

RM-DS01-IN01

(SOLAR PANELS IN URBAN AREA) INSTALLATION OF SOLAR PANELS FOR GREEN ELECTRICITY




Lower secondary school

The intervention involved installing solar panels on the school's roof to generate electricity. Initially, solar thermal panels were proposed to provide hot water for the school canteen and reduce gas consumption. However, due to technical limitations—such as the lack of hot water demand during the long summer break and the need for antifreeze protection in winter—the plan was revised. The shift from solar thermal to photovoltaic panels provided greater flexibility. An interface was installed to connect the school's electrical network to the public grid, enabling the school to obtain prosumer status. This was achieved by preparing the necessary technical documentation, securing approvals, and coordinating with the electricity provider.

To monitor electricity consumption and production, a smartphone application was installed. Additionally, an educational component was integrated into the project. Large posters were displayed throughout the school, visible to students, staff, parents, and visitors, illustrating the intervention and its outcomes.



Resources

Human	
Time	
Costs	







The ECF4CLIM team developed dedicated educational materials on solar energy—covering both heat and electricity generation—and energy conservation in the context of climate change. These materials were discussed with students and teachers, with feedback incorporated into updated versions. The finalized resources serve as foundational documents for teachers to design interdisciplinary sustainability lessons.

Finally, communication and dissemination activities were carried out to encourage replication of the initiative in other schools and households.

Relevant difficulties

The solar panel project at Drăgășani School faced no major issues, but key recommendations emerged for future implementations:

- **Technical Expertise** – Professionals should assess roof integrity, panel positioning, and provide necessary documentation.
- **Project Planning** – Clear contracts outlining roles, timelines, and quality standards are vital. Schools often need help from local authorities or inspectorates due to limited technical capacity.
- **Educational Value** – Watching installation alone is insufficient; tailored teaching materials on solar energy should be integrated into interdisciplinary lessons.
- **Funding** – Despite the modest €5,000 cost, funds must be secured in advance via municipal support or project grants.
- **Data Use** – Monitoring data from the panels should be accessible and actively used in classes to deepen students' understanding of sustainability.

 Engagement	 Connections	 Change	 Action
Engagement was achieved through collective reflection and participation in sustainability. The transition from solar thermal to PVs demonstrated adaptability and commitment. Educational posters and curriculum integration ensured the whole school community could	The intervention connected technology, learning, and community involvement. Students saw firsthand how renewable energy use connects to broader themes such as climate change, energy policy, and responsible consumption. Collaboration between	Initial plans for thermal panels had to be reconsidered due to real-world constraints such as seasonal use patterns. This led to a more suitable PV solution. Students and staff were encouraged to see the links between energy use, technology, and climate	Concrete action was central to the intervention. Beyond the technical installation, the project included active involvement of the school community, implementation of educational materials, real-time monitoring of energy use, and public communication efforts.

reflect on and internalize sustainability values. The development of personal responsibility and environmentally conscious behaviors among individuals is a testament to strong engagement with sustainability principles.	teachers, local authorities, and technical experts strengthened ties across sectors, showing how interdisciplinary and cross-sectoral cooperation is essential for impactful sustainability efforts.	change. The educational component emphasized these interconnections, helping participants understand how local decisions and infrastructure choices relate to global environmental challenges.	These activities exemplified how individuals and collectives can “walk the talk.” The result was not just reduced carbon emissions but also strengthened technical, cognitive, and collaborative competences within the school.
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<https://ecf4clim.eu/materials-from-demonstration-sites/>

<https://www.youtube.com/watch?v=RHalcDpl9zU>



Analytical Framework

Individual Competences

The solar panel intervention played a significant role in developing important individual competences among participants, including practical skills, critical thinking, communication, initiative, and environmental responsibility. These outcomes contribute to nurturing more informed, proactive, and reflective individuals who are better equipped to address sustainability challenges in their personal and professional lives.

- Increased Environmental Awareness - Participants became more conscious of their daily action impacts. They developed a greater sense of personal responsibility and began to reflect more critically on their choices, particularly in terms of resource use and sustainability.
- Development of Practical and Technical Skills - The intervention provided hands-on opportunities to understand the principles of solar energy and renewable technologies fostering new technical competencies.
- Enhanced Critical Thinking - Activities encouraged reflection, analysis, and questioning, leading to noticeable improvement in critical thinking, especially concerning ecological issues.
- Improved Communication Skills - Participants gained confidence in expressing their ideas more clearly during group discussions. The experience helped them develop the ability to articulate viewpoints.
- Personal Initiative and Responsibility - Many participants began taking the initiative in their daily lives, choosing environmentally friendly behaviours such as walking instead of driving or actively promoting sustainability in their routines. This reflects a growing sense of agency and proactive engagement.
- Curiosity and Motivation to Learn - Exposure to real-world applications of renewable energy stimulated curiosity and encouraged further learning about sustainability topics.

Collective Competences

The solar panel intervention proved to be an effective context for fostering collective competences such as teamwork, shared leadership, collaborative problem-solving, and joint environmental responsibility. These competences are essential not only for the success of sustainability initiatives, but also for the broader development of active, engaged, and cooperative citizens.

- Teamwork and Collaboration - Participants developed the ability to work effectively in teams, recognising the value of each member's contributions. They successfully organised themselves around common objectives, demonstrated shared responsibility, and supported one another in achieving collective goals.
- Shared Decision-Making - The intervention encouraged the practice of democratic and inclusive decision-making. Teams planned activities collectively, discussed options respectfully, and reached consensus on actions, reinforcing a participatory culture.
- Role Distribution and Responsibility Sharing - Individuals took on diverse roles within group activities, showing flexibility and a willingness to support the team in various ways. The recognition that every role is important contributed to a more cohesive and functional team dynamic.
- Collective Problem-Solving and Creativity - Groups engaged in collaborative problem-solving, combining their ideas to address challenges. This approach enhanced their ability to generate creative, group-based solutions rather than relying on individual efforts.
- Ecological Awareness through Collective Action - Participants connected environmental learning with group behaviour, reinforcing the idea that small, collective actions—such as advocating for sustainability or promoting recycling—can contribute to broader ecological goals. This fostered a sense of shared responsibility for environmental stewardship.

Technical-material Competences

Beyond the installation of a renewable energy system, the project provided a tangible learning environment that helped participants understand environmental principles, sustainable infrastructure, and everyday eco-responsible behaviour. Participants developed a stronger understanding of sustainable infrastructure, improved their capacity to analyse environmental data, and adopted more responsible behaviours toward energy and resource use.

- Understanding of Renewable Energy and Sustainability Concepts - Participants developed a clearer understanding of the distinction between renewables and non-renewables and how solar energy reduces carbon emissions.
- Monitoring and Interpreting Environmental Data - Students learned to read and interpret energy consumption and production data, enhancing their ability to engage with real-world environmental metrics. This competency supports evidence-based thinking and decision-making in sustainability practices.
- Energy and Resource Conservation Practices - Through active participation, students adopted more mindful behaviours in conserving water, saving energy, and minimising waste in their daily routines.
- Connection Between Local Actions and Global Impact - Participants gained a deeper understanding of how individual and local efforts—like energy conservation or waste reduction—contribute to broader environmental goals. They recognised the link between everyday actions and global issues such as climate change.
- Improvement of the Physical School Environment - The school community engaged in activities that led to a cleaner, more eco-conscious environment. These included better recycling practices, reduction of waste, and small-scale improvements that enhanced the school's overall ecological footprint.