Co-funded by
the European Union

SEED
sustainable energy education

Growing Skills for a Sustainable Energy Future

Growing Skills for a Sustainable Energy Future

SEED

sustainable energy education

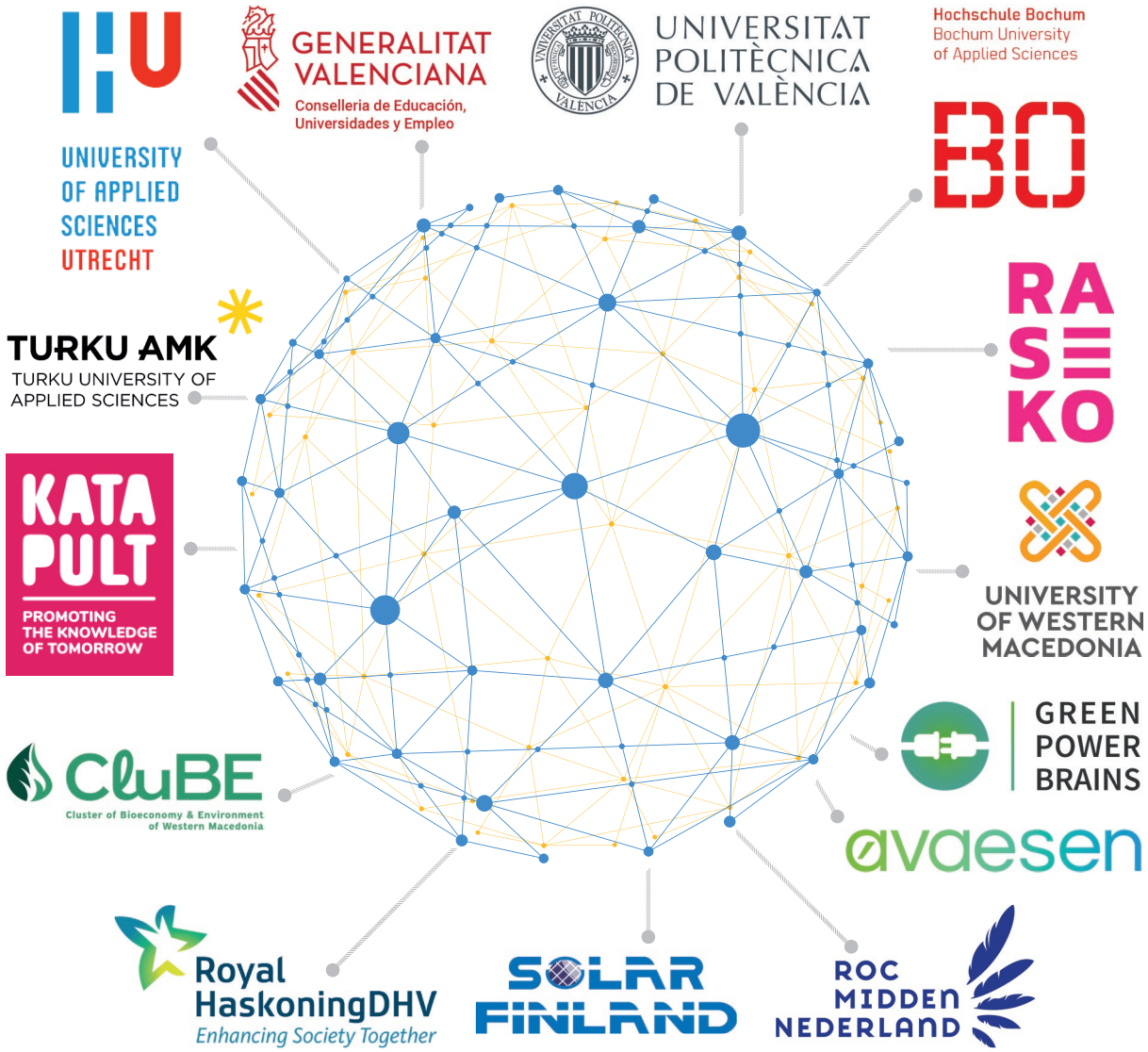
Find out more at coveseed.eu

Contact us at seed@hu.nl

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them. This project has received funding from the European Union's EACEA.A - Erasmus+, EU Solidarity Corps. Grant agreement

No 101056147



SEED's partners (14) and associate partners (23)
are VET providers EQF level 2-8, representatives from
regional skills ecosystems and national agenda-setting stakeholders

How to Read This Magazine

An editorial note
from the SEED consortium

The SEED Final Magazine brings together voices, experiences, and insights from across the education, industry, and policy ecosystem shaping the energy transition. While some chapters are designed with specific audiences in mind, every contribution speaks to anyone interested in the future of skills, education, and the energy transition.

To support orientation, each chapter includes a small legend highlighting the audiences it may resonate with most. This is meant as a reading guide rather than a boundary, helping readers quickly find topics of interest while encouraging exploration across sections.

Readers are warmly invited to look beyond their immediate field. Many of SEED's key messages from innovation in training to collaboration across sectors gain their full meaning when viewed through different perspectives.


Vocational Education and Training (VET) Providers
Universities & Higher Education Institutions
Companies & Industry Stakeholders
Clusters, Networks & Intermediary Organisations
Policy-Makers & Public Authorities
Learners & the Workforce

Shaping Skills for the Energy Transition

By Martijn Rietbergen, Project Coordinator (HU)

Under the Paris Agreement, nations committed to limiting global warming to well below 2°C—and ideally to 1.5°C—by the end of the century. To support this goal, the European Union has set an ambitious target: a 95% reduction in CO2 emissions by 2050 compared to 1990 levels. Achieving this transformation requires a rapid and coordinated energy transition—one that expands renewable energy, improves building efficiency, and electrifies heating, transport, and industry.

But there's a hitch. Severe labour shortages and a growing skills gap are slowing progress. Many workers lack the expertise needed to drive the shift, a gap often tied to the slow adaptation of Vocational Education and Training (VET) curricula. These programs—at both lower and higher levels—have not fully caught up with the evolving demands of the sustainable energy sector.

The Birth of CoVE SEED

This is where the CoVE SEED project comes in. Launched in 2022 and funded by the EU Erasmus+ program, CoVE SEED aims to establish Centers of Vocational Excellence (CoVEs) for Sustainable Energy Education across five European regions: Utrecht (Netherlands), Turku (Finland), Valencia (Spain), Bochum (Germany), and Western Macedonia (Greece). The project brings together 14 partners—including research organizations, VET institutes, private companies, and societal actors—building on existing collaborations among higher education institutions in these regions. Together, they form a transnational community committed to developing skilled professionals capable of leading Europe's energy transition.

Equipping Learners and Driving Innovation

CoVE SEED has two primary goals. First, it seeks to equip learners and professionals with the skills necessary to accelerate the energy transition. Second, it aims to boost regional innovation by fostering collaboration among stakeholders. These objectives are pursued through sharing and scaling best practices in sustainable energy education, and by creating an international learning community for knowledge exchange, shared tools, and mobility. Ultimately, the project hopes to establish one CoVE in each participating region, anchored in local strengths yet connected through a European network of excellence.

Skills for a Green Tomorrow

A detailed skills analysis highlighted the urgent needs of the sustainable energy sector. Beyond technical expertise in engineering and emerging technologies, soft skills such as adaptability, problem-solving, and communication are vital. Digital proficiency is increasingly crucial, while

technical expertise—particularly in engineering and emerging technologies—remains essential. Practical experience and flexibility bridge the gap between theory and real-world application. The findings also underscore the importance of preparing learners for a fast-changing labor market, promoting human-centered leadership, and fostering value-driven professional development.

Regional collaboration

Another key ambition of CoVE SEED is reinforcing the regional skills ecosystem—the network of institutions, organizations, policies, and relationships that sustain local workforce development. Central to this effort is Industry–Academia Collaboration: strong partnerships between educational institutions and industry ensure that training aligns with the evolving needs of the labor market. Each region has developed and showcased its own model of collaboration, providing valuable insights for designing responsive and future-ready skills ecosystems across Europe.

Sharing Good practices and Fostering Transnational Learning

CoVE projects typically focus on three main domains of learning activity: teaching and training, cooperation and partnerships, and governance and funding. Best practices emerging from all five SEED regions have been collected, refined, and adapted for transfer and replication in other contexts, ensuring that innovation can flourish regardless of regional differences.

Beyond the exchange of best practices, SEED has fostered a vibrant international learning community. Through interactive visits, workshops, presentations, and conferences, participants have shared experiences, insights, and lessons learned—enriching the collective understanding of sustainable energy education.

Looking ahead

The journey doesn't end with the project's timeline. CoVE SEED is committed to sustaining this community—continuing current activities and launching new initiatives—to ensure that learning, collaboration, and innovation extend well beyond the life of the project. Responsive and forward-looking VET programmes, embedded within strong regional ecosystems, are vital for preparing the professionals who will power Europe's green transformation. Through CoVE SEED, this vision has taken root—and will continue to grow as a living network of excellence for years to come.

> “Responsive VET programmes, embedded within strong regional ecosystems are vital for preparing future professionals.”

Table of Contents

SEED's Mission:

Equipping Learners for the Energy Transition

By Yvette Lanting (HU)
and Stefanos Dodouras (CluBE)

Developing excellent and innovative vocational education to help Europe become a fossil-free energy continent has been the mission of CoVE SEED since its launch in 2022. From the outset, SEED has aimed to empower learners with the knowledge and skills needed to thrive in the green economy.

Over the past years, the project has reached more than 1,000 students, updated over 200 existing study programmes, created 200 new ones tailored to emerging needs, and involved around 150 industry representatives in education. CoVE SEED has had a significant impact across participating regions, strengthening cross-border partnerships and enabling teachers, researchers, and industry experts to share insights and implement innovation across Europe.

This article highlights selected educational programmes and collaborations that illustrate how SEED combines technical knowledge with green values to prepare learners for the workforce of tomorrow. In doing so, SEED not only strengthens vocational education but also contributes directly to Europe's energy-transition goals. Yet the energy transition is not solely about technology—it is fundamentally about people. The following examples show how SEED is investing in human capital to build a cleaner, smarter, and more inclusive future.

Smart Sustainable Cities programme – Utrecht, The Netherlands

The Smart Sustainable Cities programme is a 30 ECTS course at EQF Level 6 offered by the University of Applied Sciences Utrecht. Running annually from September to January, it attracts both domestic and international students. The programme is international by design, featuring teaching staff and research collaborations with partner universities in Turku, Valencia, and Manchester, helping students gain a broad perspective on cities and sustainability.

Open as an elective to a wide range of study backgrounds—including industrial engineering and management, energy studies, sustainability, the built environment, creative business, and architecture—the course combines applied learning with real-world exposure. Lectures are complemented by study visits guided by industry experts, ensuring that students connect theory with practice.

Its central themes—circular economy, sustainable energy, mobility, and healthy urban living—are explored through two research projects. Students work on real-life "wicked problems" for actual clients, such as designing systems for energy sharing between buildings or storage of surplus solar power. These challenges deepen technical understanding of energy systems while developing feasibility and implementation skills. Working in multidisciplinary teams also enhances communication and cultural competencies—skills essential for the modern energy workforce.

Hosted by:
University of Applied Sciences Utrecht, The Netherlands

EQF: Level 6

Credits: 30 ECTS
(2 semester programme)

Students:
25 – 35 international students

Hosted by:
Turku University of Applied Sciences, RASEKO, Solar Finland

EQF: Level 3-6

Credits: 5 ECTS
(1 week programme)

Students:
30 international students

Summer school on photovoltaics – Turku, Finland

The Finnish CoVE organised a Summer School on Photovoltaics that brought together VET institutes and industry partners to deliver a short, intensive course taught by experts from the PV sector. Before attending, participants completed an online module on PV fundamentals to ensure a shared foundation.

During the five-day school in Turku, students gained hands-on experience with PV installations—building their own modules, testing mechanical and electrical systems, assessing performance, and conducting data analysis and energy-efficiency measurements. The Finnish CoVE collaborated with the German CoVE, which contributed expertise from innovative solar projects in Ghana, adding a valuable perspective on applying PV technologies in emerging markets.

The course brought together more than 30 students and several teachers from SEED regions. Many participants praised the practical approach:

> “At my home university I learn about PV modules, but I do not get to experience working with them. Now I know how a module is created and assembled on a roof —I can understand the theory much better.”

This approach demonstrates how hands-on learning not only builds technical proficiency but also deepens conceptual understanding and enthusiasm for renewable-energy technologies.

Bobby Energy Hub – Bochum, Germany and Utrecht, The Netherlands

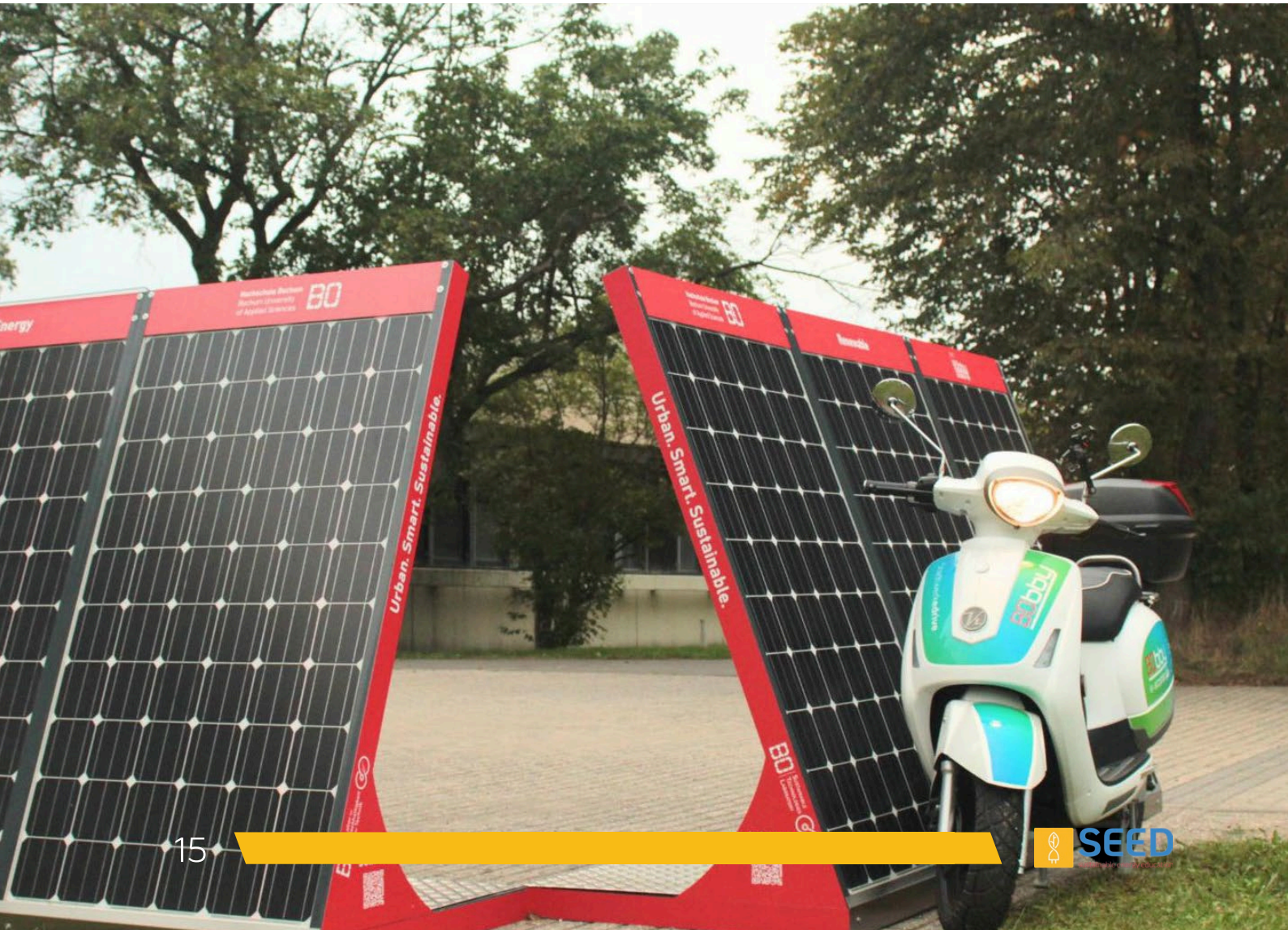
Designed and constructed by students, the Bobby Energy Hub harnesses second-life PV panels to provide renewable energy for charging light electric vehicles (LEVs). Its modular design allows easy access to internal components, making it an ideal tool for practical education.

The Energy Hub has become an integral element of teaching in Bochum, where students maintain and monitor the installation while collecting operational data. The practice was later transferred to Utrecht, where VET Level 4 engineering students focused on the physical build and VET Level 6 students on data research and performance improvement. Working together, they successfully implemented an enhanced version of the Hub, exemplifying collaboration between different VET levels and regions on a shared sustainability challenge.

Hosted by:
Bochum University of Applied Sciences, Germany
University of Applied Sciences Utrecht, The Netherlands

VET: Level 4 & 6

Core themes:
Renewable energy, circular design, modular technology, data-driven



Other Participating Regions: Sharing Knowledge, Strengthening Communities

Kozani, Greece, and Valencia, Spain, are the other two participating regions in the SEED project, each contributing valuable good practices and promoting participatory, inclusive approaches in sustainable energy education. Their involvement highlights the project's commitment to collaboration, knowledge exchange, and community engagement across Europe.

In Kozani, the past three years have seen the successful organisation of a summer school as part of the European Erasmus+ project Green Skills for Hydrogen. The Hydrogen Summer School is designed for young people, students, and professionals eager to develop both their technical expertise and soft skills in the rapidly evolving field of sustainable energy. Through daily seminars and hands-on workshops led by leading Greek companies, participants gain practical knowledge, enhance their competencies, and forge valuable connections with potential employers.

Also, the 1st Conference on Sustainable and Energy Education in Valencia, Spain, provided a unique platform for cross-border networking, knowledge exchange, and inspiring future collaborations, reinforcing SEED's commitment to equipping learners with the skills and vision needed for Europe's energy transition.

Summary

All in all, SEED's mission is simple but powerful: to equip individuals with the skills and mindset needed to thrive in a rapidly evolving energy industry. The previous examples have shown that CoVE SEED blends theoretical knowledge on energy systems with practical applications in real life projects.

This helps students to understand what is at stake and develop feasible solutions and skills for the future. Step by step, CoVE SEED is contributing to a fossil free energy society by activating students to apply state of the art technologies, inspired by industry actors.

At the core of SEED's approach lies an emphasis on practical, hands-on learning. By building this bridge between theory and practice, SEED is laying the foundation for a resilient, future-ready workforce.

1

Stories of Impact: Education Leading the Way

SEED

sustainable energy education

Empowering the Next Generation:

Vocational Education for a Changing Clean Energy Industry

Elena de la Poza, Ruijing Wang (UPV)

From a Finnish summer school to future career paths

As the energy transition accelerates, vocational education stands at a crossroads. The pressing question for educators and industry alike is how to equip young people with the competences that match tomorrow's market.

This summer, SEED's Finnish partner—Turku University of Applied Sciences—hosted a Summer School on Photovoltaics in Turku, Finland. Two Spanish VET students and one teacher took part. Their experiences showcase the potential of Spanish VET learners and hint at where clean-energy education should head next.

Vocational education students' voices: from vague to clear

Diego — Turning Inspiration into a Plan

Diego describes the Summer School as "the best investment I've ever made in myself." What changed for him was not only the content but the context. A presentation on developing PV projects in Africa—specifically in Ghana—made the social impact of solar power tangible. He left with a clear sense of purpose: complete his electrical engineering studies, then work on sustainability projects around the world. He also intends to share these projects publicly to raise awareness and attract support, viewing his work as a vocation rather than a means for quick profit. The experience shaped both his direction and his sense of community—the peers he met have become lasting friends, and the course paved the way for his next step: continuing his studies at Berlin University.

Héctor — confidence built through exposure and repetition.

In his second year of a VET programme in Renewable Energy (Segorbe), Héctor used the Summer School to connect theory with practice. Site visits let him observe a solar park under construction, similar to the Bayer–Turku Energia project in Artukainen. The scale and specificity helped: 7,956 bifacial modules, an expected output of roughly 3,400 MWh per year, and around 3,000 tonnes of CO_2 avoidance over 15 years.

A factory visit in Salo clarified the full production chain of solar panels, while a rooftop installation exercise—assembling and validating a module—anchored his technical learning.

Lectures extended his horizon further, covering topics such as agrivoltaics that create protective microclimates, off-grid and mini-grid systems that electrify rural Africa, and Finland's wider context—over 92% low-carbon electricity, a 2035 carbon-neutrality target, and substantial grid-modernisation investments.

Together, these experiences convinced Héctor to combine automation and renewables, continuing his VET studies with a focus on advanced electronic systems and control—ensuring that classroom learning connects directly with industry practice.

A vocational education teacher's view: Fast transfer to the classroom

Francisco Collado (IES Federica) — a learner-teacher in one week.

Francisco did not simply observe and learn—he trained. After completing hands-on instruction in PV design and installation, up to utility-scale thresholds, he immediately applied his learning by guiding students through the same process. This sequence—learning, then teaching—proved critical. By performing each step himself first, he could clearly explain the process to others and verify outcomes in real time. He returned home with a set of practical ideas ready for adaptation in his own VET programmes.

From content to classroom

Several elements travelled well from Turku to his syllabus. First, the emphasis on end-to-end workflow: planning, safe installation, verification, and simple performance checks that students can repeat. Second, the introduction of IoT in solar contexts offers ready-made activities for higher-level students: basic set-up, data reading, and simple interpretations of consumption patterns.

Above all, Francisco returned convinced that practical work is not an "add-on" but a core accelerator of learning. Doing the work speeds understanding far more effectively than theory alone and builds concrete, repeatable experiences that last.

Translating Labour Market Needs: Beyond "Matching Demand"

Education must respond, but not simply by replicating corporate HR lists. After consulting with industry, educators must apply professional judgement to translate those inputs into modules that are logical, structured, and achievable for students—especially under limited resources. Even modest updates—such as a short new practical session, a current workflow, or the use of monitoring tools—can yield meaningful improvements in learner readiness and employability.

Conclusion: A Renewed Mission for VET

The Finnish Summer School broadened students' horizons and clarified their ambitions. It also encouraged educators to reflect on VET's evolving mission. In the clean-energy sector, ties between education and industry have never been stronger. The task now is not merely to "keep up," but to use educational expertise to transform industry change into genuine learning gains—skills that are useful, applicable, and career-shaping. This is how vocational education empowers the next generation to move confidently toward a clean-energy future.

The grass is greener outside the classroom

Outside the Campus Living Labs are rising; where students, municipalities, and companies experiment with sustainability by getting their hands dirty.

By Eugene Zaaijer and Joost Jongen (HU)

If you exit the train at the Hoefkwartier business park in Amersfoort, you will stumble upon the Celcius House. From the outside, it looks like an wooden residential container. It is, however, much smarter than that. A model for circular design, modular living, and energy efficiency, all designed and built by students in close corporation with regional businesses.

This modest building is also a signal of something bigger: universities and schools stepping beyond their campuses to become engines of local change. Universities, traditionally built to teach about sustainability, are increasingly becoming places that practice it. And doing so in collaboration with businesses, governments, and residents.

How Living Labs are transforming education

Living Labs are reshaping higher education by turning learning into a dynamic, real-world process. Instead of absorbing knowledge in traditional classrooms, students engage directly with societal challenges — from climate adaptation to digital transformation — in collaborative, hands-on environments. This shift transforms education in several key ways. First, it bridges theory and practice, allowing students to test ideas in unpredictable, real-life contexts. Second, it fosters interdisciplinary collaboration, bringing together diverse fields to tackle complex problems. Third, it cultivates essential future skills: adaptability, creativity, systems thinking, and stakeholder engagement. Living Labs also redefine the role of educators.

Teachers become facilitators of inquiry, guiding students through ambiguity rather than delivering fixed answers. This encourages a mindset of curiosity, resilience, and co-creation.

Moreover, Living Labs embed learning within society. They connect universities with municipalities, companies, and citizens, making education more relevant and impactful. Students learn that innovation is not just technical — it's social, iterative, and deeply contextual. In essence, Living Labs transform education from a closed system into an open ecosystem. They prepare students not just to understand the world, but to shape it — collaboratively, responsibly, and creatively.

Living Labs: Where Theory Gets Dirt Under Its Nails

As discussed, Universities are no longer confined to their campuses. Through Living Labs, they are becoming engines of local change, collaborating with citizens, businesses, and governments to test sustainable solutions in real time. Where education once focused on teaching about sustainability, it now practices it — hands-on, experimental, and collaborative. In the case of the Celsius House, what looks like a compact modular home is in fact a model of circular design, modular construction, and energy efficiency. But beyond the building itself, this Living Lab symbolizes something much bigger: the shift toward education that lives in the real world.

More than two dozen student teams have already worked there, exploring themes from collective energy storage to edible gardens that build social cohesion. Each project combines technical design with social engagement, making the lab a meeting ground between innovation and community. For example, one student group turned the Celsius House into a sustainability escape room, designing interactive games that raise awareness about energy use, water conservation, and circular economy principles. Another team developed a neighborhood battery, part of a wider community effort to prepare the district for the energy transition and reduce dependence on natural gas. In a country facing grid congestion, such local energy plans are vital.

Meanwhile, other teams focused on smart home automation (domotics). With fewer care homes and an ageing population, the Netherlands faces the challenge of enabling elderly people to live independently for longer. By testing assistive technologies in the Celsius House, students discovered how digital systems can improve comfort, safety, and autonomy. These projects are not tidy exercises — they're complex, real-world challenges involving residents, rules, and resistance. And that is exactly where deep learning takes place.

Innovation as a Relay Race

Usually, Living Labs are organized like a relay race rather than a sprint. Each student team takes over from the previous one, refines prototypes, documents findings, and leaves a roadmap for the next group. This cumulative approach ensures continuity and prevents what practitioners call "challenge fatigue" — the weariness that sets in when local residents are consulted too often without visible results. Instead, projects evolve organically, following the energy of the community and adapting goals along the way.

This method also reflects a cultural shift in education. It normalizes progress as collective, iterative, and transdisciplinary. Students learn to decompose large, abstract challenges into manageable steps that fit within a semester, while partners reduce risk by experimenting in smaller increments. Over time, this creates a living innovation ecosystem — a continuous learning process that mirrors how real transitions, like the shift to sustainable energy, actually unfold.

The competencies students develop in Living Labs align closely with what international reports identify as the skills of the future. The World Economic Forum's Future of Jobs Report (2025) lists analytical thinking, creativity, and resilience as top priorities for tomorrow's workforce. Working in a Living Lab cultivates precisely these abilities. Students learn to navigate uncertainty, adapt their strategies when reality diverges from the plan, and recover from setbacks. They gain political sensitivity, systems thinking, and stakeholder management skills — all essential for addressing complex societal challenges. Equally important, students experience that innovation is a social process, not merely a technical one. They must listen, negotiate, and empathize. They learn that the most elegant technical solution fails if it ignores the human and institutional context around it.

In short, Living Labs train not only engineers or designers, but adaptive professionals — people who can think critically, act creatively, and collaborate across boundaries.

When the Professor Doesn't Have the Answer

One of the most profound shifts in Living Labs is the changing role of the educator. In this setting, even the coaches don't always have the answers — and that's intentional. The challenges are new, fluid, and context-dependent, so expertise must be co-created rather than delivered. Teachers become guides through uncertainty, helping students to ask better questions, reflect on their assumptions, and embrace ambiguity. British comedian and creativity researcher John Cleese once described creativity

as “the ability to playfully remain in a period of not-knowing.” That spirit defines the Living Lab mindset. Students learn that not knowing is not a flaw but a starting point for discovery. Once they internalize this, they become more confident, curious, and resilient — qualities essential for innovation in an unpredictable world.

Ultimately, the Celsius House illustrates how Living Labs are reshaping the boundary between education and society. What began as a student design for the Solar Decathlon Europe — the world’s leading sustainable building competition — has evolved into a dynamic hub for research, experimentation, and community collaboration. Today, it attracts engineers, social scientists, policymakers, and local residents who co-create solutions for circular building, renewable energy, and inclusive technology. The house stands as a small but powerful demonstration that learning and living sustainably are inseparable.

More broadly, Living Labs like the Celsius House embody a new educational philosophy:

- Learning is iterative — knowledge grows through experimentation and reflection.
- Learning is shared — progress is collective and open.
- Learning is embedded — it happens within society, not apart from it.

So, when you next visit the Hoefkwartier business park in Amersfoort, take a moment to stop by the Celsius House. Don’t be fooled by its modest scale. Inside, students are designing the future — not from behind a desk, but by getting their hands dirty in the real world. Living Labs remind us that innovation doesn’t thrive in sterile classrooms; it flourishes where people, technology, and purpose meet. It’s no longer about thinking outside the box — it’s about thinking outside the campus.

2

Learning for Innovation: Shaping the Future of Energy Skills

SEED

sustainable energy education

Teaching the Energy Transition: Best Practices in Renewable Energy Training

By Mansi Mehta, Aizhan Ilyassova, Semih Severengiz, (BUAS)

A new global labor market is rapidly emerging around sustainable energy, right from solar, wind and hydrogen to nuclear energy, demanding rapid changes in the current status quo of work skills, innovation and energy education. To match the pace of this development, renewable energy training must stay agile and capable of evolving with the advancing technologies and market demands.

At the same time, students and budding professionals must be inspired to become the active drivers of this change. In such scenarios, vocational education at every level plays an important role, fostering not only technical expertise but also creativity and resilience which are needed to navigate the complexities of the energy transition.

Given the rapid pace of changes in the energy field and standards that need to be achieved in the energy labor sector, best practices become a pivotal tool. They act as catalysts that accelerate the spread of effective teaching methods all while enhancing the spirit of collaboration and learning.

Building on Shared Knowledge

By identifying and sharing knowledge on the most effective methods of teaching and learning, best practices empower educators, institutions and industries to learn across regions and borders. Building on that foundation, the SEED project puts these ideas into action by harvesting and adapting best practices in sustainable energy education from Germany, Finland, Greece, the Netherlands, and Spain. In each of the regions, educators and institutions have identified good practices in three key domains: teaching & learning, cooperation & partnership, and governance. SEED does more than merely catalogue them, it aims to make them visible in detail, refine them, and replicate them across different CoVEs (Centres of Vocational Excellence), helping regions learn from each other's successes and challenges.

Best Practices Across Europe

SEED brings together a variety of best practices drawn from all regions, combining them into a common framework for renewable energy training.

In Germany, projects such as Sustainable Energy Impact, Energy Hub, and UpTrain combine problem-based learning that provide hands-on technical experience allowing students and professionals to face real-world mobility and energy challenges. From designing modular charging stations to creating blended-learning programs for public transport workers are some of the topics Germany contributes to.

From Greece, SEED incorporates the EU Financial Instruments and Hydrogen Skills Strategy and the Agrocircularity Capacity Building Program showcasing how targeted vocational education can provide new, relevant skills to workers from carbon intensive industries and promote new green economies. In addition to that, the Cooperation between the VET center of UOWM and the HEDNO network provides specialized training for integrating renewable energy sources into electrical grids. These practices show how financial innovation and industry partnerships can directly support

workforce adaptation all while ensuring that the local communities continue to learn and are not left behind in the move towards renewable energy.

The Netherlands, Finland, and Spain contribute models of governance, public–private collaboration, and inclusive education. Good practices such as the Centre of Expertise Smart Sustainable Cities, Minor Smart Sustainable Cities, and Celsiushuis are examples of how multidisciplinary learning and innovation labs help solve urban sustainability challenges. Finland adds industrial collaboration through the Turku Machine Technology Center and practical workforce training via Solarleap. Spain further brings the Shell Eco-Marathon, Energía Inclusiva, and the Vocational Training Digitalization Plan which promote the digital skills and gender inclusivity in renewable energy education sectors.

Thus, SEED creates a transnational learning ecosystem by integrating these diverse practices. The exchange of good practices is not only aimed at presenting success stories but also includes encouragement to adapt them to varied regional contexts propelling the project's goal of building a skilled, future-ready renewable energy workforce.

Cross-Regional Exchanges in Practice

One key highlight of SEED's cross-regional exchange was the visit to Bochum's Energy Hub (an off-grid solar charging station for light electric vehicles created by the Sustainable Technologies Laboratory) by students and teachers from Utrecht. During the visit, the Utrecht team explored the hub's design, the usage of reused solar panels, and its current role as a living laboratory for teaching and research on sustainable urban mobility. The exchange gave Utrecht participants the knowledge of how to adapt the Energy Hub concept within their own educational programs in Netherlands.

Additonally, the summer schools organized under the SEED project demonstrate how practice-oriented trainings advance sustainable energy education for VET students. In Kozani, Greece, a week-long program on topics of installation and maintenance of charging stations for electric vehicle included theory, practical sessions and digital learning tools. Moreover, students received an official certification to build skills for the growing e-mobility sector. Similarly, in Turku, Finland, the Solar Energy Summer School taught international students about installation of rooftop panels, visiting a panel factory, and exploring large-scale solar parks which offered direct experience right from manufacturing to system connection.

Together, these initiatives showcase SEED's approach to turning renewable energy concepts into real-world competence and equipping learners with practical skills and credentials that strengthen the green energy workforce and can be replicated across regions.

> Education is the renewable energy that powers a sustainable future.

Smart Classrooms:

Integrating Digitalization and Smart Technologies in VET

By Jan Lauwerijssen, Lisette van Ark, Ronald van Elst, and Bart van Kuik (ROC Midden Nederland)

Digital transformation is reshaping how vocational learners acquire, apply, and adapt knowledge. As industries evolve, educational institutions are exploring how digital tools and simulation technologies can bridge the gap between classroom learning and professional practice. The experience of ROC Midden Nederland offers valuable insights into how digitalisation can enhance vocational education, strengthening both technical and human skills for a fast-changing world.

Digitalisation as a Driver for Learning

For vocational learners, digital technologies are not just instruments of efficiency—they are enablers of participation in a digital society. Within SEED, ROC Midden Nederland has explored how digitalisation can help students, teachers, and companies respond to shifting labour-market needs. Their approach is built on a simple principle: technology is not an end in itself but a means to improve the quality, accessibility, and impact of learning

> Digitalization can make an important contribution to the participation of our students, staff, and partner companies in a changing society and labor market. We encourage them to develop into positively critical thinkers and digitally skilled makers of society.

Because digitalization is vast and dynamic, clear choices have been made to steer its development. In the coming years, the focus will be on three key themes: digital skills for students and staff, artificial intelligence (AI), and virtual reality (VR). These priorities align with broader European and national efforts—such as the Npuls programme in the Netherlands—which aim to make education more inclusive, flexible, and digitally ready.

Learning by Experimentation: Technology in Practice

Across vocational programmes, digital tools are being applied to replicate real-life professional environments. In healthcare education, the Future Care Lab allows students and professionals to test technologies that enhance patient support. Simulated care environments enable learners to ask key human-centred questions: What can people still do, and how can technology empower them further? For example, virtual-exercise bikes help clients "cycle" through familiar neighbourhoods, combining rehabilitation with emotional well-being. Through such applications, learners experience how empathy and innovation intersect in modern care.

In safety and defence programmes, VR simulations allow students to practise communication and crisis scenarios in a safe, controlled setting before applying their skills in real-life contexts. Meanwhile, technical programmes—including smart building, engineering, infrastructure, and automotive technology—integrate digital design, programming, and system maintenance as core learning components. Many of these courses are co-developed with local companies, ensuring that assignments mirror industry realities. This co-creation model encourages both teachers and learners to remain agile as technologies and workplace standards evolve.

Research and Innovation in the Digital Classroom

The establishment of an AI Lab demonstrates how VET institutions can embed innovation into everyday practice. Here, students and teachers jointly explore how artificial intelligence can enrich the learning process—from developing chatbots to evaluating AI-generated information critically. The focus extends beyond technical capability, addressing ethics, reliability, and responsible use.

Teachers play a key role in this evolution. They are encouraged to experiment with new didactic tools, evaluate outcomes, and model responsible digital behaviour. This approach fosters a culture of curiosity and reflection, where educators continuously learn alongside their students.

Moving Forward Together

The experience of ROC Midden Nederland shows that digitalisation in VET thrives when grounded in collaboration between learners, teachers, and regional partners. It works best when experimentation is supported, critical thinking is encouraged, and technology is treated as a tool for empowerment rather than replacement. Digitalisation also calls for ongoing professional development and collective learning. By asking the right questions about data ethics, digital safety, and inclusivity, educators and companies can co-create meaningful solutions that keep pace with technological and societal change.

The lesson from ROC is clear: future-ready education begins with people who are ready to learn from technology, not just with it. Together, we move forward.

Next-Gen Skills:

Innovation and Adaptation in the Green Economy

Thoughts from Teaching Technology in an Evolving World

By Teemu Tuomela (RASEKO)

The Future is History

The theory behind LED lighting goes back about a hundred years, but the EU regulation banning incandescent light bulbs came into force just a little over a decade ago. The theories of the photoelectric effect, which make solar cells possible, are even older. A hundred years ago, most people still taught their children farming with the help of horses. Cars were rare, and the idea of sending pictures of our own faces to each other several times a day would not have crossed anyone's mind. Wind and hydropower were central sources of energy for mills, while electricity distributed through power grids was just beginning to establish itself as the dominant technology.

What did people a hundred years ago consider the most important skills for the future? If they could find an electrician trained a century ago, he would probably manage reasonably well in today's world. The functioning of the power grid and its core components have remained much the same, although many additions have been made for safety and usability. A farmer from the same era, however, might wonder what to do with a hole in the cabin of a modern GPS-controlled tractor. Which profession has developed more in a hundred years?

Redefining the Basics

What are the "basics" of electrical engineering? Are they voltage, current, and power? Should we limit ourselves to direct current phenomena, or must we also master alternating current? Should practical installation measurements suffice, or must we also understand theoretical models? Vocational standards in Finland state only that "students are familiar with basic electronic magnitudes and their interdependencies." Yet what do employers actually mean by basics? For an electrician, it might mean handling and connecting cables safely. For a plumber, using common tools correctly and delivering leak-free piping. But in today's automated and connected environments, are those definitions still enough?

Should a farmer understand how data is transmitted between a tractor and a cloud service? Should an electrician be able to configure smart devices to communicate securely online? Perhaps more importantly—who ensures that these devices remain safe and updated in the future? Customers assume that once installed, everything will simply work. In reality, digitalisation blurs the line between technical and IT skills, demanding a broader understanding of systems and data.

Teaching in the Age of Layers

Modern automation systems use information technology solutions whose foundations were laid in the 1970s and 1980s with the development of the Internet Protocol. A newer – 30 years old – version coexists side by side with the older one. Even today, when someone teaches their students networking and communication between automation devices. Is that person teaching the latest technology—or history?

A personal computer years ago might have had a 10-megabyte hard drive, an amount of storage that now fits only a few digital photos. Back then, it was easier to grasp the basics of computing, but it was impossible to imagine all the applications computers would come to serve. Now, millions of apps exist for smartphones, yet it is almost impossible to comprehend how many layers of data processing are required for a single one to function. Early computers calculated 1+1=2 using around ten instructions, but today the same operation in a spreadsheet might require hundreds of thousands or even millions. It can feel reminiscent of modern bureaucracy, where even the simplest things seem to require a surprising number of steps.

Understanding the Learners of Today

Modern students live in a continuous flow of digital information. At the same time, they must learn both the rules of real life and the social codes of the virtual world. For educators who grew up alongside early information technology, this new digital environment can seem foreign.

When learning new skills, two worlds often meet. Teachers pass on knowledge about systems that, in the digital world of their students, are hidden beneath multiple layers of abstraction. Generational differences in how technology is experienced make the learning encounter both challenging and rewarding.

Students today achieve daily victories and setbacks in games and social media. They possess vast knowledge of virtual environments, each with its own "laws of nature" and internal logic. In many ways, video games prepare them for the structured yet complex systems they will face in their careers. Young people today are sometimes accused of not knowing anything, yet in truth they master a completely different world; one that remains largely invisible to those who did not grow up within it.

Connecting Knowledge and Curiosity

Educators across vocational education strive to pass on knowledge and skills accumulated over decades while keeping learning dynamic and relevant. Lectures are kept short to maintain attention and are complemented by hands-on activities that connect abstract theory with tangible experience. Complex mathematical and technical phenomena are often visualised and integrated into narratives, which helps learners see their relevance and remember them more easily.

A growing number of educators also adopt the “question-based learning” approach. In this model, lessons often begin or revolve around questions that students are required to pose about the subject at hand. Initially, learners may resist this method, but over time the quality of questions improves, their engagement deepens, and understanding becomes more enduring.

However, in an era shaped by artificial intelligence, learning to ask questions may be one of the most important skills of all. The essence of teaching lies not simply in transferring knowledge, but in nurturing curiosity, linking the past with the present and preparing learners to explore a future that evolves faster than ever. In the end, education in the green and digital economy is not just about producing technicians or engineers. It is about cultivating critical thinkers who know how to learn, adapt, and ask the right questions. Because the future will belong not to those who know all the answers, but to those who keep seeking better ones

When Energy Systems Go Digital: Preparing the New Workforce

By Aleksi Heinonen (TUAS)

The energy sector is changing faster than ever.

Where turbines once turned and cables simply carried power, today's infrastructure hums with data. Solar parks, batteries, heat pumps, and EV chargers are all interconnected—devices communicating through IoT gateways and lightweight protocols. Energy systems have become digital ecosystems.

Data has become the raw material of energy transition. Smart meters record every fluctuation; AI algorithms predict demand, balance grids, and tune heat pumps minute by minute. Reaching climate goals now depends as much on analytics as on engineering — on linking electricity, heat, transport, and industry into one intelligent network.

For professionals in the field, his requires new competences. Understanding kilowatts is no longer enough; you must understand the data that describes them. The workforce of tomorrow, every future engineer, technician, and planner will need to navigate a landscape of code, sensors, and algorithms.

Education Catches Up

Across Europe, vocational and higher education institutions are adapting to this digital shift. Energy and ICT are no longer separate worlds. Students learn to simulate, analyse, and optimise systems that reflect real connected infrastructure, , using professional-grade tools for modelling and data analysis.

One example comes from Finland, where students in applied-sciences programmes work with live data from solar installations, heat pumps, and storage units to design energy-management strategies. They analyse sensor data, identify consumption peaks, and test optimisation logic in real time—mirroring the digital tools and datasets used in industry. “They’re not solving textbook problems anymore,” explains one instructor. “They’re working with the same messy, real-world data that companies deal with every day.” Through this kind of applied learning, students learn to think in systems—linking physical equipment, digital twins, and AI-based optimisation in a continuous loop that blends theory with practice.

AI as the Next Layer

Artificial intelligence is rapidly redefining how energy systems operate. Predictive models forecast demand; algorithms schedule charging and heating; conversational tools help design and code optimisation logic. In this environment, AI literacy becomes an engineering skill.

Students learn to use AI not just for answers, but to explore, critique, and improve system behaviour. The focus is shifting from rule-following to reasoning—training both human and machine intelligence to collaborate in complex environments.

Bridging Energy and Digital Competence

Across Europe, educators recognise that the boundary between ICT and energy engineering has effectively disappeared. Sector coupling is now digital at its core. Energy curricula therefore need to include the fundamentals of coding, data management, and communication protocols, while ICT programmes must expose learners to the realities of energy systems.

Joint projects, hackathons, and interdisciplinary courses are emerging across Europe, bringing together learners from both fields. These collaborative formats reflect the reality of modern work: hybrid teams solving hybrid problems.

Practical Lessons for Educators

- Use authentic datasets. Real PV and IoT data build genuine analytical skills.
- Connect disciplines. Pair energy and ICT students to tackle shared challenges.
- Integrate AI tools. Let students design and critique algorithms that optimise real systems.

The Road Ahead

Authentic data, IoT communication, and AI analytics are no longer futuristic additions — they are the foundation of modern energy. Education must evolve in parallel, ensuring that graduates are fluent in both physical and digital domains.

Across the SEED community and beyond, institutions are demonstrating how this can be achieved: by linking theory with live data, fostering cross-disciplinary collaboration, and equipping learners with digital and analytical competences alongside technical expertise.

3

Beyond the Toolbox: Soft Skills in the Green Economy

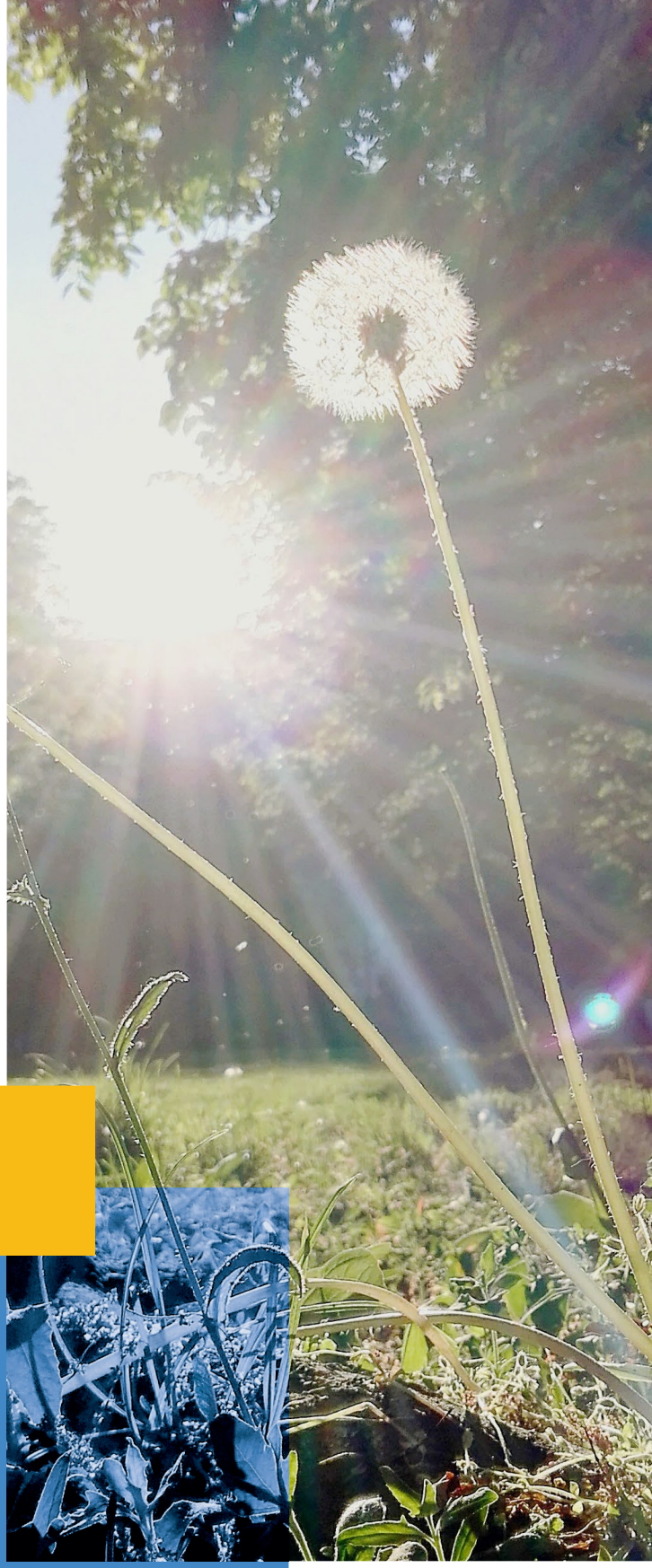
SEED

sustainable energy education

Why Soft Skills Matter:

Teamwork, Critical Thinking & Technical Excellence

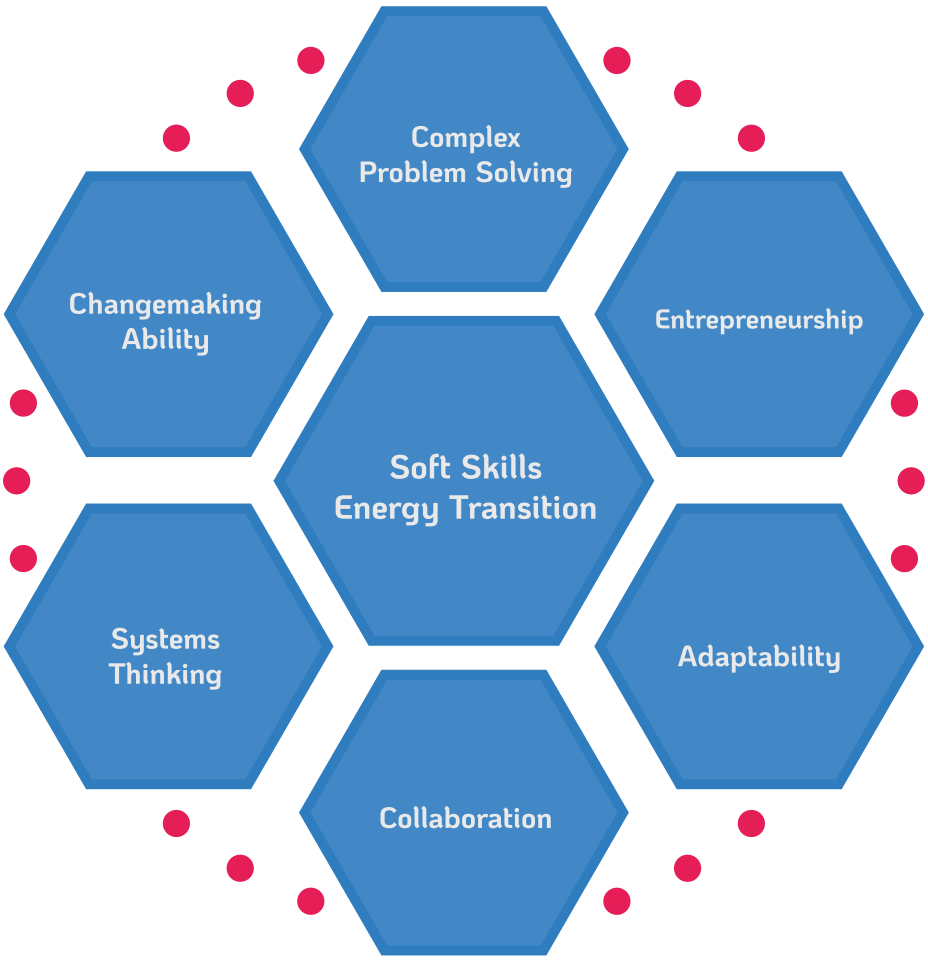
How blended learning environments and real-world projects build holistic professionals



By Frans Van Der Akker (RHDHV)

Facing Change with Confidence

For many professionals in the industry, the energy transition feels like an elusive and sometimes threatening development. While policymakers and companies discuss CO_2 reduction, electrification, and circular production, the employee on the work floor often experiences uncertainty. Questions arise: What does this mean for my job? Should I hire different people? Do I need to learn new skills? Is my factory closing or relocating?



These uncertainties can lead to a sense of paralysis. Technological and social changes are accelerating, yet the individual professional often feels they have little influence over the direction. Meanwhile, a constant stream of information about climate goals, subsidies, innovations, and regulations can lead to climate fatigue—a mental exhaustion from the pressure to constantly adapt and perform in a rapidly changing world.

Students, too, are increasingly affected by these developments. As they prepare for their future careers, many wonder: Will my chosen field still exist in ten years? Am I learning the right skills for a sustainable job market? How can I make a meaningful impact in such a complex and global issue? These concerns are valid and reflect a growing awareness among young people that the energy transition is not just a technical challenge, but a deeply personal and societal one.

Moreover, sustainability is rarely black and white. Whether you're a student or a seasoned professional, it's easy to question the direction of change: Why invest in hydrogen if it's not yet profitable? Why should we act if other countries are lagging behind? These doubts are human and understandable—but they can also reinforce the feeling that the transition is too big, too complex, and too far removed from daily life to truly engage with.

In this context, it is tempting to start learning interventions by emphasizing urgency—climate change, CO_2 targets, laws and regulations. But this focus on the problem can be counterproductive. Many people already feel overwhelmed, powerless, or fatigued by the constant stream of climate-related messages. Emphasizing what is going wrong may unintentionally deepen the sense of helplessness.

That's why we promote a different approach. Instead of focusing on limitations, we promote to highlight possibilities. Show how people—especially students and professionals in the workplace—can play a meaningful role in the transition. Through practical examples, achievable steps, and space for personal initiative, we create room for motivation and ownership. The goal is for individuals to no longer feel like spectators of an overwhelming change, but to recognize themselves as part of the solution.

This requires learning interventions that not only transfer knowledge, but also build confidence, offer actionable perspectives, and connect to everyday practice. By doing so, we empower both current and future professionals to navigate the energy transition with resilience, creativity, and purpose.

Soft skills for Complex Systems

The regional energy transition is not a simple technical project, but a complex interplay of interests, systems, and choices. It touches on infrastructure, legislation, behavior, nature, and the economy—and it requires people who can deal with uncertainty, conflicting interests, and changing circumstances.

We therefore identify several essential core skills:

- Complex problem solving is a crucial skill. It enables professionals to collaborate across sectors, explore creative solutions, and stay on course in a dynamic environment.
- Entrepreneurship means seeing opportunities instead of threats. It involves thinking along about how processes can be smarter, cleaner, or more efficient—and taking initiative to make that happen.
- Adaptability is necessary because change is happening rapidly. What works today may be different tomorrow. The ability to switch gears flexibly is a strength.
- Collaboration is more important than ever. The energy transition is not something you do alone, but together—with colleagues, suppliers, customers, and sometimes even with the neighborhood or the municipality.
- Systems thinking helps to understand how your work fits into the bigger picture. How your choices affect energy consumption, emissions, or material flows.
- Change-making ability means not waiting passively, but actively engaging. It involves daring to learn, asking questions, and bringing others along in new ways of working.

The Island Energy Challenge challenge

Fostering a mindset of positive change is essential—not only for technological innovation but also for human collaboration. This was the guiding principle behind our learning initiative, where participants engage in a dynamic team challenge centred on the energy transition of a fictional island: *The Land of Ietje*.

Rather than presenting the energy transition as a distant or overwhelming issue, the challenge invited participants to become co-creators of solutions. The program emphasizes what is possible, practical, and personally meaningful. Participants are encouraged to shift from a sense of urgency to a sense of ownership, using real-world scenarios and creative design thinking to explore sustainable futures.

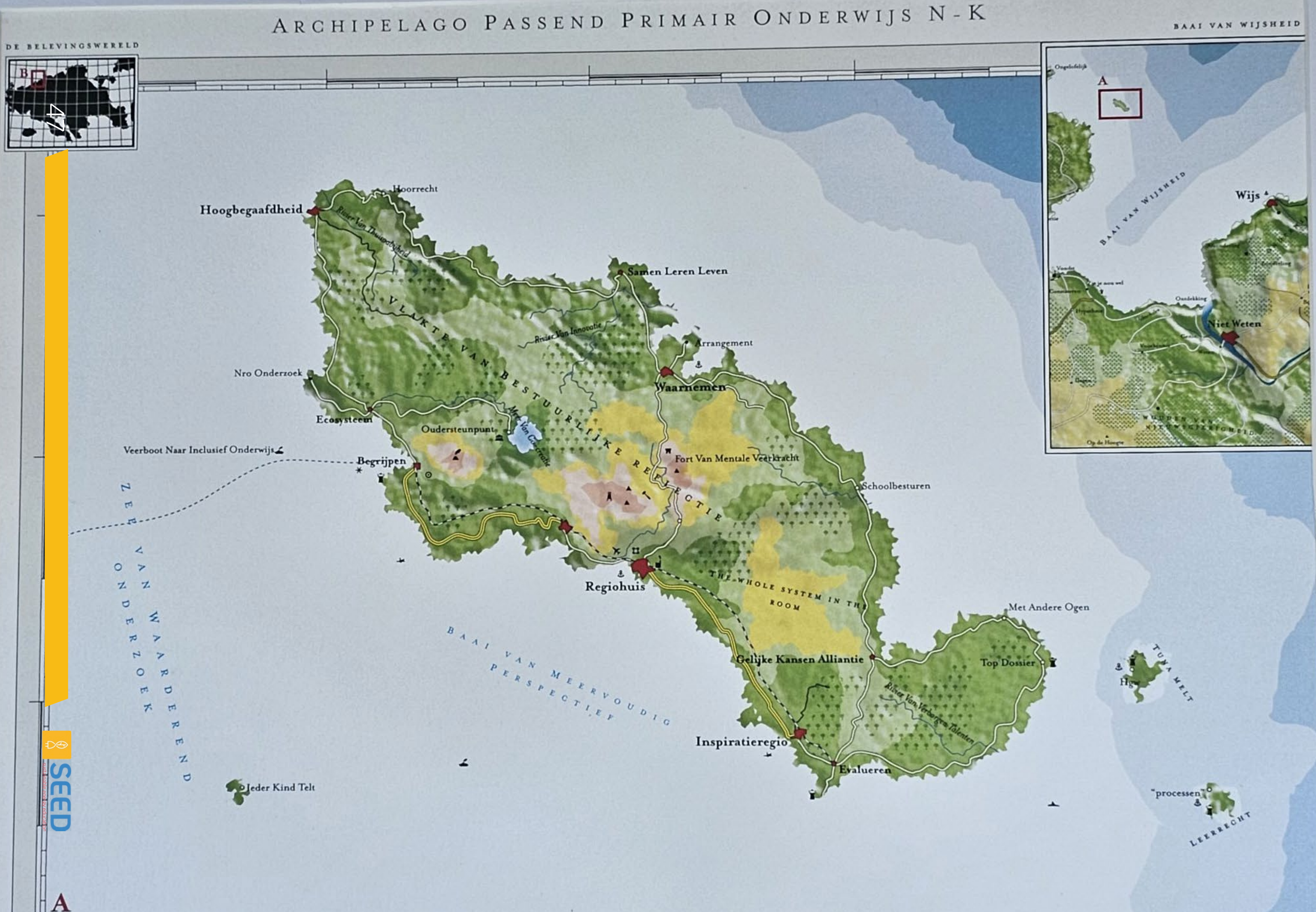
The Island as a Learning Playground

The fictional island of Ietje served as a metaphorical and imaginative space where participants could visualize, design, and test their ideas. Through storytelling, sensory engagement, and visual mapping, teams created their own ideal energy islands. When a sudden “crisis” hit—population growth and energy overload—they had to adapt quickly, drawing on their collective strengths and creativity to restore balance.

This challenge was not just about energy systems—it was about people. Participants were grouped into diverse teams based on their core qualities, using tools like the Ofman Core Quadrant model to identify strengths and potential pitfalls. Each team was then joined by a symbolic “extra team member” (e.g., Putin for power, Dalai Lama for acceptance, Elon Musk for money, Taylor Swift for influence), prompting reflection on leadership styles and group dynamics.

The challenge concludes with a reflection session, where participants shared feedback and insights. Many reported a deeper understanding of the complexity of energy transitions—and a renewed confidence in their ability to contribute meaningfully. By embedding soft skills into a playful yet realistic scenario, the program demonstrated how education can empower individuals to become agents of change.

This initiative is part of a broader movement toward practice-based, interdisciplinary learning that supports lifelong development. As we continue to navigate the energy transition, it is clear that technical knowledge alone is not enough. We need people who can collaborate, adapt, and lead with vision—and that starts with learning experiences like this one.


ARCHIPELAGO PASSEND PRIMAIR ONDERWIJS N-K
DE BELEVINGSWERELD
BAAI VAN WIJSHEID
B
A
Hoogbegaafdheid
Hoorrecht
Rivier Van Thuisnabijheid
Samen Leren Leven
VLAKTE VAN BESTUURLIJKE REFLECTIE
Rivier Van Innovatie
Arrangement
Nro Onderzoek
Waarnemen
Ecosysteem
Oudersteunpunt
Meer Van Coöperatie
Veerboot Naar Inclusief Onderwijs
Begrijpen
Fort Van Mentale Veerkracht
Schoolbesturen
Regiohuis
THE WHOLE SYSTEM IN THE ROOM
Met Andere Ogen
Gelijke Kansen Alliantie
Top Dossier
Rivier Van Verborgen Talenten
Inspiratieregio
Evalueren
ZEE VAN WAARDEREND ONDERZOEK
BAAI VAN MEERVOUDIG PERSPECTIEF
Jeder Kind Telt
TUNA MELT
Hg
"processen"
LEERRECHT
BAAI VAN WIJSHEID
Wijs
Niet Weten
Onwetendheid

The Human Factor: Problem-Solving, Leadership & Adaptability in Energy Careers

By Lukas Sturm and Martin Fortkort (GPB)

The green transition is reshaping economies around the world. New technologies, policies, and investments are accelerating the deployment of renewable energy systems and sustainable infrastructure.

But while technical expertise remains the backbone of this transformation, it is not enough on its own. Behind every successful project, there are people who can navigate complexity, build trust across borders, and adapt to rapid change. his is where soft skills become equally essential, providing the foundation for effective cooperation and long-term sustainability.

Working in the energy sector today often means working across cultures, disciplines, and regions. Teams often combine engineers, economists, policymakers, and community stakeholders. Projects may span continents, requiring collaboration across time zones and languages.

In this environment, soft skills - such as communication, emotional intelligence, and problem-solving - determine whether technical solutions can be implemented effectively. They translate innovation into impact and ensure that projects deliver both technical and social value. They enable professionals to:

- Resolve conflicts and negotiate compromises.
- Translate technical details into clear messages for non-experts.
- Build resilient teams that stay motivated under pressure.

Lessons from Experience

Practical experience from renewable-energy projects across Sub-Saharan Africa has shown how intercultural understanding is as important as engineering competence. Every country, and sometimes every community, has its own rhythm, expectations, and ways of engaging in professional settings. Technical expertise alone is not enough to bridge these differences.

In Ghana, for example, the workplace is often very formal and shaped by traditional hierarchies. Respectful interaction with superiors is expected and highly valued. At the same time, there are cultural practices to be aware of-such as using the right hand when handing over items like business cards. Doing it differently can be perceived as disrespectful, even if unintended.

Another difference often noted in international collaboration relates to task management. In Germany, when a task is assigned with a clear deadline, it is usually assumed that it will be completed without further reminders. In Ghana, however, reminding colleagues can be an integral part of the communication process; if no follow-up is made, it may be interpreted as a sign that the task is not a priority.

These insights highlight how empathy, openness, and adaptability become technical enablers in their own right. Recognising cultural norms and adjusting communication styles fosters trust and helps international teams work more efficiently. Soft skills therefore serve as bridges between diverse professional cultures, ensuring that energy projects are not only technically sound but also socially embedded and accepted by local communities.

The Added Value for Companies and the Green Economy

Across the renewable-energy sector, organisations that integrate soft-skill development into their professional training achieve stronger and more resilient project outcomes. They are better able to:

- Navigate international partnerships.
- Retain talent by fostering positive team cultures.
- Deliver innovative solutions faster and more sustainably.

This perspective is supported by project experience in Europe and Africa, where successful deployment of photovoltaic and hydrogen systems has depended not only on technical feasibility but also on communication between engineers, financiers, and local partners.

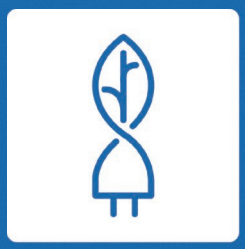
In the long term, the green economy depends not just on engineers and scientists, but on professionals who can connect, adapt, and lead. The challenges ahead such as climate change, energy security, and equitable access require as much emotional intelligence and collaboration as technical brilliance.

Conclusion & Outlook

The green transition is about people as much as it is about technology. Soft skills are not an optional extra; they are a core part of what makes projects succeed in a fast-changing world. To prepare the next generation of energy professionals, training institutions and companies alike must actively cultivate these capabilities alongside technical curricula. Communication, intercultural awareness, and leadership are not secondary skills; they are essential competences for designing and implementing renewable-energy systems that deliver lasting impact. Ultimately, to prepare the next generation of energy professionals, universities, training programs, and companies must actively cultivate these capabilities alongside technical curricula.

4

United for Sustainability: Regional & International Cooperation



SEED

sustainable energy education

Boundaries as Learning Opportunities:

Lessons from the CoVE SEED Project

By Evelien Ketelaar, Lenny van Onselen, and Esther Wijma (HU)

To address the pressing global challenge of sustainable energy, education must evolve. A regional approach—where education and industry co-create solutions—is not just beneficial, but essential. Centres of Vocational Excellence (CoVEs) offer a promising framework for this transformation. As a CoVE typically revolves around a globally relevant challenge—such as sustainable energy education— transnational collaboration between regions becomes a powerful driver of innovation and mutual learning.

Through transnational collaboration, regions actively exchange knowledge, good practices and working methods, co-develop activities and learning materials, and engage in joint research. While such collaboration appears promising and numerous examples exist across Europe, there is limited understanding of its actual benefits for learning and development within participating regions.

Drawing from experiences within the CoVE SEED project, this article presents insights for educators, policymakers, and industry partners on how transnational collaboration can strengthen sustainable energy education. The analysis applies boundary crossing theory (Akkerman & Bakker, 2011), which frames borders not as barriers, but as learning opportunities. To do so, we apply the lens of boundary crossing theory (Akkerman & Bakker, 2011). This theory views boundaries not merely as obstacles, but as opportunities for learning. A boundary is defined as a socio-cultural difference that leads to discontinuity in action or interaction.

Within CoVE SEED, numerous boundaries must be crossed. In the regional CoVEs, collaboration takes place among vocational education institutions, universities of applied sciences, public bodies, and private enterprises. From these five regional CoVEs, transnational cooperation connects diverse ecosystems—literally and figuratively crossing borders. Additionally, participants bring distinct cultural backgrounds and areas of expertise to the table, continually navigating between different professional "worlds" and co-creating new shared ones.

Although this movement between worlds can lead to friction, throughout the project, various so-called "boundary objects" were identified—artifacts, tools, or practices that help bridge differences and create shared understanding (Akkerman & Bakker, 2011). One illustrative example is the use of co-design methodology to involve regional partners in shaping innovation within sustainable energy education. The co-design method was introduced during a transnational workshop, where partners experimented with different participatory techniques for educational development. This approach not only connected stakeholders across regions but also empowered them to shape their own regional innovation strategies.

The codesign approach didn't just connect stakeholders—it empowered them to shape their own regional development plans, fostering ownership and innovation. The codesign approach was applied within each region to develop a regional development plan involving regional partners, with each region adapting the co-design techniques to fit the regional context. For example, the northern countries opted for more experimental techniques, where playfulness is accepted in education,

whereas the southern countries chose more orderly co-creation methods and involved partners by presenting ideas to suit the formal ways of working.

> The partners reviewed the different co-design methods that were presented during the co-design workshop ... They decided to follow the Double Diamond method... Last but not least, they decided to conduct a bibliographic research on different Double Diamond methods to find the most suitable template.

Excerpt from regional meeting minutes

Co-design further encouraged participants to move beyond the limits of their own expertise—particularly when preparing and facilitating workshops. Workshop leaders exchanged ideas on how to make sessions more interactive, tested new techniques, and aligned content to build on each other's work. This experimentation fostered coherence and shared purpose across transnational meetings. In this way, co-design acted as a boundary object—bridging different institutional and cultural contexts, and supporting the integration of diverse perspectives within CoVE SEED.

Through such boundary objects, boundary crossing proved not only challenging but also rich in opportunities for learning and development at individual, regional, and transnational levels alike. As Europe moves toward a sustainable future, learning to cross boundaries—between disciplines, regions, and ways of thinking—is not a luxury but a necessity. What boundaries are we ready to cross next?

SEED Connects:

Reflections from Events and the CoVEs Community of Practice

By Miriam Korstanje and Fleur Korte
(PTvT / Katapult)

From 8 to 11 September 2025, the Danish city of Kolding hosted the annual Forum on Vocational Excellence. This annual gathering has quickly become the central meeting point for Europe's Centers of Vocational Excellence, offering a unique platform where educators, project leaders, policymakers, and industry representatives come together to exchange ideas and strengthen collaboration. The 2025 edition once again confirmed the Forum's reputation as a space where ambition meets practice, and where the future of vocational education in Europe continues to take shape.

With over 350 participants from 40 countries, the diversity of perspectives was striking. The event combined formal sessions, thematic workshops, study site visits, and more informal networking opportunities, ensuring that participants could both learn from structured content and draw inspiration from spontaneous conversations.

This combination of formats created a lively atmosphere that blended dialogue, experimentation, and mutual learning. The Forum as a whole provided an inspiring blend of presentations, dialogue, and exchange that created a strong sense of belonging to a vibrant European community.

Activities of the CoP CoVEs

The Community of Practice of CoVEs is more than a network of project leaders of the CoVEs; it is a living laboratory for innovation in vocational education. Over the past years, the CoP CoVEs has facilitated peer-learning activities, joint workshops, and thematic working groups that allow members to address challenges together. Regular online exchanges and cross-CoVE collaborations keep momentum alive between annual forums, each hosted by a different country: the Basque Country in 2022, the Netherlands in 2023, France in 2024, and Denmark in 2025. These gatherings, together with ongoing cross-CoVE collaborations, support pilot projects and the sharing of curricula, methodologies, and tools. Katapult, one of the SEED partners, coordinates part of these CoP activities and contributes to strengthening cross-project dialogue.

Representatives from SEED actively participated in these meetings, finding both support and inspiration in exchanges with peers across Europe. This network of practitioners has been instrumental in sharing good practices, testing new ideas, and building the confidence to turn them into reality.

> “For me, the most valuable part of the CoP has been the sense of belonging. Talking openly with peers inspired me to rethink our strategies and reminded me of the impact we can have together.”

CoVEs for Sustainable Energy

This year’s Forum was also a key gathering for those CoVEs that focus on sustainable energy. The global energy transition is one of the defining challenges of our time, and vocational education plays a crucial role in equipping learners with the skills needed to drive it forward. Kolding offered the perfect stage for these centers to meet, to share what they are working on, and to inspire each other.

The conversations were wide-ranging: from the introduction of micro-credentials that can quickly respond to new sectoral demands, to innovative partnerships with local industries, to ways of making curricula more flexible and inclusive. Several participants noted that the most valuable part of the Forum was realizing that they are not working in isolation. They are part of a much larger European effort, each contributing from their own region but connected by a shared purpose.

Taking Home Inspiration and Purpose

By the time the Forum closed, participants were leaving Kolding with much more than notes in their conference folders. They carried home fresh perspectives on how to embed sustainability into their curricula, concrete examples of how to strengthen collaboration with industry partners, and renewed energy to take bold steps in their own institutions.

A particularly important outcome was a first step to connect the energy-focused CoVEs with the broader learning community of SEED. This initial link promises to enrich the project with practical expertise from across Europe, ensuring that work on sustainable energy education is rooted in diverse regional experiences and perspectives.

Perhaps most importantly, the Forum reinforced the feeling that vocational excellence is not an isolated endeavor. It is a European movement, made stronger by the diversity of its members and by the willingness to share, learn, and inspire each other.

Photo credits: Margus Ainsalu


SEED


unesco

5

From Training to Jobs: Bridging Education and Industry

SEED

sustainable energy education

Green jobs on the rise:

Trends & opportunities in the renewable sector

by Carlos Segui (AVAESEN)

In Europe, the renewable energy labor market is experiencing sustained growth, with socioeconomic implications and major challenges regarding gender equality. According to the "Renewable Energy and Jobs: Annual Review 2024" published by the International Renewable Energy Agency (IRENA) on October 1, 2024, employment in the renewable energy sector continues to expand, reaching 16.2 million jobs worldwide in 2023 compared to 13.7 million in 2022 (IRENA and ILO, 2024).

The same report highlights that China leads by far in the number of jobs related to the sector, accounting for 46% of global employment (7.4 million jobs), followed by the European Union with approximately 1.8 million green jobs in 2023. This notable increase has been driven by growing investments in technologies such as solar, wind, bioenergy, and other clean technologies.

Generation tecnology	Number of green Jobs 2023	Coments
Solar photovoltaics (PV)	7.1 million	Representing 44% of the world's total renewable energy workforce. China dominates with 4.6 million jobs, while the EU is a distant second with 720.000 jobs.
Hydropower	2.3 million	Down 4% from 2022, reflecting a slower pace in new additions of hydropower investments.
Biofuels	2.8 million	The bulk is in the agricultural supply chain, including seasonal and part-time work. Brazil has the largest number of jobs, at 994.000, followed by Indonesia, at 798.600.
Wind Power	1.5 million	China leads with 745.000 jobs, while secondranked Europe – still a technology leader – has some 316 300 jobs.

Source: Renewable Energy and Jobs Annual Review 2024. IRENA.

In fact, the EU recorded a new solar installation record in 2023, doubling the installation rate of 2021 and boosting job creation, which in Europe is particularly tied to the photovoltaic sector. In Spain, for example, the renewable energy sector employed 127.576 people in 2023, representing 1.13% of the national GDP, according to the APPA Renovables report (APPA Renovables – Association of Renewable Energy Companies, 2023).

Another example is the city of Bochum, in North Rhine-Westphalia (Germany), which also shows growing dynamism in renewable energies in 2024, with a sector employing thousands of people. In this state alone, around 46,000 direct renewable energy jobs were counted in 2017, according to BEE (BEE, Bundesverband Erneuerbare Energie e.V., 2025), generating around €10 billion in revenues that year. That figure has since increased thanks to the recent upturn in solar PV and wind energy.

The presence of training and innovation clusters supports this growth. Local institutions such as Hochschule Bochum are training specialists in clean energy to meet the high demand for these profiles, with "many more jobs" expected as the energy transition progresses. Looking ahead, the prospects are positive: the green economy in North Rhine-Westphalia already employs about 600,000 people (6.2% of the workforce, more than metallurgy and machinery combined), and the regional government has set a target of reaching 800,000 green jobs and €70 billion in annual added value by 2030, consolidating renewables as one of the drivers of local economic growth (Ministerium für Umwelt, Naturschutz und Verkehr des Landes Nordrhein-Westfalen, 2025).

However, the European landscape is heterogeneous. Manufacturing capacity varies across countries, and some face challenges in developing local supply chains and thus green jobs directly related to them, as highlighted by Green Forum EU (Green Forum, 2025). Meanwhile, countries such as the Netherlands maintain a significant pace of renewable adoption (17% of final energy in 2023, still below the EU average), combining imported technology with domestic innovation in energy efficiency and electric mobility. Greece also offers a paradigmatic case: its Western Macedonia region, historically dependent on coal, is undergoing a "just" energy transition. Following the phased closure of coal plants (80% of capacity retired before 2023), as noted by COAL TRANSITIONS (2025), the Greek government launched a restructuring plan focused on clean energy, more sustainable industries, and the green economy. The plan foresees the creation of 6,000 new jobs by 2028 in Western Macedonia to offset the loss of employment in the mining sector. However, that same Greek plan acknowledges that much of the local workforce will require reskilling, underscoring the importance of training and skills development as a central element to ensure that the energy transition has a positive and equitable socioeconomic impact.

Gender Equality and Green Employment

From a gender equality perspective, the renewable energy sector offers opportunities to correct the traditional imbalance in the energy industry. The Global Off-Grid Solar Industry Association (GOGLA) reports that women account for 27% of all full-time equivalent (FTE) jobs in the off-grid solar sector, and this female representation is expected to increase as the sector continues to expand (GOGLA, 2024). While trends indicate that the gender gap may narrow, the survey conducted by IRENA in 2024 highlights significant disparities, especially in science, technology, engineering, and mathematics roles, where women represent only 24% of directly related "technical" positions. However, they show

greater presence in administrative and non-technical roles (27%). The most pronounced gap, and perhaps the one where the SEED project should also focus, is in leadership positions. For example, women account for only 18% of management roles and an even lower 15% of top executive positions (IRENA and ILO, 2022). These figures clearly illustrate the persistent challenges in achieving equality at higher levels of responsibility.

Concrete Work Streams to Promote Energy Education:

Creation of Regional Centers of Excellence

Each consortium region is establishing its own CoVE in sustainable energy, with SEED providing methodological support. These centers serve as local hubs for training, innovation, and advisory services to the renewable sector. For example, in Western Macedonia, a memorandum has been signed for the first Just Transition CoVE, integrating the university, VET centers, companies, and clusters into an ecosystem that facilitates workforce reconversion and green entrepreneurship. In Valencia, the CoVE is supported by the UPV Campus, AVAESEN, and the Regional Ministry of Education to coordinate dozens of VET institutes around specialization in clean energy. In Turku, the CoVE focuses on smart energy solutions, leveraging TUAS infrastructure and the proximity of companies such as Solar Finland to offer students cutting-edge learning environments.

International Cooperation and Mobility:

One of SEED's added values is the creation of a transnational learning community. The project has organized meetings, study visits, and conferences bringing together academics, industry leaders, and policymakers from five countries. A milestone was the 1st SEED International Conference 2024 in Valencia, with 265 participants from 39 countries, 85 presentations, and multiple workshops dedicated to sustainable energy education. This international dimension fosters knowledge exchange (e.g., Dutch teachers advising Greek colleagues on methodologies, or German companies sharing digital solutions with Spanish centers) and student/teacher mobility. Exchanges have already taken place between Finnish trainers in Valencia and vice versa, and Erasmus exchanges for VET students within the CoVEs are expected to expand. International cooperation also enables the development of shared visions: in 2024 SEED produced a Regional Learning Plan and Joint Strategy aligning training competencies across regions with global sector trends.

Innovative Educational Methodologies:

SEED promotes the modernization of traditional teaching toward more practical, flexible, and student-centered models. Effective methodologies have been identified (through a comparative analysis of vocational excellence) and adapted to local contexts. For example, the Challenge-Based Learning methodology applied by HU Utrecht has been shared with centers in Greece and Spain for pilot implementation. Likewise, the use of simulators and virtual labs has been strengthened through the SEED online platform, connecting educators, students, and professionals in collaborative learning environments. An example of methodological innovation is the curriculum co-design workshop in Utrecht, where international teams worked together to design modular training units in, for instance, hydrogen energy, making them adaptable to different education systems. Specialized summer schools have also been organized: in 2023, a Summer School was held in Kozani (Greece) on the installation and maintenance of EV chargers, combining theory with intensive practice, after which participants received certifications recognized by the Greek public employment service. These pilot experiences lay the foundations for more attractive and effective permanent curricula.

Inclusion and Gender Perspective:

A cross-cutting pillar of SEED is ensuring that training actions reach diverse groups, promoting the participation of women in technical sectors and the inclusion of young people from different backgrounds. While the project itself does not segment its activities by gender, it incorporates international recommendations on equality in the energy transition.

The rise of green jobs in Europe is a tangible reality, backed by growing figures and success stories across regions. Renewable energies are consolidating as a source of quality employment, contributing to economic growth (more than 1.8 million jobs in the EU) and to social objectives such as reducing territorial and gender inequalities. However, fully seizing this opportunity requires tackling key challenges: skills mismatches, retraining workers from fossil sectors, and gender gaps in professions, among others. The experience of regions such as Valencia, Western Macedonia, Utrecht, France, or Turku shows that with the right strategies, it is possible to train for the creation of local green jobs, revitalize economies, and prepare the workforce for the ecological transition.

Upskilling the Workforce:

Training for Tomorrow's Energy Economy

by Theofano Kollatou, Athina Krestou, Fotios Tsampouris, Andreas Maropoulos, Dimitrios Tsiamitros, and Fani Tziampazi (UoWM)

Today's rapidly evolving energy sector demands not only innovative technologies but also a workforce equipped with the skills and knowledge to thrive within it. The transition from traditional energy jobs to clean, sustainable roles is not merely a future vision but an urgent necessity. Yet the question remains: how can education bridge this gap effectively?

The Need for Upskilling

As the world accelerates towards a greener future, the energy industry is shifting dramatically. Traditional jobs in sectors like automotive engineering are quickly transforming, requiring professionals to acquire new skills in electric and hybrid technologies. Adult learners and experienced professionals often face specific challenges, such as limited time, the need for relevant and practice-based content, and the demand for flexible delivery. Designing education that recognises these realities is critical for a successful transition.

Case Study Insight: Upskilling Automotive Engineers in Western Macedonia, Greece

An example from Western Macedonia, Greece, illustrates how focused training can support workforce transformation in regions transitioning to sustainable energy. A recent programme prepared automotive engineers for emerging roles in electric and hybrid vehicle technologies—demonstrating how retraining can align technical expertise with future market demand.

Key components of this successful training included:

- Development of specialised learning materials
- Online platforms for asynchronous learning allowing participants to balance work and study
- Flexible scheduling and effective logistics management, including access to labs and equipment

These design choices created a strong model for upskilling: combining theory and practice, enabling remote access, and embedding flexibility, all critical for adult learners in fast-changing sectors.

Leveraging Technology for Enhanced Learning

A recurring insight from upskilling programmes is the growing role of digital technology in enhancing learning impact. Artificial Intelligence and Machine Learning tools allow for adaptive, data-driven learning paths that respond to learner performance. Virtual Reality (VR) and simulation tools provide safe, realistic environments for practicing complex technical operations, bridging theoretical understanding with applied competence.

Collaboration between education providers, companies, and international partners ensures that upskilling programmes remain relevant to real industry needs. Shared curriculum design, exchange of trainers, and engagement with global best practices help align training content with current and emerging labour-market demands. This cross-sector cooperation is essential for equipping learners to operate confidently in both local and international contexts.

Another key takeaway is the importance of continuous evaluation. In Western Macedonia, structured feedback loops, through surveys, interviews, and assessments, helped refine the content and delivery of training. This adaptive approach keeps programmes aligned with industry evolution and learner expectations, maintaining both quality and relevance.

Challenges and Future Directions

Despite its success, replicating such programs elsewhere presents specific challenges:

- Adjusting curricula for local industry contexts
- Ensuring consistent funding and logistical support
- Balancing training demands with participants' professional commitments

To enhance impact, future initiatives could place greater emphasis on personalised learning journeys, deeper digital integration, and strengthened partnerships between education and industry at regional and transnational levels.

Bridging Today's Training with Tomorrow's Opportunities

The transition to a sustainable energy economy presents exciting yet demanding shifts in professional landscapes. Effective, flexible, and technologically empowered training programs are critical in bridging education and industry, ensuring that today's professionals are well-equipped to lead tomorrow's energy sector.

Experiences such as those in Western Macedonia underline that targeted, collaborative, and technologically advanced training can indeed unlock significant opportunities, empowering professionals and driving global progress toward sustainable development.

Real Voices:

A Learner's Story of Growth and Transition into the Sector

By Theofano Kollatou, Athina Krestou (UoWM), and Aleksi Heinonen (TUAS)

Across Europe, a new generation of engineers and technicians is discovering what it really means to work in the sustainable energy transition — not just from textbooks, but on factory floors, rooftops, and innovation labs.

Through the SEED – Sustainable Energy Education project, students from Greece and Finland stepped beyond the classroom and into real-world environments where education meets industry.

Finland: Learning by Doing — and by Listening

In June 2026, Turku, Finland became a living classroom for 30 learners from four countries who joined the SEED Summer School on Solar Photovoltaics. Organized by Turku University of Applied Sciences, Raseko Vocational School, and Solar Finland, the programme combined an online theory phase with a hands-on week exploring the full life cycle of solar panels — from manufacturing to installation and performance testing.

For Atron, a participant from Turku, it was a perfect opportunity to connect learning with real work: "It sounded like the perfect way to get hands-on experience with solar panels and see the assembly line in person," he explains. "Installing panels myself gave me a concrete view of processes I wouldn't normally get to see." Beyond technical skills, the experience was transformative on a personal level. "Interacting with people from different backgrounds was a growing experience," he adds. "The best topics come up just by talking to others — even better if it happens in a sauna or another relaxed environment."

The programme's mix of vocational and university learners created fertile ground for teamwork and idea-sharing. "One of the most helpful things was hearing how solar power is used around the world and the problems people face," Atron notes. By the end of the week, students left not only with practical know-how but also with new friends, networks, and a renewed sense of purpose. "If you're planning an exchange, this kind of international summer school is a great trial. And if you're not — it's still a great mini exchange. I'd recommend it to anyone!"

Greece: Powering Skills for the Electric Future

Three months earlier and nearly 2,500 kilometers south, the city of Kozani, Greece hosted another SEED Summer School — this one focused on Electric Vehicle (EV) Charging Infrastructure. Organized by the University of Western Macedonia and its spin-off INNORA, in partnership with PPC S.A. (Public Power Corporation), MC-Chargers, and LIME Technology, the week-long training brought together electricians, engineering students, and professionals eager to upgrade their skills. The participants learned how to install, maintain, and repair EV charging stations up to 22 kW, combining theory with live demonstrations and troubleshooting sessions. The collaboration with PPC's Training and Lifelong Learning Centre ensured that graduates left with not just knowledge but professional certification — a bridge straight into the fast-growing Greek e-mobility sector.

> "This seminar gave me the confidence to move from theory to practice. Working directly with real equipment and trainers from PPC made me realize I could actually do this for a living."

These stories illustrate how regional partnerships between universities, companies, and training centres can translate new technologies into tangible job opportunities. Beyond immediate employment prospects, they also demonstrate how hands-on, interdisciplinary collaboration fosters a culture of lifelong learning, where professionals continue to adapt, reskill, and co-create solutions in step with technological change.

A Shared Vision: Skills for the Green Transition

Both experiences — from Finland's solar rooftops to Greece's EV charging stations — point to a simple but powerful truth: effective learning occurs where education, industry, and real-world practice intersect. Through SEED's hands-on approach, students don't just learn about sustainability — they live it. Participants consistently emphasised three outcomes: stronger professional networks, a clearer sense of career direction, and a deeper understanding of how local action contributes to Europe's wider clean-energy goals.

As one Finnish participant summarised. "I learned the most from interacting with people who share the same goals and interests. It's in those conversations that the future starts to take shape."

6

SEED: Beyond the Project


SEED
sustainable energy education

SEED Lives On: Shaping the Future of Vocational Excellence

By Natalia Dokolianidou, Evridiki Mandela and Stefanos Dodouras (CluBE)

Introduction

The shift toward energy transition is creating new and transforming existing professions. Apparently, Europe's energy transition depends not only on technology, but also on people with the right skills. SEED represents this human-centred dimension of the green transition, fostering collaboration between education, industry, and regional stakeholders to align training with real labour market demands. In line with the previous statement, such a transformation should be supported by training systems that are flexible, forward-looking, and closely connected to industry. This is where the Centres of Vocational Excellence come in, bringing together stakeholders from the academia, businesses and local authorities to co-create strategies that serve the needs of the regional labour markets. Through its innovative, inclusive and regionally driven approach, SEED demonstrates how CoVEs can act as hubs of innovation and cooperation, providing a scalable blueprint for the green transition.

Building Skills for a Sustainable Future

SEED's strength lies in combining local action with European cooperation. Each region developed its own strategy to further develop their regional skills ecosystems, meet local labour market needs and energy priorities. At the same time, partners have worked closely across borders to complement and support each other through their good practices, innovative approaches and lessons learnt. Such an approach ensures innovation happens both regionally and transnationally; a basic prerequisite for a thriving European learning community.

At the core of SEED's methodology lies experiential learning. Through workshops, Summer Schools, and Living Labs, students and academics are engaged on real-world projects, i.e. from photovoltaic installations in Turku to hydrogen training in Kozani. Thus, this practical approach directly links education to the needs of the green economy, cultivating the necessary digital, green and soft skills.

SEED brings together vocational schools, universities, companies and local authorities through Public-Private Partnerships. These collaborations have created strong regional ecosystems that support both regional growth and educational excellence. The development of governance models and MoUs ensures long-term cooperation beyond the project lifecycle, promoting flexible, inclusive, and shared-responsibility approaches that can be replicated in similar Erasmus+ projects and beyond.

The SEED Toolkit: Practical Tools for Growth

SEED has created a Toolkit, validated by the project partners, with three main instruments, i.e. Skills Scan, CoVEs Maturity Assessment, and Good Practices. On one hand, this customised Toolkit aims to share knowledge, experience and good practices among SEED's regional partners. On the other hand, it is expected to support continuous improvement, cooperation, and innovation across Europe. More specifically:

1. Skills Scan: A methodology which demonstrates how stakeholders can map skills needs and skills gaps in their regional ecosystems, helping align training with labour market demands. Through surveys, interviews and comparative analysis, it provides quantitative and qualitative insights, which, in turn, can be used to develop regional strategies and design targeted training programmes.

2. CoVEs Maturity Assessment: A framework that enables CoVEs to evaluate their performance in terms of governance-, teaching-, and innovation maturity, as well as sustainability, and plan their next steps. The pilot assessment results offer comparative data, best practices and key recommendations, allowing CoVEs to identify strengths and weaknesses and to design sustainable development strategies. By using this tool, other CoVEs can align with European excellence standards, enhancing long-term sustainability and fostering transnational cooperation.

3. Good Practices: The Good Practice Booklet gathers successful methods and approaches from all SEED regions, offering inspiration and ready-to-use examples for educators and policy makers. Collecting and analysing these practices allows for the creation of a European framework of quality and innovation, supports sustainable development, and increases the attractiveness of vocational education in the context of the energy transition.

A Legacy that Grows

SEED is a dynamic, living model of cooperation, innovation, and excellence. It has shown that excellence in vocational education is not a one-time achievement but a living process. The CoVEs developed through SEED have fostered new forms of cooperation between education, industry, and regional actors, creating pathways for lasting impact and growth. This is, after all, the true essence of CoVEs: to evolve, to connect, and to empower.

SEED's networks, methods, and partnerships continue to expand beyond the project's formal end, forming a vibrant community that connects, learns, and leads. The project's outcomes are all available through the SEED online platform, ensuring that knowledge remains accessible and continues to inspire future collaborations. Through this growing digital and human network, SEED's legacy lives on, proving that when education, industry, and regions work together, Europe's green transition becomes not only stronger, but also more inclusive, resilient, and future-ready.

What if the most powerful lessons aren't written down, but experienced through playful collaboration across borders?

By Lenny van Onselen, Evelien Ketelaar (HU), Miriam Korstanje (PTvT / Katapult), Ruijing Wang, Elena de la Poza (UPV), and Minna Harju (RASEKO)

From quizzes to storyboards, and from Finnish saunas to Dutch folklore, the SEED journey showed that learning thrives when it's unexpected. Exchanging lessons learned was a key part of the CoVE SEED project. Lessons were explored, exchanged, and enriched through visits, workshops, presentations, and conferences. Knowledge is often shared through lectures and written words; however, these practices are not always the most effective for exchanging experiences. Therefore, the consortium often opted for more innovative approaches. Within the CoVE SEED project, creativity and connection—not just content—proved to be the keys to meaningful knowledge exchange.

Making Meetings Matter

Meeting minutes revealed that meetings were essential for exchanging information, making agreements, and strengthening collaboration . Although hybrid or online meetings were sometimes used, they were less effective for transferring knowledge, exchanging ideas, and getting to know partners. Attempts to include lessons learned in presentation slides proved ineffective in inspiring participants. Online meetings became genuine learning experiences only when infused with creativity or playfulness. On one occasion, the project leaders, Yvette Lanting and Martijn Rietbergen, appeared during an online meeting as traditional Dutch figures from a children's festival, instantly transforming the atmosphere.

Even the coordinators consistently began sessions with engaging activities, such as quizzes or playful icebreakers. This approach helped set the tone for more creative and engaging exchanges of lessons learned. During the transnational meetings, participants experimented with interactive methods to exchange practices and ideas, such as co-design workshops, value mapping, visualising a collaboration tree, fishbowl and sauna sessions, and storyboarding. Initially, the Dutch use of playful methods in meetings and workshops was unexpected for some international partners. The p ence for fun and interactive formats sparked both criticism and curiosity—but eventually enthusiasm—among international colleagues. Over time, all partners adopted more creative and engaging ways to exchange lessons learned and collaborate. These experiences demonstrated that fostering innovative education requires educators to experience and embrace playful, interactive learning themselves.

MissionMapping: Visualising Collaboration

In addition, the MissionMapping approach was adopted to track activities, map lessons learned, and identify connections for new initiatives. Developed by the Co-Design research group at HU University of Applied Sciences, this tool was used to create an overview of activities and a learning strategy for regional and transnational cooperation. Mission Mapping made it possible to explore activities across regions, identify gaps, and zoom in and out of different contexts, enabling both detailed and general analyses that helped partners adapt to new information and changing circumstances.

> "For me, the best lesson learnt is that it is much easier to get an overview of all regions with a visual tool like MissionMapping than with written reports or plans."

Miriam Korstanje,
Regional Coordinator, Katapult (Netherlands)

Within CoVE SEED, MissionMapping was used as a learning approach to exchange activities, lessons, and ideas at both regional and transnational levels. Each semester, it served as a learning agenda and a source of inspiration for new initiatives. The visual overview allowed partners to explore how different activities linked and supported one another, fostering interaction and connections with regional stakeholders. Five themes emerged from the MissionMap served as foundation for further international collaboration, which were (1) international project-/ challenge-based learning, (2) building and sustaining network at transnational level, (3) connecting VET to University level for a skilled future, (4) clear and dynamic vision of skills need, and (5) responsive sustainable energy education in all five regions.

Cross-Border Learning in Practice

Transnational collaboration fostered creativity and inspiration, enriching the learning experience. Exchanging knowledge and good practices stimulated learning and led to more effective approaches in sustainable energy education. Learning from diverse perspectives—from VET, higher education, company partners, and different regional and cultural contexts—brought inspiration and new ideas for the regional CoVEs that would not have emerged otherwise. Transnational collaboration and learning also created a strong foundation for developing CoVEs and implementing new practices.

> You are not alone anymore as you can learn from other regions with similar struggles

Minna Harju,
Project Coordinator, Raseko (Finland)

Lessons from Four Years of Collaboration

One of the most profound lessons from the four-year journey was that the energy transition is context-dependent, and each region requires tailored solutions. For example, in southern regions, contracts between partners typically needed to be signed before collaboration could begin, while in northern regions, a simple agreement or handshake was often sufficient. Cultural differences and the initial process of understanding all project activities presented challenges, but partners agreed that investing time early to understand different contexts and cultures was worthwhile. The developed workshop materials can help other transnational collaborations overcome similar challenges. Reflecting on the project, participants noted that initiating a learning strategy and defining concrete results earlier could have generated even greater impact. Nevertheless, the consortium succeeded in developing regional and transnational learning strategies, adopting good practices, and organising three summer schools.

MissionMapping, fishbowls, and transnational teamwork: the CoVE SEED project reimagined how vocational education can inspire change. Key takeaways from the project include:

1. Creative and engaging activities—such as quizzes, storyboards, and co-design workshops—enhanced mutual learning and collaboration.
2. Transnational collaboration fostered inspiration, creativity, and a sense of shared purpose, especially in tackling regional challenges in energy education.
3. Mission Mapping emerged as a powerful visual tool to track activities, identify gaps, and support strategic learning across regions.
4. The project highlighted the need for early development of a learning strategy, including concrete goals like summer schools.

During the final conference, the consortium will share our lessons learned through various methods that we have found most effective and practical for sharing with others. As the project reaches its conclusion, in order to continue the flow of learning, SEED partners have set up an online community where they continue to exchange lessons learned from good practices, research, and other relevant sources. In particular, partners aim to continue by maintaining current activities and initiating new ones across four themes: international student and teacher programmes (e.g., summer schools), a transnational network on energy education (e.g., conferences), educational content exchange and development (e.g., online community), and responsive curriculum (e.g., skills analysis).

Let's keep the spark alive: by sharing lessons, embracing differences, and designing learning experiences that energise both people and the planet. This journey does not end with the project itself. The SEED community now extends beyond its original partners, welcoming educators, institutions, and organisations who share the same vision of connecting skills, sustainability, and innovation. Join us!

Policy for Progress:

Recommendations for a Greener Skills Agenda

By Miriam Korstanje and Fleur Korte
(PTvT / Katapult)

Introduction

Much is happening at the European level regarding policies for a sustainable and competitive future. Recent initiatives in Brussels have reinforced the connection between green growth, industrial resilience, and education, placing vocational excellence at the centre of Europe's twin transition.

This article explores how SEED's four-year experience as a Centre of Vocational Excellence can inform these evolving frameworks. What practical lessons can help shape the EU's next skills agenda, one that supports both innovation and the green transition?

EU Green and Sustainability Policy

The European Union has set ambitious targets for a sustainable economy, most notably through the European Green Deal in 2020, which aims to achieve climate neutrality by 2050. While the previous Commission placed sustainability at the forefront, the new Von der Leyen II Commission has shifted emphasis toward competitiveness and industrial autonomy. In this context, the Clean Industrial Deal, introduced in 2025, focuses on decarbonizing industry while safeguarding Europe's competitive edge.

The market demand for sustainable solutions is growing rapidly, creating a pressing need for skilled professionals capable of leading this transition. The Clean Industrial Deal acknowledges that across sectors, from renewable energy to sustainable manufacturing, there is a significant shortage of well-trained workers. The Commission argues that the EU workforce needs to be equipped with the right skills to realize the green transition. Therefore, strengthening vocational education and training (VET) in these areas is essential to ensure Europe can meet its environmental and economic goals.

VET and Centres of Excellence: Shaping Tomorrow's Green Workforce

But what is already in place to achieve these ambitions? There is a clear intersection between EU sustainability policies and VET. In September 2025, European education ministers signed the Herning Declaration, building on earlier commitments and setting out a renewed vision for VET as a driver of Europe's green and digital transitions. It places strong emphasis on upskilling and reskilling the workforce in line with sustainability goals, ensuring VET systems are flexible, future-oriented, and closely aligned with labour market needs in emerging green sectors.

Additionally, the Union of Skills, including the STEM Education Strategic Plan, aims to strengthen education across Europe by raising overall education and skill levels while also developing specialists in key fields. In the Commission's Union of Skills, strong emphasis is placed on the pivotal role of Centres of Vocational Excellence (CoVEs) as bridges between education and industry, ensuring smoother collaboration and supporting students in making a successful transition into the labour market, and ensuring the reskilling and upskilling of the workforce.

Centres of Vocational Excellence are tasked to foster joint transnational programs, micro-credentials, and industry partnerships that directly address skills gaps in strategic sectors, including those critical for sustainability and the green transition. By coordinating education providers, pooling investments, and leveraging private sector engagement, CoVEs are positioned as catalysts for building a future-ready workforce.

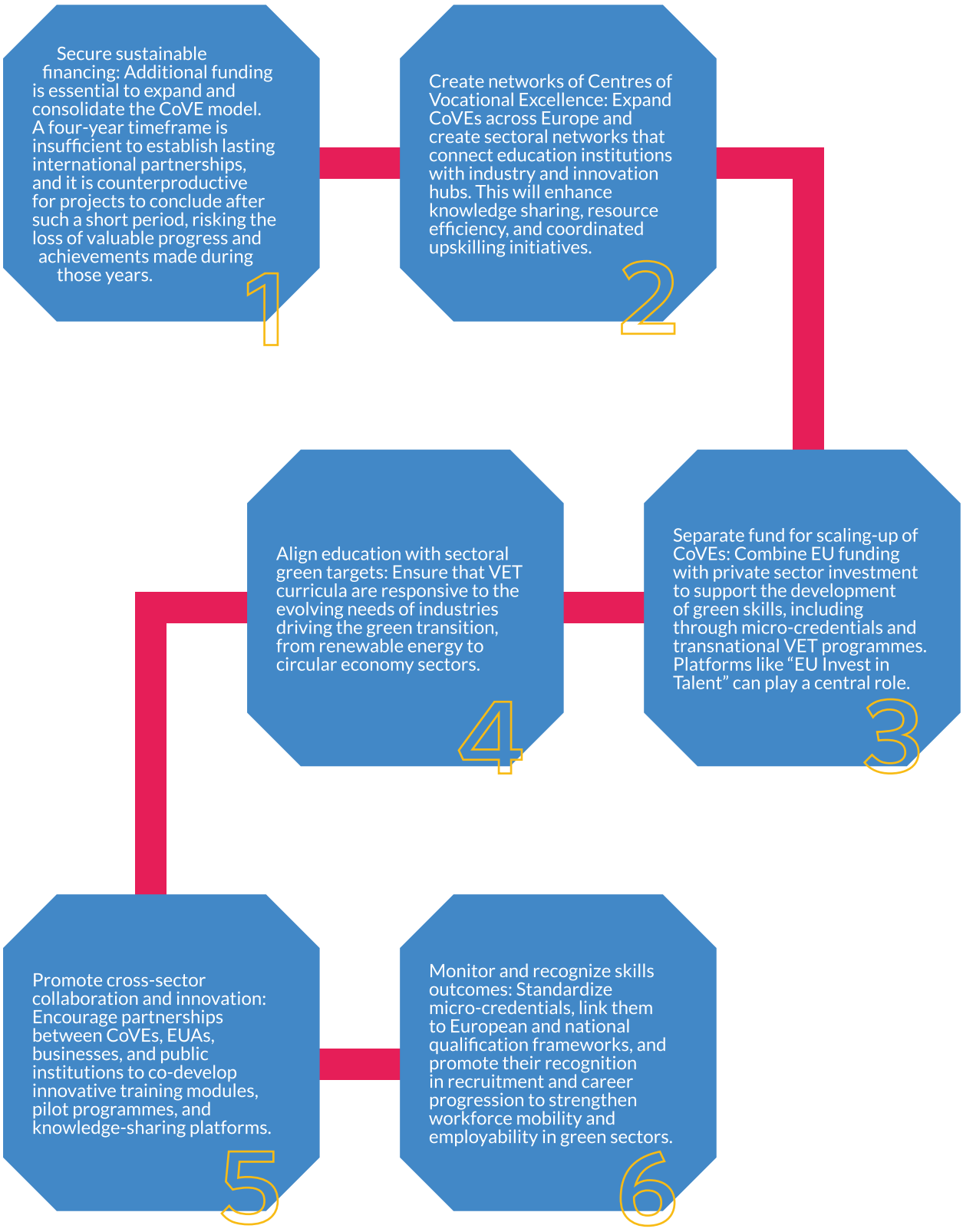
Look to the future!

The upcoming Multiannual Financial Framework (MFF) for 2028–2034 offers a key opportunity to strengthen VET across Europe. The Commission has proposed a 50% increase in the Erasmus+ budget, which could provide a major boost to Centres of Vocational Excellence (CoVEs). With additional funding, CoVEs could expand transnational programs, develop industry-aligned micro-credentials, scale-up mobility for students and staff, and deepen cooperation with European Universities and private sector partners, positioning them as drivers of a sustainable, future-ready workforce. However, the Commission's proposed increase is only the starting point of negotiations, which may take up to two years before the final budget is confirmed. Therefore, it remains uncertain how much funding will ultimately reach CoVEs and what concrete impact it will have on them.

SEED Policy Recommendations

Based on four years of hands-on experience running a Centre of Vocational Excellence, the SEED partners have gained unique insights into what works and what challenges remain in building effective VET programs. These lessons have informed a set of policy recommendations aimed at strengthening CoVEs across Europe :

Scaling up what already works should now take precedence over launching entirely new initiatives.



The SEED partners' experience demonstrates that effective collaboration between education and industry can be achieved through structured CoVE networks, stable financing, and shared European platforms.

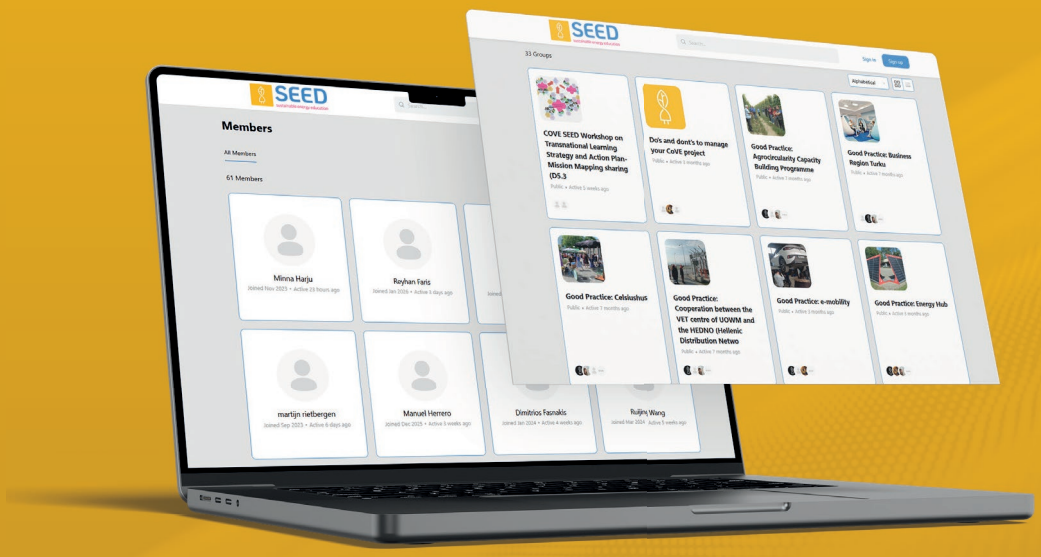
By implementing these measures, Europe can build a robust, future-ready workforce capable of leading sustainable transformation, ensuring competitiveness, and driving innovation across industries.

Join the Movement: Support the SEED Community

By Minna Harju (RASEKO)

The SEED project has built a strong foundation for developing sustainable energy expertise, but its true impact will be determined by how deeply its results become embedded in practice. One of SEED's most significant legacies is its online platform, a space that unites good practices, training materials, and lessons learned from all partner regions. More than a digital archive, it functions as an evolving knowledge hub, ensuring that the project's achievements remain active, accessible, and continuously expanded. Building on the collective learning journey of SEED, the platform embodies the project's commitment to keep collaboration alive. It transforms the exchange of lessons and practices into an ongoing movement, where new connections can continue to grow long after the project's conclusion.

For companies and stakeholders, the platform provides a long-term channel to cooperate with educational institutions beyond the duration of the project. By sharing insights on new technologies, skill needs, and practical experiences, companies help align vocational education with industry developments. In return, they strengthen their own competitiveness and ensure that future graduates possess the expertise required in a rapidly changing energy landscape. The platform therefore acts as a bridge between the practical needs of employers and the evolving methods of teaching and learning within vocational education.



For educational institutions and teachers, the platform offers access to the teaching materials and methods developed during SEED, which can be directly applied or adapted to different national contexts. These shared resources help ensure that training programmes remain current, flexible, and relevant. The platform also provides a space for reflection, where institutions can compare how sustainable energy is taught across Europe and discuss how the same practices have been interpreted and implemented locally. Lessons learned from SEED's activities, from transnational project management to hands-on training, can serve as guidance for others planning similar initiatives.

For educators, the platform also functions as a space for ongoing professional development. Access to up-to-date content, digital learning tools, and new pedagogical approaches allows teachers to strengthen their own competences while enhancing their courses. When institutions and educators use the platform collaboratively, they can jointly develop curricula and integrate authentic, practice-based learning into their programmes. The international summer schools held in Kozani and Turku, for instance, provide replicable examples of how theory, practice, and certification can be successfully combined in vocational training. Through these shared experiences, the platform transforms networking into an active process of collaboration and co-creation.

From the student's perspective, the online platform offers a gateway to understanding the green transition from multiple viewpoints. The projects, case studies, and experiences presented there expand learning beyond the limits of a single institution, allowing students to engage with real-world applications and develop their own expertise. This approach not only strengthens their professional skills but also empowers them to take an active role in advancing the green transition. In this way, SEED's continuity is ensured not only through institutions, but also through the learners who carry its lessons forward.

In a broader sense, the platform is the key to maintaining SEED's momentum and fostering the project's continuity. It should not be seen merely as an archive where outcomes are stored, but as a shared arena where knowledge continues to grow. When companies, teachers, and institutions contribute and collaborate through it, SEED's results evolve alongside the needs of society. The platform ensures that the project's impact extends far beyond its formal end, supporting sustainable energy education, innovation, and professional growth for years to come. Together, these shared efforts ensure that the spark of SEED continues to shine, inviting educators, companies, and learners across Europe to join the movement and co-create the future of sustainable energy education.

platform.coveseed.eu

Authors' Bio

Martijn Rietbergen

Heads the Centre of Expertise Smart Sustainable Cities at the University of Applied Sciences Utrecht. Specializes in sustainable development and leads applied research and education initiatives focused on energy systems, circular economy, and sustainable mobility. Coordinates innovation-driven projects that connect academia with industry and regional stakeholders. Also serves as project coordinator of the COVE SEED consortium, supporting collaborative capacity building and knowledge transfer in sustainability-oriented vocational and higher education.

Yvette Lanting

Experienced programme manager in higher education and urban area development, focusing on practice-based education that connects industry stakeholders with research and teaching activities. Has led multiple Erasmus+ research programmes within universities of applied sciences and contributes to strategic coordination of research agendas. Currently supports the development of a research framework on healthy urban living at HAS Green Academy. Areas of expertise include sustainable energy, circular economy, urban development, and sustainability transitions.

Stefanos Dodouras

Senior Project Manager at the Cluster of Bioeconomy and Environment in Western Macedonia, Greece, and heads the Sustainable and Intelligent Transition Department. Leads and coordinates initiatives that build multi-stakeholder partnerships and support regional development strategies. Work focuses on green innovation, sustainable growth, and transition planning, promoting collaboration between industry, research, and public actors to accelerate environmental and bioeconomy solutions and strengthen regional capacity for sustainable and intelligent transformation.

Eugene Zaaijer

Programme leader for Urban Innovations at the Centre of Expertise Smart Sustainable Cities (HU), working at the interface of strategy and implementation in living labs and area development for healthy and sustainable cities. Connects research, education, public authorities, and businesses through applied innovation projects and field experiments. Initiated multiple collaborative innovation formats, including Living Lab Hoefkwartier and a multi-project innovation relay model, supporting iterative solutions and continuous learning in complex urban transition challenges.

Joost Jongen

Lecturer in higher education specializing in building services engineering, simulations, and technical infographics. Contributes to applied teaching and project-based learning activities, with emphasis on clear communication of complex technical concepts. Experience includes project management, product development, energy systems, and professional training. Holds an engineering degree from Eindhoven University of Technology and combines strong technical expertise with visual communication and didactic capabilities.

Jan Lauwerijssen

Project leader of three public–private partnerships focused on innovation in vocational education and strengthening links between education, industry, and society. Supports collaborative programme development and implementation across multi-stakeholder environments. Contributes to educational innovation processes that promote sustainable co-creation with companies and knowledge institutes. Work emphasizes partnership building, applied learning models, and long-term cooperation structures that enhance relevance and impact of vocational education and training.

Lisette van Ark

Head of Nursing and Care, responsible for the development and coordination of practice-based education in the healthcare domain. Leads initiatives that strengthen applied learning and skills development for students and professionals. Co-initiated the Future Care Lab, an experiential learning environment where healthcare technologies and innovative care solutions are tested and demonstrated. Work focuses on educational innovation, technology-enabled care, and closer alignment between training programmes and real-world healthcare practice.

Ronald van Elst

Educational technology advisor with a background in teaching, specializing in the integration of digital tools in vocational education and training. Supports educational teams in adopting and applying AI and other emerging technologies in teaching and learning processes. Contributes to innovation in pedagogy through practical guidance, tool selection, and implementation support. Work focuses on improving learning effectiveness, digital readiness, and instructional innovation across vocational education environments.

Authors' Bio

Bart van Kuik

Educational consultant contributing to the development of the AI Lab in vocational education and training. Explores how artificial intelligence can enhance learning processes and educational design. Supports teachers in the practical adoption of digital innovations and AI-based tools in their teaching practice. Work focuses on pedagogical innovation, technology integration, and capacity building for educators to effectively use emerging digital solutions in learning environments.

Teemu Tuomela

Vocational education teacher from Finland with over 20 years of experience in training future electricians. Combines traditional electrical engineering instruction with modern information and automation technologies to support industry-relevant skills development. Focuses on practice-oriented learning and up-to-date technical competencies. Teaching work aims to prepare learners for the evolving requirements of the green and digital economy and the transition toward more intelligent and sustainable energy and automation systems.

Aleksi Heinonen

Senior Advisor at Turku University of Applied Sciences and a member of the New Energy Research Group. His work focuses on applied RDI and piloting real-world energy solutions in cooperation with industry and regional stakeholders. In the SEED project, he serves as the Turku Regional Coordinator, contributing to the development of the Turku COVE and supporting cooperation around future energy skills.

Mansi Mehta

Research associate at the Sustainable Technologies Laboratory at Bochum University of Applied Sciences in Germany. Contributes to applied research and project activities related to energy transition skills, sustainable urban mobility, and climate action. Supports interdisciplinary initiatives that connect technology, education, and sustainability policy. Work focuses on capacity building, innovation uptake, and the development of practical solutions that advance low-carbon transitions in urban and regional contexts.

Aizhan Ilyassova

Research associate at the Sustainable Technologies Laboratory at Bochum University of Applied Sciences in Germany. Contributes to applied research and innovation projects related to energy transition skills, sustainability, and climate action. Supports interdisciplinary collaboration between education and technology domains. Work focuses on strengthening green competencies, promoting sustainable practices, and developing knowledge-based solutions that facilitate low-carbon and resilience-oriented transitions.

Frans Van Den Akker

Strategic consultant working at the intersection of digitalization and sustainability across public and private sectors. As a senior consultant in the Digitalisation, Industry and Energy domain, supports organizations in managing technological and societal transitions. Brings expertise in systems thinking, innovation strategy, and cross-sector collaboration. Has contributed to national and European initiatives on sustainable industry, smart energy systems, and digital skills development. Focuses on translating strategy into actionable transformation pathways.

Lukas Sturm

Project engineer at Green Power Brains GmbH, responsible for the technical management of renewable energy projects. Coordinates engineering activities and supports project implementation across multiple development stages. Contributes to technical planning, system design, and performance verification to ensure feasibility and reliability. Work focuses on effective delivery of renewable energy solutions through structured engineering coordination and quality control throughout project development.

Martin Fortkort

Project manager and business developer at Green Power Brains GmbH, involved in the development and management of renewable energy projects. Supports the advancement of sustainable energy solutions by linking technical implementation with strategic planning and partnership development. Contributes to project structuring, stakeholder coordination, and market-oriented deployment approaches. Work focuses on enabling effective delivery of innovative renewable energy initiatives across diverse application contexts

Authors' Bio

Evelien Ketelaar

Educational researcher and work package leader at the research group of Vocational Education at HU University of Applied Sciences in the Netherlands. Also serves as senior lecturer, contributing to applied research and curriculum innovation in vocational education and training. Work focuses on learning design, teacher development, and evidence-based educational improvement. Actively involved in collaborative projects that strengthen the quality and impact of vocational education systems.

Lenny van Onselen

Trainer and researcher specializing in co-designing learning processes. Works as a researcher in Co-Design and advisor on innovative learning at HU University of Applied Sciences in the Netherlands. Supports the development of participatory and practice-based learning approaches across education and training contexts. Focuses on collaborative design methods, educational innovation, and learner-centered environments that strengthen engagement and effectiveness in vocational and higher education.

Miriam Korstanje

Manages international programmes at Katapult, including Centres of Vocational Excellence (CoVE) projects. Expert in public–private partnerships for education and innovation, with extensive experience in cross-border collaboration. Coordinates regional CoVE activities within SEED and supports alignment with broader European initiatives. Focuses on strengthening networks and cooperation models that advance sustainable energy education and skills development through structured partnership frameworks and knowledge exchange.

Fleur Korte

Project leader at Katapult, driving initiatives that connect STEM education, vocational training, and labor market needs. Works on European cooperation projects, including Centres of Vocational Excellence (CoVE) and STEM-focused networks. Supports cross-border partnership development and programme implementation aligned with skills and innovation agendas. Based in Brussels, contributing to close interaction with European policy processes and stakeholder platforms related to education and workforce development.

Carlos Segui

Project director with a background in environmental sciences and a master's degree in renewable energy and sustainability. Works as project manager at AVAESEN, leading national initiatives on smart cities, energy innovation, and local energy communities, as well as multiple European projects. Previously contributed to circular economy, zero-emission buildings, and clean energy programmes in research and innovation organizations. Focuses on project leadership, ecosystem development, and sustainable energy transition initiatives.

Theofano Kollatou

Laboratory teaching staff and project assistant at the Department of Electrical and Electronic Engineering, University of Western Macedonia. Supports laboratory education, technical training, and applied project activities in engineering programmes. Contributes to hands-on instruction and student supervision, linking theoretical knowledge with practical implementation. Involved in research and project support tasks that strengthen academic–industry collaboration and applied learning in electrical and electronic engineering fields.

Athina Krestou

Assistant professor at the School of Engineering, University of Western Macedonia, with a background in chemical engineering. Research focuses on advanced and nanostructured materials derived from industrial by-products and waste for sustainable and energy-related applications. Contributes to national and European research and education projects in advanced materials, circular economy, environmental technologies, and sustainable energy, supporting applied innovation and knowledge transfer activities.

Fotios Tsampouris

Project manager at the University of Western Macedonia with a background in economics and international business management. Involved in the implementation of national and European projects related to innovation and development. Research and professional focus include green and digital economics, R&D, entrepreneurship, digitalization, and upskilling and reskilling. Also manages the Digital Innovation Hub of Western Macedonia (SYNERGiNN EDIH), supporting the identification and scaling of digital technologies in the energy and environmental sectors.

Authors' Bio

Andreas Maropoulos

Research associate at the University of Western Macedonia and certified project manager with a background in mechanical engineering. Experienced in the implementation of national and European R&D projects focused on renewable energy systems and technologies. Has contributed to large-scale green energy infrastructure initiatives in Greece. Work emphasizes innovation, sustainable development, and the advancement and deployment of modern energy solutions through applied research and project coordination.

Dimitrios Tsiamitros

Professor of the Department of Electrical and Computer Engineering at the University of Western Macedonia. Has served as scientific manager of major European projects focused on intelligent transport systems and electric mobility. Experience includes coordination of large-scale initiatives such as CEF Crocodile 2 on smart transport corridors and Interreg Europe E-MOB on electric mobility policy and infrastructure. Work emphasizes innovation, transport digitalization, and sustainable mobility systems.

Fani Tziampazi

Project and administrative support specialist at the University of Western Macedonia (Special Account for Research Funds) with a background in trade and marketing. Experienced in the management and administrative coordination of national and European co-funded R&D projects. Supports implementation of European, national, and international research funding agreements and compliance procedures. Certified Benchmarking Qualified Consultant (BQC), contributing to quality-oriented project support and performance improvement processes.

Ruijing Wang

Researcher at the Economic Engineering Research Center (INECO), Universitat Politècnica de València, and member of the regional team for the COVE SEED initiative on sustainable energy education. PhD candidate focusing on electric vehicles and sustainable mobility. Brings more than ten years of private-sector experience in sales and supply-chain roles, contributing an industry-oriented perspective to research, education, and innovation projects in mobility and energy transition.

Natalia Dokolianidou

Junior project manager at the Cluster of Bioeconomy and Environment in Western Macedonia, Greece, and member of the Sustainable and Intelligent Transition Department. Contributes to the implementation and coordination of regional, national, and European projects related to sustainability and innovation. Supports partnership activities, reporting, and stakeholder engagement actions that advance green transition, environmental solutions, and bioeconomy-oriented development initiatives.

Elena de la Poza

Full professor in the Department of Economics and Social Sciences at Universitat Politècnica de València and researcher at the Economic Engineering Research Center (INECO). Serves as Vice-Rector for Employability, Lifelong Learning, and Languages. Active in European-funded projects on sustainability and education, with responsibilities in international cooperation and project leadership. Leads the Valencia regional activities of the COVE SEED initiative, supporting skills development and innovation in sustainable energy education.

Minna Harju

Project coordinator at Raisio Regional Education and Training Consortium (RASEKO), Finland, specializing in sustainable development projects. Coordinates and supports education and training initiatives related to sustainability and green transition. Contributes to project planning, implementation, and partnership cooperation across regional and international activities. Work focuses on integrating sustainable development principles into vocational education and training programmes and related collaboration projects.

Bram Smitt

Mechanical engineering lecturer at the University of Applied Sciences Utrecht with a strong focus on control engineering and simulation. Contributes to teaching and project-based learning activities in engineering education. Brings a broad interest in design and interdisciplinary problem-solving to educational practice. Supports applied and concept-driven learning approaches that connect analytical methods, modeling, and system thinking with real-world engineering challenges.

Authors' Bio

Semih Severengiz

Professor and head of the Department of Electrical Engineering and Computer Sciences, and head of the Sustainable Technologies Laboratory at Bochum University of Applied Sciences. Leads interdisciplinary research on sustainable mobility, energy systems, circular economy, and life-cycle engineering. Coordinates applied research and innovation activities that connect engineering, sustainability, and technology deployment. Work focuses on developing practical, scalable solutions that support long-term sustainable and low-impact development.

Evridiki Mandela

Project manager at the Cluster of Bioeconomy and Environment in Western Macedonia (CluBE) and researcher collaborating with multiple academic and research institutions. Involved in the coordination and implementation of national and European projects on energy, sustainability, and clean technologies. Contributes to research and innovation activities alongside project management responsibilities, supporting proposal development, technical coordination, and stakeholder engagement across interdisciplinary initiatives.

Danai Andreadi

Digital communication and web management specialist with a background in computer engineering and telecommunications from the University of Western Macedonia and postgraduate studies in digital marketing and e-business. Experience includes website development and management, social media coordination, and digital content administration. Has supported online platform operations in both public organizations and private-sector environments, contributing to digital presence, outreach, and communication effectiveness across different projects and services.

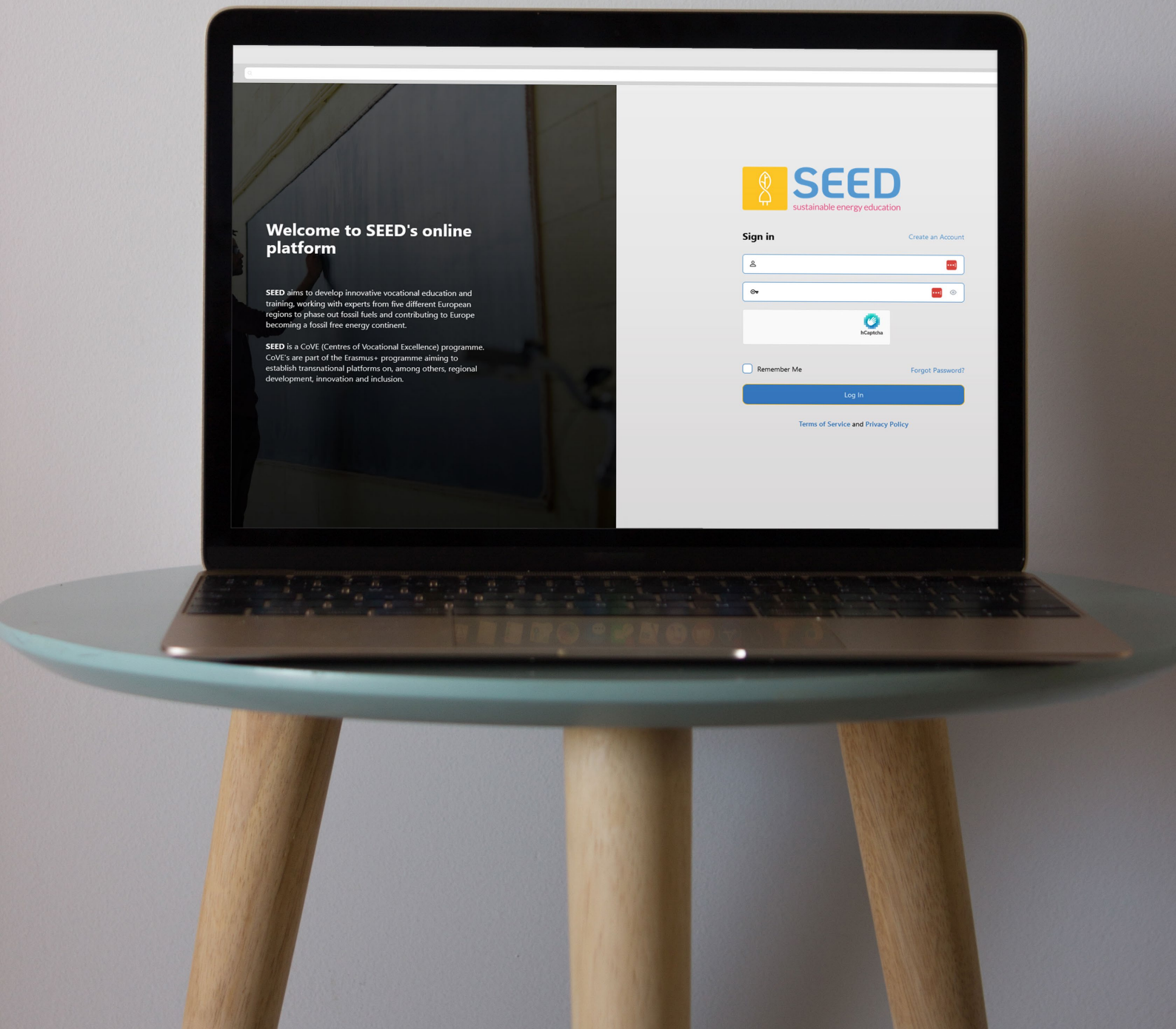
Vangelis Kalianiotis

Has been solving tech problems for more than two decades repairing computers, troubleshooting issues, and helping people get their systems working. Graphic design started as a passion but became his main profession, built through 10 years in digital printing, and strengthened by daily hands-on work. Over the last 3 years, he has expanded into web design and social media marketing, combining technical thinking with clean, effective communication. Calls himself a Creative Tech Specialist of the Cluster of Bioeconomy and Environment in Western Macedonia (CluBE).

Interested to learn more?

Scan below and join our SEED Community by participating in the thematic group of your choice:

...or simply visit platform.coveseed.eu



SEED

sustainable energy education

Find out more at coveseed.eu

Contact us at seed@hu.nl

SEED (Sustainable Energy EDucation) is a collaborative program funded by Erasmus+ that seeks to equip young people and adults with the skills and competencies necessary to face the energy challenges of the future. The program is based on the formation of CoVEs (Centres of Vocational Excellence) comprising networks of vocational education institutes, industry partners and other organisations. Through these CoVEs, SEED will work to develop excellent sustainable energy education, preparing learners, students and existing professionals with the necessary skills and competencies for the future.

SEED will provide the knowledge and resources to enable regional innovation, helping to move towards a fossil-free energy society and future-proofing the workforce. It will also empower regional innovation based on regional needs, by reinforcing the connections within the regions. Good practices on teaching and learning, partnerships with industry and educational governance will be selected, enriched and shared to ensure that learners, students and existing professionals are equipped with the skills and competencies required for the future.

In addition to providing high quality vocational skills, the goal of the program is to create an international learning community with shared standards, approaches, tools, experiences and lessons learned to achieve excellence in vocational education on sustainable energy.