joint discussions in the community*

One of the recurring obstacles in the implementation of the ECF4CLIM interventions has been that the students and teachers lack the time needed for participation, especially in the iterative meetings of the deliberative workshops (SCTs). Since these workshops were provisional and temporary pilots designed to test the feasibility of the approach, they were generally not integrated into any overall school or university strategy. In most cases, students and teachers therefore were neither rewarded for their participation, nor did they receive support to facilitate participation in SCTs. Only at a few DSs, such as a primary school in Romania and a university in Portugal, was it possible to link some interventions to predefined plans and strategies (with allocated resources and defined

responsibilities). However, even in the case of the Portuguese university, an organisational reform ultimately slowed down the implementation of the intervention.

- *Engaged management*

The commitment of school principals and administrations was found to be vital for a successful implementation of the ECF4CLIM interventions. This was especially evident in the elementary schools and high schools, where it would have been impossible for students and teachers to dedicate their time to participating in the project, had the administration not provided its support. In the universities, this commitment has been laxer and les determined. The organisational specificities of the two types of institutions influenced what was possible in each one. However, students, teachers, and staff who participated in our project did so voluntarily, dedicating many hours of their free time, beyond their usual and mandatory duties.

- *Involving and engaging a diverse range of people*

Cooperation between a diverse range of stakeholders, both internal and external to the school, is perceived as desirable and necessary for promoting sustainability. The ECF4CLIM interventions required and further fostered close cooperation between students, teachers, and staff. Moreover, there were also examples of cooperation with stakeholders from outside of the school, as these stakeholders are often necessary for the proper functioning of the school itself. This was the case in Finland, for example, where collaboration with the town councils was vital, given that the schools are owned and operated by the municipalities. Collaboration with private companies was important, for instance in the Portuguese case, where the contribution of the waste collection company was necessary for the establishment of new mutually shared rules.

According to our evidence, sustainability projects would be more powerful, more likely to be sustained over time, and more effective, if they would earn the support of both internal and external actors, such as families, city councils, local communities, and businesses, each bringing on board its own language, knowledge, interests, etc. Hence, it is necessary to elaborate interdisciplinary or transdisciplinary strategies.

Sustainability knowledge as a common ground for discussion

For collective competences, curriculum and multidisciplinary learning modules that include sustainability and connections to environmental sciences are important. Every discipline and subject has its unique perspective to environmental sustainability. It is necessary to discuss collectively about these connections to reach a common understanding. Joint discussions should also address the question of how sustainability science, as an inherently normative field of study, compares with other disciplines. Comparisons could be made with the classical and well-established scientific disciplines on the one hand, and with other new and interdisciplinary fields of study (e.g., environmental sciences, gender studies, public health, urban studies) on the other.

- *Incorporating sustainability in every discipline and subject (curriculum)*

In some cases, such as those of Finland, Portugal and Romania, a new subject has not been created, but sustainability is discussed as part of teaching under other subjects (for example, in English classes). As a result of our project's interventions, it seems that these topics are being addressed and discussed in classes, albeit sporadically, in an increasing number of teaching subjects. This is the case even though the curricula often have not changed. The ECF4CLIM project's interventions also helped the schools and teachers to translate into practice the theoretical lessons on sustainability that they had been teaching already prior to the project. In this way, ECF4CLIM has helped to reinforce the content already included in the curriculum.

Teachers sometimes (such as the Finnish case), claim that students are not always willing to spend time learning more about sustainability. The pressure to do well in final exams outweighs their interest in learning about these topics, especially outside of the classroom.

- *Maintaining joint discussions on the normative nature of sustainability science compared to other disciplines*

According to our evidence, some teachers think that the concept of sustainability typically included in academic curricula is too narrow, and that a broader concept is needed. The results of this project suggest that there is a persistent dispute over how to teach sustainability at schools and universities. For example, the UNSTPB Pitesti University in Romania has designed a specialised course on sustainability with a clear professional orientation, focusing on how to interpret and manage sustainability in a business company. This choice for a management-focused concept of sustainability contrasts with that of the UAB (Spain), which opted for a broad and philosophical concept of sustainability, manifested in one of the UAB interventions, which consisted of the design and implementation of a 2-credit course focused on a critical view of the eco-social crisis.

Although sustainability is increasingly recognised as a topic of concern in educational institutions, there are disparate understandings of what "sustainability" means. Multiple concurrent meanings coexist and compete with each other, and it is common for different people to refer to different things when they evoke the notions of sustainability or sustainable development. Furthermore, sustainability often remains merely a discourse that is rarely put into practice.

Inclusive reflection and dialogue on values

For collective competences, recognising the values of the community and society helps to promote sustainability. Collectively shared values are institutionalised in regulations, documents, norms, modes of action, dialogue, communication, and materialised in technical infrastructure, landscape, and the environment. It could be useful to analyse what kind of values are embodied in key documents, how the values from the documents are reflected in everyday practices and decisions, and whether those choices and practices indeed promote sustainability. It is essential to prioritise value discussions and ensure that the requisite time, space, and other resources are available. The principles of respectful and inclusive discussion need to be defined and reflected upon together.

- *Identifying and analysing how the shared values are institutionalised in regulations, documents, norms, etc., how they are reflected in everyday practices, and with which consequences*

The analysis of the laws and regulations of the demonstration sites made it possible to identify the different conceptions of sustainability and the values underlying these conceptions. However, in the implemented interventions, it was difficult for the participants and schools to identify and reflect upon the conceptions of sustainability that guided the interventions without expert guidance. The ECF4CLIM project researchers acted as facilitators with technical expertise assisting the participants with this task, but it is uncertain whether the schools will be able to continue doing so once the project ends.

- *Defining the principles of respectful and inclusive discussion*

Although we do not have much direct evidence on this issue in the sources underpinning our analysis, the deliberative workshops (SCTs) were designed so that the groups could define the rules for achieving the most equitable deliberations possible. In this sense, the methodology used (based on the STAVE method) proved to be highly conducive to a participatory process that respected all points of view.

8.2. Connections

The aim of this step is to identify and examine the connections that link the everyday life of the educational establishment in question with other actors, learning contents, disciplines, and the state of the environment. This helps to trace the root causes – whether they be systemic, structural, human, or cultural – behind unsustainable activity and culture. This knowledge makes is possible to frame the problems and the scope: where to focus and have impact?

Table 4: Proposed content for the 'connections' step of the Roadmap

CONNECTIONS	
Complexity and root causes of environmental impact	- Methods to map all essential actors - Clear picture of regulations and local norms
Underlying assumptions	- Open discussion on cultural assumptions
Current state of practice	- Regular assessments of the environmental, social, economic systems

Source: ECF4CLIM Roadmap (preliminary)

Complexity and root causes of environmental impact

As for the collective competences, it is important to learn and investigate what kind of local issues and stakeholders are related to and involved in local sustainability activities. Methods are needed that allow the identification of all key actors, creating conceptual systems for understanding the organisation. Critically mapping out the systemic, regulative, and normative constraints in the local context help to trace the societal and organisational roots of unsustainable activities. From a strategic perspective, it is beneficial to identify enablers and opportunities that have the greatest potential to trigger change for sustainability.

- *Methods to map all essential actors*

The iterative deliberative processes implemented throughout the project allowed students and teachers to collectively reflect on the relevant stakeholders in carrying out sustainability projects. In the course of this process, the participants repeatedly mentioned internal entities (offices, departments, etc.), external bodies (municipalities, companies, etc.), and intermediaries (families) to whom specific responsibilities are assigned and with whom specific types of relationships are required.

- *Clear picture of regulations and local norms*

Identifying these norms has been the task of ECF4CLIM project researchers. Furthermore, during the interventions, new norms were created in schools and universities, primarily to adapt student and teacher behaviours to the requirements of new ways of managing electricity, water, waste, and other consumption.

Underlying assumptions

The immediate sources of environmental impacts can be rather easily traced. However, some root causes are less readily observable, such as individual and collective assumptions, attitudes and cultural conventions that may constrain or enable sustainability. As elements of "cultural-cognitive" collective competences, tacit knowledge and cultural habits embody, create, and reproduce tacit norms and rules that are not said out loud. Critical understanding of our cultural values and norms can help to understand the impact that culture has on the ways of responding to sustainability issues. Traditionally, arts have had an important role in questioning and provoking critical awareness of cultural assumptions.

- *Open discussion on cultural assumptions*

The sources analysed here did not provide much evidence on underlying cultural assumptions. Structured reflection on such assumptions is a task that requires a high level of "meta-reflexivity" and is difficult without good expert support from for example facilitators.

Current state of practice

The final element of the "connections" phase of the roadmap is to map the current state of practices. From the perspective of collective competences, critical analysis of the current state of practice helps to frame problems at an organisational level within the educational establishment in question. More specifically, for the collective competences of a cultural-cognitive nature, it is important to examine how environmental performance is measured and advocated, to develop the organisation: are these measurements exercises noted and valued among teachers and students or are they seen only as something that one does to satisfy a formal requirement? In the latter case, measurements lose a lot of their effectiveness in fostering change towards sustainability.

- *Regular assessments of the environmental, social, economic systems*

Several of the project's interventions have generated data on electricity and water consumption, air quality, waste generation, and more. This has allowed schools and universities to estimate certain environmental impacts and assess the effectiveness of the interventions. These data can thereby constitute a powerful means of awareness-raising, which can, in turn, foster change in behaviours and practices. Making data on environmental impacts visible can guide future action, by for example motivating the involved actors to improve or at least maintain the improvements achieved. One of the difficulties encountered with some of the interventions, especially those requiring the installation of equipment or devices, was that no provisions were made for repair and maintenance. This problem was clearly documented for example in the Romanian basic and high schools. Addressing this problem will require that the schools and universities allocate sufficient financial resources for this purpose, including systematic and regular monitoring and revision of the equipment.

8.3.   Visions

This step aims at visioning preferred futures and reflection on likely futures and shorter-term scenarios of possible trajectories, in the organisational context in question. It includes reflection on what kind of steps need to be taken for the visions of the preferred future to become a reality. Promotion of transdisciplinary knowing, e.g., integrating natural, social, psychological, artistic, and experiential knowing, can tap the creative and intuitive potential of individuals to identify and "unlearn" their unsustainable ways of thinking. The whole community can act and learn while creating things that do not exist yet.

Table 5: Proposed content for the 'visions' step of the Roadmap

VISIONS	
Envisioning likely and preferred futures and short-term scenarios	- Collective visioning process organised by management (expectations based on the current trends and trajectories)
Emotional, cognitive and behavioural adaptability	- Space for emotions and creativity - Positive, caring atmosphere and a sense of community - Focus on sustainable wellbeing
Exploration through creative and relational knowing	- Creative and artistic approaches should be included in curricula - Collective appreciation of other ways of knowing should be made explicit

Source: ECF4CLIM Roadmap (preliminary)

Envisioning likely and preferred futures and short-term scenarios

Collective visions of sustainability can foster the understanding that future is in human hands. Collective visions are a precondition for shared strategies and plans. Collective visioning can focus on the questions concerning the kind of futures that can be expected, given the current trends and trajectories, and the aspects of those futures that we would wish to avoid and those worth striving for. Creating contextually grounded short-term visions – starting from the problem framing conducted earlier at the phase 2 of the roadmap – can provide a basis for the strategy for action at the final fourth step of the roadmap.

- *Collective visioning process organised by the management (expectations based on the current trends and trajectories)*

During the deliberative workshops, several exercises were carried out to collectively imagine positive and negative futures. The SCT reports contain data on how students, faculty, and staff imagine the school or university to be in the future, and the interviews also contained some questions related to this issue. Students expressed their preferences for the future in terms of sustainability, believing it is a topic that should be addressed in more subjects and in a more practical way. The deliberative groups (SCTs) showed good potential for designing this future. Teachers, in turn, called for more resources (financial resources and, above all, time), something that will only be achieved if sustainability becomes part of the curriculum and a priority area at the establishment in question.

Emotional, cognitive and behavioural adaptability

A caring atmosphere and concrete action for a more sustainable future constitutes a collective competence, which can engender active hope and resilience among the involved individuals. Supportive listening and taking young people's worries about the future seriously helps individuals to choose positive coping strategies, and help to avoid indifference, depression and denial of the need for change. Fostering knowledge about the possibilities of effecting change is an important task for educational communities. Focusing on success and the expected positive consequences from actions in favour of sustainability can also help in adapting and coping with the fact that we are living in unsustainable societies: radical changes are inevitable if transitions towards sustainability are to succeed.

- *Space for emotions and creativity*

Although we do not have much data on this topic, it is worth noting that the deliberative workshops fostered a climate conducive to the expression of emotions and creativity. Furthermore, the deliberation allowed for collective diagnoses and the development of creative proposals.

- *Positive, caring atmosphere and a sense of community*

One of the most frequently mentioned aspects of the approach followed in the deliberative groups (SCTs), was that they generated a strong sense of "belonging" and "ownership" of the interventions. Students and, to a lesser extent, teachers, considered the interventions as "their own," even though they were promoted and organised by the school. On the other hand, it was observed that participation in these groups had been very inclusive. One of the most valued aspects mentioned was that the groups had provided for the participants the opportunity to express themselves (especially students) and to be heard (teachers). This is something that the hierarchical relationships typical for schools and universities seldom allow.

- *Focus on sustainable wellbeing*

Throughout the group discussions, both students and teachers repeatedly referred to the obstacles posed by today's society, based on the massive consumption of natural resources and manufactured goods, and the corresponding generation of huge amounts of waste. The students themselves perceived this contradiction between what is recommended at school and the dynamics that govern today's consumer society. Demands for a less consumerist future appeared in the debates, but with little concreteness, as imagining such a future seems difficult in the current context. Despite this philosophical concern, not many proposals for drastic social change emerged during the ECF4CLIM process. A rare exception were the teachers in Finland, who made proposals for moving towards a future based on degrowth.

Exploration through creative and relational knowing

From the perspective of collective competences, communities have a crucial role in encouraging creative individual initiatives. Collective responses to creative individual initiatives can help embed

creative thinking as a collectively shared norm and practice within the community. Creative and artistic approaches should be included in curricula, and collective appreciation of other ways of knowing be made explicit in the everyday life of educational establishments.

- *Creative and artistic approaches should be included in curricula*

There was plenty of discussion about how to introduce sustainability into the curriculum, and how interventions like those introduced by ECF4CLIM can help translate into practice the theoretical concepts of sustainability learned in the classroom. However, there has been little discussion about how to actually teach this, or about the possible creative ways of doing this. Obviously, the approach adopted in ECF4CLIM and the interventions can as such be considered "creative".

- *Collective appreciation of other ways of knowing should be made explicit*

Throughout the project, the need (and the desirability) of networking among stakeholders, both those internal to the institution (teachers, students, staff, families, service providers, etc.) and external (municipalities, local associations, businesses, etc.), was highly valued. The desire and readiness to listen to other stakeholders that hold different interests and ways of thinking hence seem to be present. However, at the universities, these good intentions face serious difficulties. Although such openness was considered necessary for prerequisite for success of interdisciplinary sustainability projects, several institutional barriers, including those related to the roles of faculty members, stand in the way of practical application. It was noted that faculty members value above all autonomy, that is, the possibility to freely organise their own teaching and other professional activities, and therefore are reluctant to listen to advice or receive support offered by colleagues, especially those from other disciplines than their own. This was evident in some of the participating universities, where it was been difficult to establish links with professors from other departments or faculties.

8.4. Action

The aim of this step is to proceed to action by using the knowledge gained during the previous phases. Designing and evaluating action for sustainability should build on the previous phases: values and principles, systems understanding and framing of the problem, and our vision. To implement and realise the visions elaborated in step 3, strategies and action plans are needed. Assessment of the results is an essential part of action.

Table 6: Proposed content for the 'action' step of the Roadmap

ACTION	
Structures for change	- Well organised teamwork, projects, and management for sustainability - Clear time and place for collective planning and implementation
Action plan	- A plan clarifying goals, resources, roles and responsibilities in sustainability work. - Planned activities connected with subject matters in different subjects and courses. - Connecting the local plan with the other national and local norms and regulations that steer the work of the educational establishment. - Mapping possibilities to participate in societal transformations. - Promoting adaptability and strengthening a sense of hope and a positive atmosphere
Resources	- Resources for planned activities - The supply of pedagogical tools, materials and models.

Source: ECF4CLIM Roadmap (preliminary)

Structures for change

From the perspective of collective competences, it is important to remember that persons in charge of sustainability cannot make organisation sustainable by their own. Participatory approaches to planning collective action are crucial. A permanent team for sustainable issues can develop educational organisation in a more lasting and effective way.

- *Well organised teamwork, projects, and management for sustainability*

The participatory design of the ECF4CLIM project was perceived as a very powerful mechanism for student engagement, as it helped generate a sense of belonging, shared responsibilities, and identification with the objectives of the activities. It also served as a space for expression and deliberation, which was considered important for learning. Among the aspects most valued both by teachers and students were teamwork, and the inclusive processes of listening, co-creation, and co-decision.

- *Clear time and place for collective planning and implementation*

The deliberative workshop meetings (SCTs and SCCs) were clearly defined, with a designated time and place, and a clear schedule. There were complaints that sometimes too much time elapsed between meetings, which meant that participants lost some of their interest in engaging in the process.

Action plan

For the development of collective competences, it is important that strategy and concrete action plan are collectively discussed and that decisions are made jointly. The plan should clarify goals, roles, and responsibilities of the groups and individuals involved in sustainability work. It should define who does what, with whom, when, and with which resources (see the discussion on resources in the next section), and how the results are to be evaluated. Planned activities should relate to subject matters in different subjects and courses. Mapping the possibilities to participate in societal transformations should be included as a planned activity. Furthermore, concrete action for promoting adaptability, and for strengthening a sense of hope and positive collective atmosphere could be included in the roadmap.

- *A plan clarifying the goals, resources, roles, and responsibilities in sustainability work.*

In the interventions implemented along our project, there hasn't usually been a broad, general sustainability action plan, but rather a plan for individual actions or interventions. To this end, intervention templates were developed that included details of each step needed to implement the intervention in question. The interventions were the result of a joint decision-making process involving students and faculty, and were subsequently agreed upon with each institution.

- *Planned activities connected with subject matters in different subjects and courses.*

According to the evidence gathered, sustainability issues tend to be discussed in different subjects (for example, as said in the Finnish SCT reports, in English classes). Romania's high school presents also many examples of this. As a result of our project's interventions, it seems that these topics are being addressed (albeit sporadically and intermittently) in an increasing number of teaching subjects at all of our DSs. Thus, although the curriculum has not changed, sustainability appears to be increasingly being discussed in the classrooms. Yet, there were still cases in which students said they had not noticed changes in the teaching content. This would indicate that the trend noted above does not apply equally to all DSs.

- *Connect the local plan with the other national and local norms and regulations that steer the work of the educational organisation.*

Several of the schools involved belong to or intend to join eco-school or green school networks. This gives them commitments that appear to be very useful for integrating sustainability into their activities. For example, some Romanian and Spanish schools associated with eco-school or green school networks are already committed to dedicating teacher hours to coordinating and ensuring compliance with sustainability goals. At the universities, this phenomenon does not occur to the

same extent. In fact, some universities anticipate that, as a result of recent legislative reforms, sustainability principles will be included in many university courses in the future. At the Finnish university, for example, the ECF4CLIM project interventions took place at a time when the school's future curriculum was being redefined. This allowed these interventions to provide input to the design of the new curriculum, which will now incorporate a broader perspective on sustainability. However, the students doubted whether the new content items and ways of interpreting sustainability will ultimately be taught in classes. They anticipated that a discrepancy will persist between what the curriculum says and what teachers teach in the classroom.

- *Mapping possibilities to participate in societal transformations.*

At the participating high schools and universities, the participants stressed that because sustainability is a transversal topic, it can be learned and practiced both within and outside of the school. This seemed to appeal to some students, who were already considering taking action in their neighbourhoods or cities. Links with actors outside the school were mentioned, too, such as efforts to share knowledge, information, and practices with families and local communities. However, teachers and school principals regretted the scarcity of such connections with families – connections that would be needed if the schools were to contribute to transforming domestic and local environments.

- *Promoting adaptability and strengthening a sense of hope and positive collective atmosphere*

Although we have no direct evidence of this, it seems that the group meetings (SCTs) included discussions about how to positively address climate and sustainability challenges. At the UAB (Spain), for example, one of the interventions consisted of a training cycle on how to confront the eco-social crisis, with ample space to discuss and imagine alternative social forms (utopias) and to reduce the levels of eco-anxiety experienced by students. However, this led the students to strengthen their demands for action, which in turn was not always well received by the institution. Seriously discussing sustainability involves questioning the normal way of doing things, something that not all educational institutions seem able and willing to embrace.

Resources

The allocation of resources for collective action towards sustainability can be made by decisions or by steering of educational organisations. The supply of pedagogical tools, materials and models are vital for the construction and maintenance of collective competences. There are considerable differences between countries in terms of the amount and nature of resources (including infrastructure) that are available for educational organisations to conduct sustainability work.

- *Resources for planned activities*

The scarcity or even a complete lack of financing is a key factor limiting action towards sustainability in the educational establishments that participated in the ECF4CLIM project. This was the case especially where sustainability was not a major part of the curriculum. ECF4CLIM provided financial

resources to design and implement several sustainability interventions at each demonstration site, thus allowing the participating establishments to launch pilot experiments that provided data, context, and networks for advancing sustainability in education. For example, purchasing "time" that allowed several teachers to dedicate themselves to the ECF4CLIM activities (e.g., in the Finnish case) at the same time made possible the implementation of our project and fostered lasting change at the participating educational establishments. Time is indeed another key scarce resource, alongside money, the lack of which limits the capacity of educational organisations to promote sustainability. The cost of sustainability interventions is often too high to be borne by the educational establishments themselves. Therefore, additional funding from public administrations or local industries should be sought, following for instance the Romanian example. The universities (such as those in Portugal and Spain) have seen a slight increase in financial (non-human) resources dedicated to sustainability. It seems that the momentum of the ECf4CLIM project has been used to strengthen the strategic orientations that the universities had previously proposed. At the same time, there is also a perception that sustainability is not a priority for universities, and that many activities are carried out simply thanks to the voluntary initiative of a few teachers and staff members committed to sustainability action. A disproportionate and unjustified burden therefore seems to fall upon active individuals. The scarcity of financial resources at the universities constitutes an obstacle even to this voluntary individual commitment.

- *The supply of pedagogical tools, materials and models.*

Several initiatives to promote and teach sustainability by designing teaching materials and organising courses were mentioned. For example, in one of the schools in Romania, our project's interventions seem to have led to the inclusion of a subject on environmental education in one of the courses. At the Spanish secondary school (IES Itaca), the ECF4CLIM project served to strengthen and maintain a new sustainability-related subject that the school had recently included in its curriculum. Many of the participating universities have designed, approved and/or implemented courses or curricular units on sustainability and/or climate change. At the Finnish university, one of the ECF4CLIM interventions consisted of the design of training activities for teachers and the organisation of a seminar to discuss the role of sustainability in the university degrees. At the ITS in Portugal, a new course on climate crisis was introduced during the project, although the decision had already been made before the start of ECF4CLIM. The UNSTPB Pitesti University in Romania designed a specialised course on sustainability. Although not yet underway, the programme is available for consultation and is ready to be implemented soon. At the UAB (Spain), one of the interventions was the design and implementation of a two-credit course on a critical view of the eco-social crisis, open for students from any study programme offered by the university. Each of these materials and courses has its own focus, ranging from technical and corporate-management-oriented teaching to highly philosophical courses focused on questioning the hegemonic socioeconomic model.

8.5. Concluding remarks

Our empirical analysis has allowed us to identify various elements that demonstrate the relevance of ECF4CLIM work to the framework proposed by the Roadmap. We thus hope to contribute to the validation of the roadmap by providing empirical evidence from various educational contexts. Our analysis confirms that the categories proposed in the Roadmap capture several key mechanisms quite well.

First, the evidence that we gathered emphasises the importance of the design and creation of new participatory organisational structures, which allow schools and universities to utilise key factors such as the following:

- Time and place for joint discussions in the community (ENGAGEMENT)
- Engaged management (ENGAGEMENT)
- Well-organised teamwork, projects, and management for sustainability (ACTION)
- Clear time and place for collective planning and implementation (ACTION)

Second, the Roadmap addresses most of the issues essential for the introduction of sustainability into the educational curriculum. In this case, it's a question that can appear in each of the Roadmap's phases:

- Incorporating sustainability in every discipline and subject (curriculum) (ENGAGEMENT)
- Planned activities connected to subject matters in different subjects and courses (ACTION)
- Creative and artistic approaches should be included in the curriculum (VISION) (this requirement was not met during the ECF4CLIM process)
- Regular assessments of the environmental, social, and economic systems (CONNECTIONS) (the ECF4CLIM experience showed the importance of ensuring coherence between the curriculum and teaching in the classroom).

Third, the Roadmap effectively captures all essential elements related to the availability of resources (human, financial, time), particularly in the ACTION phase.

- A plan clarifying the goals, resources, roles, and responsibilities in sustainability work (ACTION)
- Resources for planned activities (ACTION)
- Clear time and place for collective planning and implementation (ACTION)

Fourth, the Roadmap includes issues related to the introduction of sustainability into all school activities, in a comprehensive manner. This is especially the case in the VISION and ACTION phases.

- Planned activities connected with subject matters in different subjects and courses. (ACTION)
- Connecting the local plan with other national and local regulations and norms that steer the work of the educational establishment in question. (ACTION)

- Collective visioning process organised by the management of the educational establishment in question (expectations based on current trends and trajectories) (VISION)
- Collective appreciation of multiple ways of knowing should be made explicit (ACTION)

Fifth, the Roadmap is also effective in addressing all issues related to outward exposure and fostering the diversity of stakeholders involved in the educational establishment's sustainability initiatives. Here, the key phases are ENGAGEMENT and CONNECTIONS.

- Involving and engaging different types of people (ENGAGEMENT)
- Defining the principles of respectful and inclusive discussion (ENGAGEMENT)
- Methods to map all essential stakeholders (CONNECTIONS)

Sixth, issues related to participatory learning possibilities, especially the organisation of workshops, events, awareness-raising activities, etc., fit well with some of the dimensions proposed in the ACTION phase.

- A plan clarifying the goals, resources, roles in sustainability work, and including responsibilities (ACTION)
- Planned activities connected with subject matters in different subjects and courses. (ACTION)

Seventh, the proposals regarding encouraging students to participate and get involved in participatory actions for sustainability align well with the ACTION phase.

- Well-organised teamwork, projects, and management for sustainability (ACTION)
- Clear time and place for collective planning and implementation (ACTION)

Eighth, issues related to accounting and monitoring are also reflected in the Roadmap, especially in the CONNECTIONS and VISIONS phases.

- Regular assessments of the environmental, social, and economic systems (CONNECTIONS)
- Collective visioning processes organised by the management of the educational establishment in question (expectations based on current trends and trajectories) (VISIONS)

On the other hand, the Roadmap does not sufficiently include some of the information that emerged from the qualitative analysis. Specifically, the Roadmap should include elements such as the following:

First, the Roadmap does not explicitly include in any of its phases the creation of formal and informal norms, which has occurred in almost all SDs. Our analysis showed that the introduction of sustainability activities can transform behaviours and prevailing norms in the educational establishments.

Second, the Roadmap does not sufficiently recognise the importance of the promotion of cooperation between internal and external stakeholders, the creation of partnerships, etc. Our analysis identified these activities as an important, possibly even necessary, strategy for promoting sustainability, and especially ensuring that the positive changes persist over time.

Third, and related to the above, the Roadmap should give greater attention to the promotion of interdisciplinarity, given that the involvement of very different stakeholders in any given participatory process inevitably introduces problem of compatibility of languages, knowledge, principles, etc.

Fourth, the issues related to "regular assessments" should perhaps be included not only in CONNECTIONS, but also in ACTION, because assessing the state of the school's or university's performance in terms of the environment and sustainability is often the trigger for effective change processes.

Finally, some dimensions of the Roadmap bear little relation to the qualitative analysis of collective competences we conducted (or are underrepresented in our analysis). The primary among such elements, which were absent from our empirical analysis, were the following:

- Open discussion on cultural assumptions (CONNECTIONS)
- Space for emotions and creativity (VISIONS)
- Positive, caring atmosphere and a sense of community (VISIONS)
- Focus on sustainable wellbeing (VISIONS)
- Creative and artistic approaches should be included in curricula (VISIONS)
- Promoting adaptability and strengthening a sense of hope and positive collective atmosphere (ACTION)

The absence or underrepresentation of these dimensions in our empirical corpus may have resulted from the fact that the interventions did not take them into account. This may be a useful warning for future processes and interventions.

H2020-LC-GD-2020-3, Project 101036505, ECF4CLIM, European Competence
Framework for a Low Carbon Economy and Sustainability through Education
Task 6.1: Collective competences for sustainability

9. CONCLUSIONS

The analysis has allowed us to observe how collective competencies are developed in practice, with examples from different political frameworks and educational contexts. In conclusion, the following comments can be made:

Regulative Competences:

The concept of regulative competences refers to the formal frameworks—legislation, policy, and guidelines—that establish the conditions under which educational institutions operate. Since 2022, all four participating countries have introduced substantial legal and regulatory developments in the domains of energy transition, environmental protection, and climate change mitigation. These developments reflect the strategic priorities of the European Green Deal and the broader European Union commitment to achieving carbon neutrality, energy independence, and environmental resilience.

Within the domain of primary and secondary education, the integration of sustainability into national curricula has intensified. However, implementation models vary across contexts. Finland and Portugal permit a degree of curricular flexibility at the local or municipal level, enabling schools to tailor sustainability content to community-specific needs. In Spain, regional governments define up to 50% of curriculum content, offering another layer of decentralisation. Romania's reforms have emphasised environmental education through the 2023–2030 National Strategy on Education for the Environment and Climate Change. Across all countries, however, the actual integration of sustainability content into teaching practices is largely discretionary and highly dependent on individual educators' initiative.

A particularly noteworthy policy innovation is observed in Finland, where legislation mandates that each upper secondary school must appoint a "sustainability support person" by 2025. This role is backed by designated resources equivalent to one full course, indicating a formal institutional commitment to sustainability governance. Other countries, while less prescriptive, have introduced national plans and policy frameworks that recommend or encourage the inclusion of climate and environmental modules, such as Portugal's PNEC 2030 and Romania's ECCE initiative.

At the university level, institutions benefit from high degrees of autonomy, allowing them to incorporate sustainability into teaching and research with considerable latitude. Recent legislative developments have provided additional impetus for universities to embed sustainability into both academic and operational domains. These measures are often framed within national education strategies or linked to European funding instruments that prioritise sustainable development goals (SDGs). However, actual implementation depends on the strategic orientation of university leadership, the interests of individual departments, and the availability of financial and human resources.

Despite these regulatory advances, several structural impediments persist. Funding for sustainability initiatives remains limited, with many institutions relying on temporary project-based support rather than sustained public investment. Furthermore, the balance between the different

pillars of sustainability—environmental, social, and economic—remains uneven. The environmental dimension tends to dominate regulatory texts, with the social and particularly the economic aspects often underrepresented. This asymmetry risks reinforcing a technocratic interpretation of sustainability that neglects questions of equity, social justice, and long-term institutional transformation.

Normative Competences:

Normative competences refer to the internal processes through which organisations define roles, allocate resources, and develop strategic responses to sustainability imperatives. This dimension focuses on how institutions organise themselves to pursue sustainability goals, including the establishment of governance mechanisms, action plans, and the assignment of responsibilities.

In the school sector, there is a considerable variation in the degree of institutionalisation of sustainability. In Finland's Juhannuskylä school, sustainability has been embedded into the school's annual planning and governance structures, supported by a designated "contact person of sustainable future" who operates as part of the management team. This model exemplifies an integrated approach in which sustainability becomes a cross-cutting institutional priority.

Conversely, in many other demonstration sites, sustainability remains largely dependent on voluntary engagement by individual educators. In both Portugal and Spain, membership in the international Eco-Schools network provides a framework for action, but participation is not mandatory and often limited in scope.

In all the analysed cases, decision-making authority over infrastructure, such as energy use, waste management, and procurement, is frequently outsourced or delegated to external actors—municipalities, regional authorities, or private contractors—thereby constraining the school's capacity to act autonomously.

The ECF4CLIM project has made notable contributions in this context by offering financial resources, technical assistance, and pedagogical support to implement and evaluate sustainability interventions. Such support has enabled schools to test and develop organisational innovations that might otherwise have been infeasible due to resource limitations. Nevertheless, the sustainability of these interventions beyond the life of the project remains an open question, particularly in the absence of dedicated funding or formal integration into school governance frameworks.

At the university level, all four analysed institutions have adopted strategic plans and established governance structures for sustainability. These include dedicated committees, vice-presidential posts, and cross-departmental working groups. Since 2022, these structures have gained increased prominence, reflecting a shift from operational efficiency-focused initiatives (e.g., reducing energy costs) toward a broader integration of sustainability into research agendas, teaching curricula, and community outreach.

For example, the University of Jyväskylä (JYU) has instituted a "Sustainable and Responsible Development Team" composed of faculty experts, while the Instituto Superior Técnico (IST) in Portugal has created a Vice-Presidency for Sustainability and Infrastructure. The UAB (Spain) has

launched a "Healthy and Sustainable Campus Plan" and begun the process of designing a mandatory cross-curricular course on sustainability for all students. These developments suggest an emergent paradigm shift, in which sustainability is not merely a technical problem of resource management but a strategic orientation shaping institutional identity and purpose.

Nevertheless, implementation is uneven. Responsibilities for sustainability-related tasks are often relegated to technical staff, thereby marginalising academic stakeholders and underemphasising the social dimensions of sustainability. Moreover, universities' reliance on external service providers for core functions (maintenance, catering, cleaning) imposes structural constraints on the scope of possible sustainability reforms. Institutional inertia, bureaucratic complexity, and the fragmentation of decision-making across academic and administrative units further inhibit the translation of strategic goals into operational practice.

Cultural-Cognitive Competences:

Cultural-cognitive competences pertain to the internalised beliefs, shared assumptions, and behavioural norms that underpin institutional responses to sustainability. This dimension is crucial for understanding how formal policies and organisational strategies are enacted—or resisted—by individuals and groups within educational settings.

The analysis shows that ECF4CLIM interventions have catalysed meaningful changes in the social dynamics of participating institutions. At many demonstration sites, the formation of Sustainability Competence Teams (SCTs) and Sustainability Competence Committees (SCCs) has created new relational infrastructures for sustainability dialogue and action. These groups, while often lacking formal institutional status, have enabled cross-role collaboration among students, teachers, and staff, and in some cases, have been integrated into existing structures such as Eco-Schools committees.

However, these efforts frequently encounter structural and cultural limitations. Students in several schools reported that sustainability themes remained marginal in curricular content, and teachers noted that time constraints, inflexible schedules, and examination pressures made it difficult to prioritise sustainability in teaching. Moreover, participation in sustainability activities was often limited to a small group of motivated individuals, raising concerns about wider inclusivity and long-term impact. Without institutional mechanisms to scale and diffuse these practices, the risk is that sustainability becomes a niche concern rather than a systemic priority.

At the university level, participatory approaches such as co-design and deliberative workshops (SCTs) were well-received by those already engaged with sustainability. These practices fostered a sense of ownership, reflexivity, and intersubjective learning. Yet they also revealed structural challenges, including high turnover among students and teachers, low levels of cross-departmental collaboration, and limited time availability due to academic workloads. Faculty autonomy, a cornerstone of university culture, can act as both a facilitator and an obstacle: while it allows for curricular innovation, it also hampers coordinated institutional responses.

One of the most impactful elements of the ECF4CLIM project has been the use of empirical data on environmental indicators (electricity and water consumption, air quality, waste production, etc.) as tools for awareness-raising and pedagogical engagement. In some cases, these data were integrated into classroom activities, allowing students to link abstract sustainability concepts to concrete realities within their own institutions. However, data dissemination practices were not always possible, and in several instances, institutional reluctance to share environmental performance metrics limited their transformative potential. The visibility of such data—and the discussions they generate—are crucial for embedding a culture of accountability and continuous improvement.

Contribution to the ECF4CLIM Roadmap:

Institutionalising sustainability competences will require more than regulatory compliance or isolated good practices. It calls for sustained political will, strategic vision, and a reconfiguration of institutional cultures and epistemologies. The roadmap developed by ECF4CLIM offers a promising foundation for this work, but its realisation will depend on the capacity of institutions to navigate complexity, mobilise resources, and foster inclusive and collaborative modes of engagement.

10. ANNEX

10.1 Regulative competences: Schools of basic education and high schools

List of key laws and regulations affecting SD education

Finland

- Basic Education Act (628/1998)

- Basic Education Decree (852/1998)

- Government Decrees on the national goals of education and distribution of lesson hours in basic education (422/2012) and (378/2014),

- Government Decree amending the Basic Education Decree (423/2012)

- National Core Curriculum for General Basic Education 2014.

- Act on General Upper Secondary Education (714/2018)

- Government Decree on General Upper Secondary Education (810/2018)

- National Core Curriculum for General Upper Secondary Education 2019.

- Curriculum of the municipality of Tampere and Juhannuskylä school

- Curriculum of upper secondary schools in the municipality of Tampere

- Sustainable development policy of the Ministry of Education and Culture and its administrative branch.

- National youth work and youth policy programme VANUPO 2020–2023: Aiming to ensure a meaningful life and social inclusion for all young people. Publications of the Ministry of Education and Culture, Finland 2020:4. URN:ISBN:978-952-263-887-8.

- Ministry of Education and Culture. 2019. Ministry of Education and Culture Strategy 2030. URN:ISBN:978-952-263-632-4.

- The City of Action - Tampere City Strategy 2030.

- Carbon neutral Tampere 2030-roadmap

- Other special programmes of City of Tampere, e.g. Plan for sustainable urban mobility (Kestävän kaupunkiliikkumisen suunnitelma), Sustainable Tampere 2030 policies (Kestävä Tampere 2030 -linjaukset), Housing and land policies of Tampere City 2022-2025 (Tampereen kaupungin asunto- ja maapolitiikan linjaukset 2022–2025), Education policy program of Tampere City (Tampereen kaupungin koulutuspoliittinen ohjelma 2019-2025), Program for

walking and city life in Tampere 2030 (Tampereen kävelyn ja kaupunkielämän ohjelma 2030), LUMO -Biodiversity porgram of Tampere (Tampereen LUMO - luonnon monimuotoisuusohjelma 2021-2030), Developing programme for bicycle mobility in Tampere 2030 (Tampereen pyöräliikenteen kehittämisohjelma 2030)

- Agenda 2030 and Tampere

- Service plan of the the Education and Culture Committee in Tampere (Sivistys- ja kulttuurilautakunnan palvelusuunnitelma 2022–2025)

- Annual plan of the the Education and Culture Committee in Tampere (Sivistys- ja kulttuurilautakunnan vuosisuunnitelma 2022)

- The template for annual plan of the schools from the Office pf the Basic Education Services in Tampere

- A plan for sustainable future in education in Tampere (2018)

- A plan for global education and education for international understanding 2022-2023 for upper secondary schools in Tampere. (Globaali- ja kansainvälisyyskasvatuksen suunnitelma 2022–2023. Lukiokoulutus. Tampere.)

- UN Sustainable Development Goals. Implementation in Tampere is assessed in the document "City Of Sustainable Action. The Voluntary Local Review of the UN Sustainable Development Goals in Tampere 2022."

- Plan for Global and International Education in upper secondary schools 2024 – 2025 in Tampere (Globaali- ja kansainvälisyyskasvatuksen suunnitelma 2024 – 2025)

- The annual plan of the Growth, Innovation and Competitiveness Services in Tampere 2025 (Elinvoima- ja osaamislautakunnan vuosisuunnitelma 2025)

Portugal

- Students' Profile by the End of Compulsory Schooling

- National Education Strategy for Citizenship (ENEC – Estratégia Nacional para a Cidadania)

- National Strategy for the Environmental Education 2020 (ENEA – Estratégia Nacional de Educação Ambiental 2020)

- National Strategy for the Adaptation to Climate Change (ENAAC)

- Portuguese Carbon Fund (FPC)

- Leading the Transition: Action Plan for the Circular Economy in Portugal (PAEC 2023-2027)

- National Programme for Climate Change (PNAC 2020/2030)

- National Strategy for the Adaptation to Climate Change (ENAAC 2020)

- Action Plan for Climate Change Adaptation (P-3AC)

- National Plan for Energy and Climate 2030 (PNEC 2030)

- Carbon Neutrality Roadmap 2050 (RNC2050)

- National Youth Plan

- II National Youth Plan (2022-2024)

Spain: national level

- LOMLOE: the Organic Law 3/2020 on primary and high school education, of December 29 (modifies LOE, the Education Act 2/2006, of May 3). https://www.boe.es/boe/dias/2020/12/30/pdfs/BOE-A-2020-17264.pdf

- Royal Decree 95/2022 on early childhood education. https://www.boe.es/boe/dias/2020/12/30/pdfs/BOE-A-2020-17264.pdf.

- Royal Decree 157/2022 on primary education, which consists of three cycles. https://www.boe.es/eli/es/rd/2022/03/01/157

- Royal Decree 243/2022, of April 5, on the basic high-school curriculum.

- Royal Decree 95/2022 (early childhood education)

- Royal Decree 157/2022 (primary education)

- Royal Decree 126/2014 (establishes the basic curriculum for primary education)

- Royal Decree 217/2022 (emphasizes the understanding of the interdependence between human activities and the environment, fostering habits committed to sustainability)

Spain: Madrid Autonomous Community

- Decree 36/2022 (early childhood education)

- Decree 61/2022 (primary education)

Spain: Andalusia

- Act 17/2007, of December 10, on education in Andalusia. 2020 Consolidated Text.

- Joint Instruction 1/2022, of June 23, from the General Directorate for Educational Planning and Evaluation and the General Directorate for Vocational Training (on the organisation and operation of compulsory secondary education schools in 2022-2023)

- Instruction 13/2022, of June 23, from the General Directorate for Educational Planning and Evaluation, on the organisation and operation of high schools in 2022-2023.

- Order of January 15, 2021 (establishes the curriculum for compulsory secondary education, including stipulations concerning diversity, student evaluation, and the advancement of students from one educational level to another).

- Decree 102/2023 (secondary education)

Romania

- The National Strategy for Sustainable Development of Romania 2030 (NSSDR, 2018) adopted by the Government Decision 877/2018,

- The National Strategy on Climate Change and Economic Growth through Low Carbon (NSCCEG, 2013) and its Action Plan (NPCC, 2013); in the process of updating (2022) as the National Strategy on Adaptation to Climate Change (NSACC) for the period 2022-2030 with the perspective of 2050 and its National Action Plan for the implementation of the NSACC,

- Initiative "Education on Climate Change and the Environment" (ECCE, 2021) of Romanian Presidential Administration,

- The National Energy and Climate Plan (NECP, 2020)

- National Education Law (NEL, 2011), modified in 2022 (in debate, probably final approval in mid-2023) to include competences for sustainability in the core competences.

- Ministry of Education Decision 3238/2021 "Methodology regarding the development of the curriculum at the decision of the school" (MCSD, 2021)

- National Strategy on Education for the Environment and Climate Change 2023–2030 (Approved the National Strategy on Education for the Environment and Climate Change 2023 - 2030 in Romania - Good Deeds, Education and Training Monitor 2023).

- Framework Methodology for Organizing and Operating "Green Schools" (Order No. 4147/2022), June 2022

- Introduction of "Education for Climate Change" Optional Subject (the Minister of Education Officialy Approves important changes for schools in Romania)

- Implementation of the "Green Week" Program

- Romanian Sustainability Code (Government Decision No. 1.117/2023)

- Education Law No. 198/2023

10.2   Normative competences: Schools of basic education

List of key plans and strategies affecting SD education in Schools of basic education

Finland:

- Local curriculum of Juhannuskylä school

- The annual plan of Juhannuskylä school

- Mission and goals of the school

- Juhannuskylä school does not have a "plan for a sustainable future", which all schools should have according to municipal regulations. However, drafting such a plan is mentioned as an objective in the school's annual plan.

Portugal:

- Educational Project - 2018 – 2021 (Projeto Educativo - 2018 – 2021)

- Eco-schools guide for teachers (Guia eco-escolas para professores)

Romania:

- Plan for School Development, School "Nicolae Balcescu" Dragasani

- CSD, "Ecological and environmental education", School "Nicolae Balcescu" Dragasani

- Adapting the strategic vision of school to follow the "Green School" program with the target to obtain the certification (all 3 schools). The adaptation supposes: (1) modernization of infrastructure, (2) integration of environmental and climate-related contents across various subjects, (3) adopting teaching methods to promote interdisciplinarity.

- Implementation of the "Green Week" in the school's activity and adapting to the local context

- Nicolae Balcescu School Dragasani: (1) Recycling Workshops (2) Environmental Art Projects (3) Community Clean-Up Drives (4) Educational Seminars

- Sercaia School: (1) Outdoor Activities (2) Educational Workshops (3) Creative Projects

Spain:

- The CEIP Mozart school participates in the International Network of Eco-schools through the projects "The Great Plant Hunt" (focused on plant and specie biodiversity), and the "Litter Less Campaign" (to reduce waste and contribute to long-term behaviour change among youth).

- The CEIP Mozart school participate in the "Naturaliza" project, developed by Ecoembes (non-profit environmental organisation dedicated to recycling and eco-design of light domestic packaging in Spain). The project aims to introduce environmental education (climate change, biodiversity, food, water, pollution, mobility, environmental conflicts, circular economy, energy, etc.) in a transversal way in the primary school curriculum. The project provides training and teaching resources for teachers on environmental topics.

- As a result of the participation and experience with the ECF4CLIM project, several of the interventions carried out within this project will be included in the school's annual action plan. Therefore, it is planned to include the following interventions as an annual activity throughout the school:

  - Flea market for the reduction of the environmental footprint in the reuse of clothes.
  - Workshops on sustainable and healthy eating
  - Improvement in the treatment of waste
  - The planned installation of solar panels will save greenhouse gas emissions and electricity consumption and therefore improve their environmental performance. The didactic units associated with solar installation will allow children to understand how solar energy works and become aware of its environmental benefits.
  - The intention is also to continue with the garden and its relationship with sustainable and healthy food, as well as the environmental benefits associated with planting native species. These two spaces can be used to raise awareness and develop individual and collective skills/competences in the school.

10.3 Normative competences: High school

List of key norms and plans affecting SD education

Finland:

- Curriculum of Sampo upper secondary school
  https://www.tampere.fi/sites/default/files/2022-09/sammon_keskuslukion_opetussuunnitelma_lops21_0.pdf

- Annual plan based on curriculum (PESU)

- Descriptions of the courses in Sampo upper secondary school (Opintojaksojen kuvaukset)

- Description of the school https://www.tampere.fi/sammon-keskuslukio

- Annual plan of SAMKE based on the curriculum 2024-2025
- Updated web page for SamkeCO2 team https://www.tampere.fi/sammon-keskuslukio/opiskelijalle/ilmastotoiminta-samkeco2
- Annual planning cycle for SamkeCO2 team

Portugal:

- Educational Project - 2022 – 2025 (Projeto Educativo - 2022 – 2025)

- Education Programme for Health and Citizenship at School (Programa de Educação para a Saúde e Cidadania na Escola)

- Internal Regulations Of The Camarate School Group D. Nuno Álvares Pereira 2023 – 2027

Romania:

- Plan for the School Development, High School "Iulia Zamfirescu" Mioveni

- CSD, "Ecological education", High School "Iulia Zamfirescu" Mioveni

- Adapting the strategic vision of school to follow the "Green School" program with the target to obtain the certification (all 3 schools)

- Implementation of the "Green Week" in the school's activity and adapting to the local context

- Iulia Zamfirescu High School: (1) Recycled Materials Costume Parade (2) Thematic Exhibition (3) Recycling and Composting Workshops (4) Presentations about Ecological Islands (5) Clean-up Actions

Spain:

- ALDEA Environmental Education Programme (organised by the regional government): a tool for the development of competences in environmental education, which introduces and develops contents related to climate change, forest and coastal environment, waste management and waste reduction, biodiversity conservation, and knowledge about natural spaces of Andalusia within the educational project of the schools that join the program.

- Intervention SP-DS01-IN05: Aims to develop and enforce an internal mechanism related to waste management and the cleanliness of public spaces within the school.

10.4   Universities

Regulative competences: List of key laws and regulations affecting SD education in the Universities of the sample

Finland

- Universities Act 2009/557

- Government Decree on Universities 2009/770

- Attachment to Government Decree on Universities (current: 595/2020, 1.8.2023->: 12/2022)

- Agreement between the University of Jyväskylä and the Ministry of Education and Culture 2025–2028

Portugal

- Decree-Law No. 62/2007 - Legal Regime for the Higher Education Institutions

- Leading the Transition: Action Plan for the Circular Economy in Portugal (PAEC)

- National Programme for Climate Change (PNAC 2020/2030)

- National Strategy for the Adaptation to Climate Change (ENAAC 2020)

- Action Plan for Climate Change Adaptation (P-3AC)

- National Plan for Energy and Climate 2030 (PNEC 2030) - Updated in 2024

- Carbon Neutrality Roadmap 2050 (RNC2050)

- National Youth Plan

- II National Youth Plan (PNJ 2022–2024) - Adopted in September 2022

- Action Plan for the Circular Economy in Portugal (PAEC 2023–2027)- Approved in late 2023

Spain

- LOU (2001): Organic Law of Universities 6/2001; modified by the Organic Law of Universities 4/2007

- LOSU (in preparation): Organic Law of the University System, to be approved by Parliament

- The CRUE Sustainability Assessment Working Group - Guidelines for Curriculum, from the Conference of Rectors of Spanish Universities

- Action Plan for the Catalan university system

- Royal Decree 822/2021, of September 28

- Organic Law 2/2023, of March 22, of the University System (Ley Orgánica del Sistema Universitario, LOSU). The introduction justifies this as a reform to address the fact, among other things, that "the ecological transition, the climate emergency, and the demographic challenge have taken on extraordinary prominence." This legislation considers the university system's responsibility to promote sustainability, the fight against climate change, and the values that emerge from the Sustainable Development Goals (art. 2.3).

Romania

- The National Strategy for Sustainable Development of Romania 2030 (NSSDR, 2018) adopted by the Government Decision 877/2018,

- The National Strategy on Climate Change and Economic Growth through Low Carbon (NSCCEG, 2013) and its Action Plan (NPCC, 2013); in the process of updating (2022) as the National Strategy on Adaptation to Climate Change (NSACC) for the period 2022-2030 with the perspective of 2050 and its National Action Plan for the implementation of the NSACC,

- Initiative "Education on Climate Change and the Environment" (ECCE, 2021) of Romanian Presidential Administration,

- The National Energy and Climate Plan (NECP, 2020),

- National Education Law (NEL, 2011), modified in 2022 (in debate, probably final approval in mid-2023) to include competences for sustainability in the core competences.

- National Strategy on Education for the Environment and Climate Change 2023-2030, adopted in January 2023

- Strategic Vision: "Educated Romania" (2021-2030). This initiative serves as the national strategic framework for educational policies for 2021–2030

- Integration of ESD in University Curricula.

Normative competences: list of key norms and plans affecting SD education

Finland:

- University of Jyväskylä Regulations

- Curricula of University of Jyväskylä 2024-2028

- Curriculum Policies of The University of Jyväskylä 2024–2027

- Theses on sustainable development and responsibility (UNIFI)

- Campus Development Programme 2019-2030: JYUnique Campus - where tradition and tomorrow meet

- A Road Map of Planetary Well-Being - an environmental programme of JYU and its action plan 2022-2030

- "Sustainable and responsible university" web page https://www.jyu.fi/en/about-us/organisation-and-management/regulations-and-principles/sustainable-and-responsible-university

Portugal:

- Instituto Superior Técnico Regulation – Estatutos do Instituto Superior Técnico

- Curricula of IST - Oferta curricular

- Instituto Superior Técnico – A School for the World – Strategic Plan 2015

- Técnico Sustentável - Environment, Society, Economy from the Environmental Science and Engineering Platform

- Strategic Plan 2020–2030 (updated) - A new Strategic Plan was adopted, replacing the previous 2015 strategy. The updated plan places sustainability as a core pillar.

- Creation of a Vice-President for Sustainability and Infrastructure. The formal creation of the Vice-Presidency for Sustainability and Infrastructure was established through Despacho n.º 1109/2024 (published in the *Diário da República*).

- Curricula (programmes and course offerings) - Sustainability content continues to be integrated into various programmes and courses. IST has also expanded access to sustainability knowledge through online courses (MOOCs) and the new course unit "Climate Crisis and Just Transition"

Romania:

- **Strategic Plan (2020-2024)** of University of Pitesti and the Operational Plans (annually planning)

- The University of Science and Technology Politehnica Bucharest (UNSTPB) aligns its sustainable development strategy with the objectives of the 2030 Agenda and Romania's National Strategy for Sustainable Development.

- Strategic Objectives in Sustainable Development (upb.ro): (1) Strengthening Competencies in Fundamental Sciences and Engineering (2) Fostering Transversal Competencies (Soft Skills) (3) Promoting Green Energy and Energy Efficiency.
- Through projects such as integrating photovoltaic stations on campus, UNSTPB demonstrates its commitment to using renewable energy sources and reducing its carbon footprint.
- UNSTPB's strategy is fully aligned with Romania's National Strategy for Sustainable Development 2030, which focuses on implementing the 17 Sustainable Development Goals of the 2030 Agenda, adapted to the national context. (sgg.gov.ro)

Spain:

- Strategic Plan for a healthy and sustainable Campus (2018-2022), Universitat Autònoma de Barcelona

- In 2023 a new 'Healthy and Sustainable Campus Plan' for the period 2023-2027 (Campus SiS) was approved. This Plan is framed within the Sustainable Development Goals (SDGs) of the United Nations (UN) 2030 Agenda and reinforces the contribution of the Universitat Autònoma de Barcelona (UAB) to their achievement, especially in the areas of health and sustainability.

- The ECF4CLIM project was chosen as an example of the type of actions that could be carried out at the university under the frame of this Healthy and Sustainable Plan, attempting to link research with action and teaching. Various actions implemented by our project have been adopted by the university as pilot tests that will be extrapolated to other faculties (such as the change in the waste management system) or will be continued in the future (such as the training cycle on the ecosocial crisis).

- Strategic Plan 2030 Horizon (UAB) (with a section on social responsibility)

10.5   Sustainability-related legislation

Basic and High schools: List of sustainability-related legislation

Finland:

- The City of Action - Tampere City Strategy 2030. https://www.tampere.fi/en/tampere-city-strategy (updated 2023)
- UN Sustainable Development Goals. Implementation in Tampere is assessed in the document "City Of Sustainable Action. The Voluntary Local Review of the UN Sustainable Development Goals in Tampere 2022." https://www.tampere.fi/sites/default/files/2022-06/Tampere_FI_VLR_%20City_of_Sustainable_Action_2022.pdf
- Plan for Global and International Education in upper secondary schools 2024 – 2025 in Tampere (Globaali- ja kansainvälisyyskasvatuksen suunnitelma 2024 – 2025) https://www.tampere.fi/sites/default/files/2024-08/Lukio_KV_suunnitelma_2023_2024.pdf
- The annual plan of the Growth, Innovation and Competitiveness Services in Tampere 2025 (Elinvoima- ja osaamislautakunnan vuosisuunnitelma 2025) https://tampere.cloudnc.fi/download/noname/%7B4ca04571-4af5-4ccf-a92e-b84d88d678f9%7D/9151692

Portugal:

- **National Plan for Energy and Climate 2030 (PNEC 2030)**: Revised in October 2024, the updated PNEC 2030 sets more ambitious targets, including a minimum contribution of 85% from renewable energy sources in electricity production by 2030.
- **Action Plan for the Circular Economy in Portugal (PAEC 2023–2027)**: Approved in late 2023, this plan aims to accelerate the transition to a regenerative, efficient, productive, and inclusive economic model. It emphasizes the importance of education and awareness in promoting circular economy principles.
- Additionally, the **II National Youth Plan (2022–2024)** was approved in September 2022, reinforcing intersectoral coordination of youth policies in Portugal.

Spain:

- Educational legislation in Spain is very recent. Organic Law 3/2020, of 29 December, which amends Organic Lau 2/2006, of 3 May, on Education, known as LOMLOE, regulates the educational standard for all stages in education: infant, primary, secondary, baccalaureate, vocational training and university. There are no new laws regarding the teaching of sustainability in primary education.

− There is only a draft decree UNI/XXX/2023, which establishes the requirements for the examination of curricula leading to the award of official university degrees that allow the exercise of the profession of teacher in primary education. There are two mentions of sustainability: 1) its inclusion in the subject of Physical Education: "It makes it possible to work as a teacher specialising in Physical Education and to acquire the competences, resources and strategies necessary to intervene in the motor behaviour of pupils. The main objective is to promote the full development of their personality through the experience of different motor situations linked to motor culture, healthy habits and sustainability. 2) In the area of instruments and musical groups: "by simply making simple constructions of instruments or sound objects for interpretive use in primary education as an accompaniment to works using recycled materials that promote sustainability".

− In **Compulsory Secondary Education (ESO)**, **Royal Decree 217/2022** emphasizes the understanding of the interdependence between human activities and the environment, fostering habits committed to sustainability. Additionally, **Decree 102/2023 of 9 May** establishes the structure and curriculum for ESO in Andalusia, integrating environmental sustainability as a cross-cutting theme. This curriculum promotes ecological awareness and environmental responsibility among students.

− In **Bachillerato**, **Royal Decree 243/2022** incorporates the critical analysis of ecological footprints and encourages a responsible attitude towards climate change.

− Furthermore, **Decree 102/2023** also highlights the importance of family and community participation in school life. It promotes the creation of open educational communities that serve as drivers of social and environmental transformation, fostering sustainability and social cooperation.

Romania:

− **National Strategy on Education for the Environment and Climate Change 2023–2030** (Approved the National Strategy on Education for the Environment and Climate Change 2023 - 2030 in Romania - Good Deeds, Education and Training Monitor 2023). This strategy marks Romania's first comprehensive plan dedicated to environmental and climate education.

− **Framework Methodology for Organizing and Operating "Green Schools" (Order No. 4147/2022)** Issued in June 2022, this order establishes the criteria for schools to be recognized as "Green Schools" focusing on the infrastructure, the curriculum and pedagogy.

− **Introduction of "Education for Climate Change" Optional Subject** (The Minister of Education Officially Approves IMPORTANT Changes for Schools in Romania iDevice.ro). This subject is designed to help students understand the causes and impacts of climate change and to explore solutions for mitigation and adaptation.

− **Implementation of the "Green Week" Program** (Press review – February 3, 2023 - UVT). A week-long series of activities focused on environmental protection and sustainability in all schools.

- **Romanian Sustainability Code (Government Decision No. 1.117/2023)** (Dentons - Romania new Sustainability Code). It introduces a standardized framework for sustainability reporting, which can serve as a model for educational institutions aiming to enhance transparency and accountability in their sustainability initiatives.
- **Education Law No. 198/2023** (https://legislatie.just.ro/public/DetaliiDocument/271896). While its primary focus is on modernizing educational practices and infrastructure, it also supports the integration of sustainability principles by promoting digitalization and personalized learning, which can include environmental education components.

Universities: List of sustainability-related legislation

Finland:

- Agreement between the University of Jyväskylä and the Ministry of Education and Culture 2025–2028

Portugal:

- **Decree-Law No. 62/2007 – Legal Regime for Higher Education Institutions (RJIES) Modified by Law No. 16/2023 (April 10, 2023)**. The revision introduced changes in the legal framework governing the creation, organization, and supervision of higher education institutions, though no specific new obligations were imposed regarding sustainability.
- **National Plan for Energy and Climate 2030 (PNEC 2030) - Updated in 2024**, the revised PNEC 2030 establishes more ambitious targets, including an 85% minimum contribution from renewable energy sources in electricity production by 2030. The plan reinforces the role of education in promoting climate literacy, energy awareness, and low-carbon behaviours.
- **Action Plan for the Circular Economy in Portugal (PAEC 2023–2027)- Approved in late 2023**, this new action plan aims to accelerate the transition to a regenerative, efficient, productive, and inclusive economic model. It highlights the importance of education and awareness-raising to promote circular economy principles across sectors, including higher education.
- **II National Youth Plan (PNJ 2022–2024) - Adopted in September 2022**, this updated plan reinforces the importance of promoting youth engagement, active citizenship, and sustainability, in alignment with the SDGs. While not imposing direct obligations on higher education institutions, it encourages cross-sectoral cooperation involving universities and research centres.

Spain:

- At the end of 2022, a **legislative Royal Decree approved a year earlier came into force: the Royal Decree 822/2021, of September 28**, "establishing the organization of university education and the quality assurance procedure", establishing the guiding principles for the design of curricula for official university degrees in Spain.

− In March 2023, a new law was passed that modified the regulatory framework for universities in Spain. It was **the Organic Law 2/2023, of March 22, of the University System (Ley Orgánica del Sistema Universitario, LOSU)**. The introduction justifies this as a reform to address the fact, among other things, that "the ecological transition, the climate emergency, and the demographic challenge have taken on extraordinary prominence." This legislation considers the university system's responsibility to promote sustainability, the fight against climate change, and the values that emerge from the Sustainable Development Goals (art. 2.3).

Romania:

− **National Strategy on Education for the Environment and Climate Change 2023-2030.** Adopted in January 2023, this strategy marks Romania's first comprehensive plan dedicated to environmental and climate education. It outlines four main action areas: (1) Implementing a national educational program focused on the environment and climate, (2) Developing and promoting educational resources for environmental learning, (3) Supporting the rehabilitation and development of sustainable school infrastructure, (4) Providing training for educators to foster a culture of sustainability within schools. The strategy emphasizes integrating environmental education across all levels of formal education and encourages active student participation in environmental protection activities.

− **Strategic Vision:** "Educated Romania" (2021-2030). This initiative serves as the national strategic framework for educational policies for 2021–2030. It has led to the development of laws and strategies addressing key areas of education, including digitalization, teaching careers, infrastructure, curriculum, evaluation, STEAM education, and components related to ESD and greening education.

− **Integration of ESD in University Curricula**. Romanian universities have begun incorporating ESD into their curricula, particularly in master's programs related to economics, geography, exact sciences, and engineering. This integration aims to equip students with the knowledge and skills necessary to promote sustainable development.

10.6   Interviews guides

The aim is to conduct interviews with a small number of people who have participated in the project from the beginning. The information collected through these interviews is designed to serve the evaluation of the project.

The interview consists of a questionnaire with open-ended questions. The list is composed of 23 questions, structured according to our theoretical and analytical framework. It includes:

- 3 background questions concerning the interviewee (0a, 0b, 0c)

- 4 questions about the 'engagement' in the project (1, 2, 19, 20)

- 4 questions on the 'expectations' concerning the evolution of the project (3, 4, 17, 18)

- 3 questions about 'environmental performance' (5, 6, 7)

- 4 questions about 'individual competences' (8, 9, 15, 16)

- 5 questions about 'collective competences' (10, 11, 12, 13, 14)

Sample: At each Demonstration Site, at least 2 students and 2 teachers and, if possible, 1 staff member will be interviewed.

The interviews can be conducted face-to-face or on-line, except for the interviews with primary school students, which should be conducted face-to-face. Furthermore, some questions on the list may not be relevant for these primary-school-student interviews. Feel free to use your own discretion in deciding which questions, if any, could in these cases be left unanswered.

Responses can vary from one sentence to one paragraph, and the interviewees should be encouraged to give specific examples of their experience from participating in the project.

Each question includes several sub-questions. Not all of the sub-questions need to be answered systematically, as they serve only to provide context. The respondents therefore have the freedom to choose which elements to prioritise in their answers. For us, it is also interesting to observe what each person decides to focus on when answering.

Interview for children (basic schools)

QUESTIONS LIST

a)   Date: _____

b)   Gender:

   - Male

   - Female

   - Other (non-binary, etc.)

   - Prefer not to say

c)   Demonstration Site: _____

Substantive questions:

1) [Engagement]: Have you enjoyed your participation in the ECF4CLIM project? Have you been able to participate whenever you wanted?

2) [Engagement]: Have you enjoyed participating in the project together with your schoolmates?

3) [Expectation]: What did you like the most? What, if anything, did you like the least? Could you provide some examples?

H2020-LC-GD-2020-3, Project 101036505, ECF4CLIM, European Competence
Framework for a Low Carbon Economy and Sustainability through Education
Task 6.1: Collective competences for sustainability

4) [Expectation]: Would you have liked something else to happen? Was there something you expected to happen but that didn't? Could you provide an example?

5) [Environmental performance]: Do you think the project has brought environmental benefits for your school? What kind of benefits? Could you provide examples?

6) [Environmental performance]: If new devices or equipment have been installed (solar panels, sensors, new waste bins, etc.), do you think they've been useful for the school? In what way? Could you provide an example?

7) [Individual competences]: Do you think your schoolmates are more aware of environmental issues now, thanks to the ECF4CLIM project? Do you think their behaviour has changed in any way? Could you explain how?

8) [Individual competences]: Do you think your ways of thinking (e.g. knowledge, skills, and attitudes) or behaviour have changed in any way, as a result of the ECF4CLIM project? Could you provide an example?

9) [Collective competences]: Do you think the project and the "interventions" carried out as part of it have produced lasting changes in the teaching or other activities at the school? What kind of changes? Could you provide an example?

10) [Collective competences]: Do you think what you learned at school as a result of this project will have impacts elsewhere (e.g., among your family members, neighbours, friends; in your municipality)? Could you provide an example?

Interview for adults (high schools & universities)

QUESTIONS LIST

Interviewee profile:

0a.   Date: _____

0b.   Profile:

- Student

- Teacher

- Staff

- Leadership and management

0c.   Gender:

- Male

- Female

- Other (no binary, etc.)

- Prefer not to say

Substantive questions:

1) [Engagement] How did you get involved in the ECF4CLIM project (hereafter "the project")? What motivated you to participate in it? Which factors facilitated the most your involvement in the project?

2) [Engagement] Has the project succeeded in involving the educational community? Who has been more and who less involved? How would you explain the differences between groups and individuals in their degree of engagement in the project?

3) [Expectations] What do you think are the main results of the project? Have these results met the expectations you had at the beginning? How, if in any manner, have your expectations have evolved throughout the process?

4) [Expectations] What unexpected effects has the project generated? Have they shaped the implementation of the interventions in your school/university?

5) [Environmental performance] Do you think the project has brought environmental benefits for your school/university? What kind of benefits?

6) [Environmental performance] If new devices or equipment have been installed, do you think they have been useful in reducing the environmental impacts of the school/university infrastructure?

7) [Environmental performance] If new devices or equipment have been installed, do you think they have helped to promote the individual and/or collective sustainability competences among students, teachers and staff? How have the devices/equipment been used?

8) [Individual competences] To what extent do you think the project has contributed to improving the knowledge, understanding, and awareness of the educational community on sustainability issues? In your case, how has it changed your understanding of the topic?

9) [Individual competences] Do you think your understanding of sustainability (and of the ways of fostering sustainability) has changed because of your participation in the project? How did you understand it at the beginning and how do you understand it now?

10) [Collective competences] What new norms, rules or guidelines for sustainability have been implemented in your school, and to what extent would you say the "sustainability culture" of your school has changed?

11) [Collective competences] To what extent do you think the project has contributed to generating new organisational structures (offices, committees, commissions, networks, etc.) designed to favour sustainability?

12) [Collective competences] To what extent do you think the project has helped to improve academic teaching plans or educational curricula (introducing sustainability topics in courses)? If changes have been introduced, do you think they will be last over time?

13) [Collective competences] To what extent do you think the project has contributed to the school/university allocating more resources (financial, human, time, etc.) to promoting sustainability?

14) [Collective competences] To what extent do you think the project has helped to improve the visibility of data and information on environmental impacts and sustainability at the school/university?

15) [Individual competences] Would you say that, thanks to the project, environmental awareness among the educational community has improved? Has your own awareness has increased? In what way?

16) [Individual competences] How has your participation in the project influenced your behaviours? Can you describe any concrete examples of such changes?

17) [Expectations] How do you think the school will evolve in relation to sustainability? Which factors do you think will determine whether the achieved improvements will last over time? Why?

18) [Expectations] What conditions should be in place to spur you, personally, to actively engage in future interventions towards sustainability at your school?

19) [Engagement] Do you have further plans, individually or collectively, to promote sustainability at your school? Can you please describe these plans?

20) [Engagement] Do you plan to do something related to sustainability outside the school (at home, in your neighbourhood, in the municipality, etc.)? How, if in any manner, has your participation in the project influenced your attitudes or plans in this regard?