

The ECF4CLIM Tools and learning materials

As part of the ECF4CLIM project, **we have developed digital tools and learning materials designed to promote sustainability competences and support active learning through simulation, reflection and action-oriented experiences.** These include an Environmental Footprint Calculator tailored for educational communities, a Retrofitting Toolkit for assessing building energy efficiency, a Sustainability Intervention Evaluation Tool for improving sustainability competences at educational settings, and an IoT Ecosystem for acquiring indoor air quality and energy consumption data. All of these tools are hosted on the project's digital platform.

The project has also developed pedagogical tools to provide teachers and educators with resources to promote sustainability in their teaching, including Flipbooks and a Learning Game. These resources were co-designed with the educational communities at our demonstration sites in response to emerging pedagogical needs, and were used throughout the project. Serving as both learning tools and diagnostic instruments, they provide a practical mechanism for implementing the competence-based approach to sustainability education set out in the Roadmap for Sustainability Competences.

All the tools can be adapted for different educational levels and used in both formal and non-formal educational contexts, as well as for lifelong learning. These resources are also hosted on the project's [digital platform](#).

The digital tools developed in the ECF4CLIM integrate data collection, self-assessment, and participatory learning features within a unified digital ecosystem, enabling schools and universities to analyse their sustainability practices, plan improvements, and engage their communities in meaningful action.

A particularly distinctive feature is the Environmental Footprint Calculator, which has been specifically adapted to the characteristics and needs of educational centres and educational communities. This tool allows institutions to measure and understand their environmental impact, beyond climate change impacts, through parameters directly linked to school operations—such as energy consumption, mobility, waste management, and resource use—making it both an educational and decision-making instrument. Complementing it, the Sustainability Intervention Evaluation Tool enables schools to assess their performance and to evaluate the

effects of sustainability interventions across a series of environmental KPIs (energy, waste, green procurement, green spaces, transport, water), providing evidence-based insights into the outcomes of their actions. In addition, the Retrofitting Toolkit supports the technical and infrastructural transformation of educational buildings by helping institutions identify, plan, and implement improvement measures that enhance energy efficiency, reduce environmental impact, and align with broader sustainability goals. It bridges the gap between pedagogical practices and the technical material environment, reinforcing the Roadmap's approach to sustainability competences.

In addition to these digital tools, **the interactive flipbooks and the learning game foster the pedagogical and motivational dimensions of sustainability education.** Both make explicit reference to the Roadmap for Sustainability Competences, helping educators and students understand and apply its principles in practice. They also include concrete examples of sustainability interventions carried out within the project, which serve as inspiration and practical guidance for implementing the Roadmap in other educational institutions. The flipbooks present complex sustainability concepts in an engaging, visual, and accessible way, while the learning game promotes active engagement and collaboration among students, enabling them to internalise sustainability competences through experiential and playful learning.



Overall, these tools stand out for their integration of educational, organisational, and technical dimensions: they function not only as learning materials but also as instruments for institutional transformation. Developed collaboratively with educators, students, and technical partners, they ensure pedagogical relevance, usability, and adaptability across diverse European contexts. In line with the overall evaluation strategy of the ECF4CLIM project, the tools and learning space underwent several internal and external validation processes.



The ECF4CLIM project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101036505. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union.

