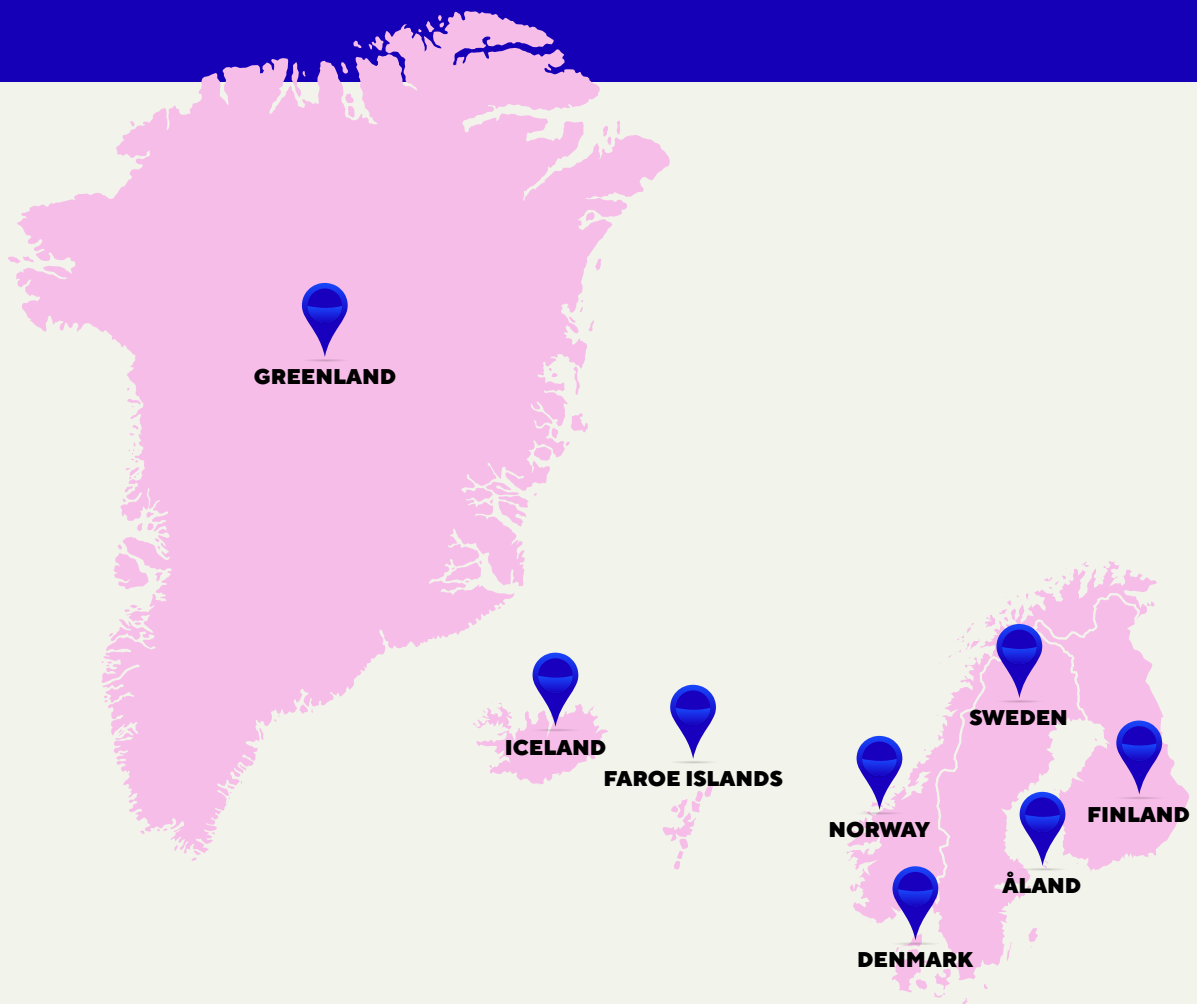
FUTUREPROOFING VET IN THE NORDICS

Nordisk Ministerråd

NCE NATIONALT CENTER FOR ERHVERVSPÆDAGOGIK

REEN SKILLS: THE PATH TO SUSTAINABLE VOCATIONAL EDUCATION IN THE NORDICS

Case magazine – Futureproofing VET in the Nordics



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INTRODUCTION

The world is undergoing rapid change, and the demand for sustainable solutions across all sectors of society is steadily increasing. We see rising adoption of electric vehicles, a heightened interest in sustainable building materials and food production, and a shared goal of a public sector that operates sustainably. To meet these expectations, the workforce needs relevant education and upskilling to align with society's evolving needs, making vocational education and training (VET) central to this transformation.

The green transition calls for many people to rethink how they carry out their work. To keep pace, vocational education institutions must also adapt. This shift towards sustainable solutions has established a new agenda for VET in multiple respects.

This case magazine highlights those leading the way. Across workplaces and educational institutions throughout the Nordic region, initiatives are actively preparing the next generation of skilled workers for this sustainable future. These workers are already key players in the green transition, interacting daily with customers and stakeholders who prioritize sustainable products, services, and processes. Therefore, it is essential that VET continues to evolve alongside these changes, equipping individuals to meet future demands.

In this case magazine, Think Tank Monday Morning and the National Center for Vocational Pedagogy present a series of cases from the Nordic countries — Denmark, Norway, Finland, the Faroe Islands, Greenland, Iceland, and Sweden. Each case illustrates how vocational education programs are working in various ways to develop skills for the green transition.

On the following pages, eight cases showcase how different industries, as well as various organizational and educational levels, are working to build competencies among both unskilled and skilled workers to address green transition-related tasks. Across these cases, themes of sustainability and climate have led to new collaborations and prompted educational and didactic considerations and approaches.

The cases presented in this magazine highlight diverse and innovative approaches to integrating sustainability into vocational education. For example, Greenland has launched a program to train rural caretakers to manage advanced sustainable energy systems and ensure eco-friendly energy supplies in remote areas. In Denmark, a collaboration between carpenters and university researchers promotes the use of sustainable building materials to accelerate the green transition in the construction industry.

Projects like Sweden's "Kompetenslyft grön industri" support the green transition within the metal industry through targeted skills development and continuing education. Finland's VASKI project has developed a comprehensive roadmap to embed sustainability across all aspects of vocational education, aiming for carbon neutrality by 2035. These cases underscore the importance of evolving educational practices to meet the requirements of a sustainable future.

Insights from the collected cases show that strategic skills development in vocational education not only prepares the workforce to meet future demands but also positions the Nordic region as a leader in global sustainability efforts.

The initiatives in this magazine aim to inspire further development and collaboration, emphasizing that vocational education is a cornerstone of the green transition. Through continuous innovation and strategic partnerships, vocational education empowers individuals and communities to drive and support sustainable change. The table below provides an overview of the cases included in this magazine.

Land	Initiative
Greenland	Securing Future Energy Supply through Training for Skilled Settlement Technicians
Iceland	Education Center Leads with Green Initiatives
Finland	Collaboration Among 61 Educational Providers to Achieve CO2 Neutrality
Denmark	Collaboration Between Researchers and Vocational Schools Allows Students to Experiment with Sustainable Building Materials
Faroe Islands	Green Transition in Culinary Education
Sweden	Greening the Metal Industry through Skills Development
Norway	Education in Energy Storage Secured through School Partnerships
Denmark	Progress in Green Initiatives within Agricultural Education

The Future of Nordic Vocational Education
This case magazine is part of the Futureproofing VET in the Nordics project, a collaboration between Think Tank Monday Morning and the National Center for Vocational Pedagogy (NCE) on behalf of the Nordic Council of Ministers. Running from 2023 to 2025, the project aims to provide insights into how Nordic vocational education can be future-proofed to support regional goals of sustainability and integration. A key objective is to connect the perspectives of young people with policy discussions on addressing the evolving challenges faced by vocational education in the Nordic region. This initiative highlights the importance of amplifying young voices and creating a platform for cross-national dialogue to tackle the complex issues vocational education encounters as Nordic labor markets and societies transform.

The project seeks to bridge young people's experiences with the political focus on developing skilled competencies that will support the green transition. Alongside this case magazine, which shares examples and initiatives, young Nordic vocational students have created a series of recommendations that aim to combat stigma, strengthen social networks, and improve facilities. The full set of recommendations and insights from young people across the Nordic countries can be found in a dedicated brief at:
futureproofingvet.com

In this case magazine, we highlight how educational providers, partners, and vocational sectors are developing programs that prepare future skilled workers for green transition tasks. We examine how green skills development can attract new groups to vocational training, the various actors and partnerships driving these training and upskilling initiatives, and the didactic and pedagogical approaches characteristic of the featured programs and projects.

Vocational Education in the Nordics
Vocational education is a key component of the educational landscape for both young people and adults across the Nordic countries.

These programs prepare individuals for roles across the public and private sectors, typically spanning 3-4 years depending on the industry. A defining feature of Nordic vocational education is its agility and adaptability to meet labor market demands, staying relevant and responsive through flexible systems that can quickly incorporate new content, teaching methods, and sustainability requirements.

A shared characteristic across Nordic vocational education is the integration of theoretical education with practical, workplace-based training. This close alignment with the labor market is essential to the effectiveness of these programs. Each Nordic country has developed its own model to strengthen this connection, tailored to national traditions and needs. Although these models vary, they all aim to provide flexible, up-to-date, and

attractive education that promotes successful workforce integration for both young people and adults.

In recent years, Nordic vocational education has adapted significantly to address the climate crisis, reflecting changes seen across many other sectors.

As electric vehicles increase, new building materials emerge, and food production, distribution, and preparation become more sustainable, vocationally trained skilled workers will be essential for repairs, construction, production, transportation, and food services. Thus, skilled workers will be pivotal in driving the green transition. For vocational education to support this transition effectively, it must adapt alongside these developments, preparing the skilled workforce of tomorrow to meet the demands of a sustainable future.//

CROSS-CUTTING FOCUS AREAS FOR ADVANCING THE GREEN TRANSITION THROUGH SKILLS DEVELOPMENT

The cases presented in this magazine reveal varied experiences across Nordic countries in promoting the green transition through education, upskilling, and competence development. Achieving a successful green transition demands a collaborative, interdisciplinary approach, with all societal sectors actively working toward shared political goals. The focus areas outlined here highlight the common priorities across the Nordic region. The cases emphasize, for example, the importance of investing in teacher competencies, as seen in Finland, and fostering collaboration across institutions, as demonstrated in Norway and Denmark.

1: Clear Political Objectives for Education and Training in the Green Transition

To enable a unified approach to the green transition, strengthened political frameworks and requirements have proven instrumental in kick-starting green education initiatives. Political support can drive curriculum development, certification programs, defined objectives within regulations, and incentives for schools and students to focus on green skills and competencies.

2: Enhanced Collaboration with External Partners

Increased collaboration with industries, businesses, and other stakeholders with expertise in sustainability strengthens green transition efforts. Partnerships can include joint projects, internships, guest lectures by researchers or industry experts, and opportunities for hands-on learning within companies. Involving external stakeholders ensures education remains practical and aligned with the latest developments in green technology and sustainable practices.

3: Cross-Institutional and Cross-Border Collaboration

Collaboration between schools and educational institutions, both within and across Nordic countries, can enhance education and facilitate knowledge-sharing. By utilizing each school's areas of strength and expertise, cross-institutional development becomes possible. This may take the form of specialized courses, projects, or internships focusing on specific aspects of the green transition.

4: Enhancing Teacher Competencies for Green Transition Education

Teachers play a vital role in preparing and training the future workforce. To equip students with green transition skills, teachers themselves need strong competencies in this area. Mapping teachers' current competencies provides insights for further training opportunities, while also ensuring access to appropriate teaching resources and sufficient time for lesson planning on sustainability topics.

5: New Learning Approaches and Skills for Emerging Target Groups

The green transition requires workers to acquire new competencies, so teachers must support students in developing the skills needed for future careers. Beyond expertise in specific subjects, teachers also need the ability to address students' diverse needs and backgrounds. Enhancing teachers' competencies, therefore, involves both technical and pedagogical training.//

GREENLAND

Unskilled Technicians Trained to Manage Future Energy Supply

In Greenland, a collaboration among the technical school, the energy supply company, and other Nordic institutions has led to the development of a program aimed at transforming unskilled technicians into skilled professionals. This initiative demonstrates how inspiration and cooperation with educational environments in other countries can help create a program that addresses local sustainability challenges.

Energy supply in Greenland is characterized by decentralization, with each town and settlement operating its own energy production facilities instead of relying on a shared supply network. Nukissiorfiit, Greenland's energy company, employs local residents to maintain and repair these facilities. These workers, known as settlement technicians, are often unskilled. However, as equipment becomes more sophisticated and requires specialized knowledge or certifications, the demand for skilled settlement technicians is increasing.

Nature and its forces play a fundamental role in life in Greenland's settlements. This reality complicates the maintenance of energy facilities due to long distances and limited transportation options. However, Greenland's natural resources also offer opportunities for local energy production using generators, as well as sustainable solutions like hydropower, wind energy, and solar panels. Therefore, settlement technicians are crucial for ensuring a stable energy supply in these areas.

A significant challenge for residents, settlement technicians, and Nukissiorfiit is that many technicians lack the necessary skills to maintain advanced equipment. This skill gap can force Nukissiorfiit to seek external assistance, resulting in periods of suboptimal operation for energy facilities. Furthermore, transporting qualified personnel to remote settlements requires significant resources, including time and fuel.

There is a growing recognition of the need for sustainable energy supply. Nukissiorfiit is working to implement more sustainable energy sources, but success hinges on well-trained and competent settlement technicians who can manage and maintain these facilities effectively.

To address these challenges, Greenland has identified the need to invest in the education and training of settlement technicians, enabling them to acquire the necessary qualifications. This initiative not only enhances supply security but also strengthens the local workforce and supports the development of sustainable energy solutions in Greenland.

As part of a comprehensive Arctic collaboration involving Kalaallit Nunaanni Teknikkimik Ilinniarfik (KTI), Nukissiorfiit, the Nordic Folk Center for Renewable Energy, Herningsholm Business College in Denmark, and Longyearbyen School of Higher Education in Svalbard, a vocational training program has been developed, inspired by the Danish training for supply operators. This program targets individuals working with water or energy supply, whether in small or large companies, and in both urban and rural settings, with a primary focus on the production of renewable energy.

In the Greenlandic context, this program specifically aims to train settlement technicians. Its goal is to equip them with the skills needed to effectively maintain and operate energy facilities in Greenland's towns and settlements. As a result, unskilled workers can be upgraded to skilled technicians through this training.

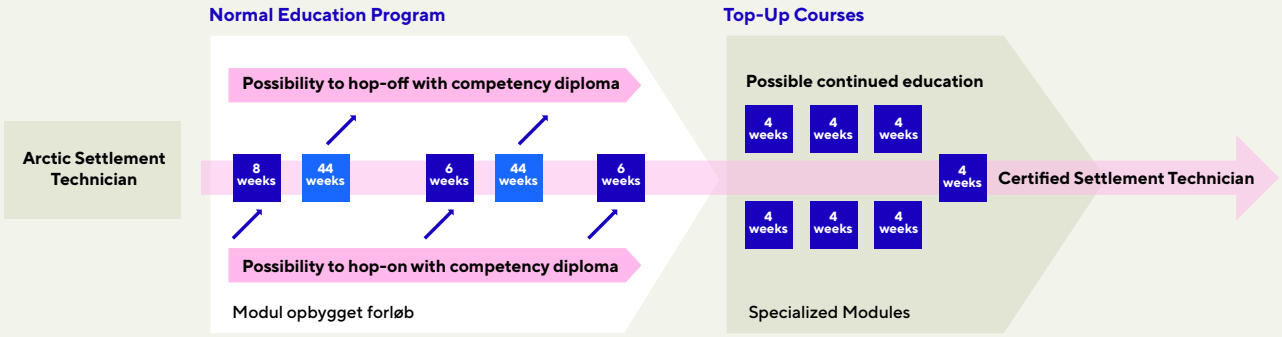
Settlement Technicians are Central to Greenland's Green Transition
Greenland's unique landscape and dispersed population present particular challenges for the supply sector. To tackle these issues, KTI and Nukissiorfiit have partnered to launch a new training program. The objective is to equip settlement technicians with the skills necessary for the smooth operation of supply facilities nationwide while advancing the green transition.

This training program, the first of its kind in Greenland, combines theoretical education with practical experience at supply facilities in the settlements. The integration of classroom learning and hands-on training makes the program both relevant and meaningful for participants. Notably, the program offers participants the opportunity to receive a competency certificate after each module. This means that upon completing each module, participants receive proof of the competencies they have acquired and are not required to finish the entire program to obtain certification.

With the authorizations and new skills gained after each module at KTI, settlement technicians will be equipped to handle more complex tasks. This capability enables them to monitor the operation and maintenance of supply facilities while actively contributing to the green transition in their daily work.

Recruitment for the program occurs in close collaboration with Nukissiorfiit, allowing previously unskilled employees to advance to skilled positions. The program equips settlement technicians with the skills necessary to maintain and repair supply facilities locally, thereby reducing the need for external assistance and minimizing downtime.

Arctic Settlement Technician



- Theory: 14 weeks
- Internship : 1 year & ½ year
- Skill Test: 2 weeks

- Specialization: 24 weeks
- Internship: 3 years
- Certification Skill's test: 4 Weeks

Developing, offering, and implementing new educational programs is rarely straightforward. KTI has faced specific challenges in recruiting qualified instructors with the appropriate language skills. As a result, KTI has had to borrow teachers from Herningsholm, a Danish vocational school, to assist with instruction in Greenland.

This shortage of local teaching capacity and expertise has led to both language and cultural barriers that needed to be overcome. To address this challenge, a form of reverse peer learning has been employed. An experienced Greenlandic instructor has supported the Danish teacher, enabling them to tackle the pedagogical and didactic challenges that arose. This support has included explaining technical terminology for which there is no Greenlandic equivalent and navigating the cultural differences between teaching at a Danish vocational school and in a Greenlandic context.//

ICELAND

Iðan Education Centre Leads the Change

As Iceland places an increasing emphasis on green transition and sustainability, Iðan Education Centre plays a pivotal role in preparing future workers to tackle environmental challenges. Iðan integrates sustainability into its programs by promoting green practices and aligning with the UN's Sustainable Development Goals. Through practical learning experiences, the centre sets an example for other educational institutions while contributing to making Iceland a leader in environmental protection and sustainable development.

In recent years, there has been a strong political desire to promote green transition and sustainability in Iceland. This island nation, renowned for its stunning landscapes and natural beauty, is increasingly aware of the need to protect its environment. Key political agendas in Iceland now focus on renewable energy, environmental protection, and climate adaptation.

Iceland is rich in renewable energy sources, particularly geothermal and hydropower. These resources are utilized to reduce reliance on fossil fuels and facilitate a transition to green energy. This commitment aligns not only with global environmental goals but also leverages Iceland's natural advantages. By focusing on renewable energy, the country aims to remain at the forefront of green energy initiatives.

To ensure the island's biodiversity, efforts are being made to manage waste and pollution effectively. This includes robust policies aimed at reducing pollution and preserving natural habitats.

Purpose-Driven Education at Iðan Education Centre
Amidst these national priorities, Iðan Education Centre stands out for its commitment to sustainability and green transition. Inspired by the UN Sustainable Development Goals (particularly Goals 4, 5, 8, and 12), Iðan aims to integrate sustainability into both its educational activities and operational practices. This includes making education accessible for individuals with disabilities, promoting gender equality, and ensuring geographic diversity and accessibility through hybrid course offerings.

Education Tailored to Labor Market Needs
Iðan Education Centre offers a wide range of vocational training programs in fields such as automotive mechanics, welding, media, and the food industry. Owned by trade unions, the centre provides training for union members, while also allowing non-members to participate. The centre caters to around 17,000 members, typically skilled workers with a vocational qualification, at an education level equivalent to EQF 5-6.

With five project managers overseeing specific areas, Iðan employs targeted advertising and mailing lists to communicate with potential participants. Most attendees come from the private sector, although employees in the public sector can also take advantage of the centre's offerings. While diplomas are awarded upon course completion, these do not carry ECTS credits.

Funding and Sustainability Initiatives
Iðan is funded by the trade union movement and also generates revenue through course fees from non-members. The centre's courses are evenly split between hard and soft skills, with an increasing emphasis on integrating green and sustainable perspectives into the curriculum. Although there is no fixed didactic manual for teaching sustainability, courses often incorporate considerations about material selection, environmental awareness, and waste management.

Annual Professional Days Promote Sustainability Focus
Each year, Iðan organizes professional days—a two-day event with a specific theme. In 2023, the focus was on sustainability. These events create a festival-like atmosphere, engaging participants in meaningful discussions and activities around the chosen theme. The annual professional days are a highlight for many attendees, offering opportunities to explore new ideas, network with peers, and gain insights into the latest trends and innovations in their fields.

Success Stories and Lessons Learned
Iðan Education Centre has learned that simplifying complex concepts is crucial for engaging skilled workers in sustainability. By adopting the philosophy of "Show it, don't tell it," instructors have effectively encouraged participants to embrace green practices. This approach emphasizes practical, hands-on learning, making it easier for attendees to understand and apply sustainable practices in their daily work.

Another success story comes from the centre's waste management initiatives. By providing clear instructions and creating an infrastructure that supports recycling, Iðan has significantly increased recycling rates—from 46% to 86% in just 18 months. This achievement underscores the importance of simplicity and clarity in promoting sustainable behaviors. Participants have responded positively to these changes, showing a willingness to adopt new habits when presented in a straightforward and manageable way.

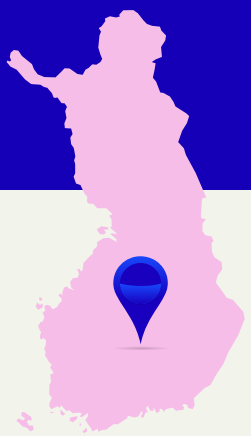
As Iceland continues to prioritize sustainability, Iðan Education Centre's efforts highlight the essential role of education in driving the green transition. By integrating sustainable practices into vocational training, Iðan is equipping a new generation of skilled workers ready to tackle future environmental challenges. The centre's innovative approaches and commitment to continuous improvement serve as a model for other educational institutions in Iceland and beyond.

In conclusion, Iðan Education Centre not only contributes to the green transition through its educational programs but also sets a standard for sustainable practices in vocational education. As Iceland works towards its environmental goals, institutions like Iðan will play a crucial role in shaping a sustainable future. Through collaboration, innovation, and a commitment to quality, Iðan is making a significant impact at both local and national levels, paving the way for a greener, more sustainable Iceland.//

For more information: https://www.idan.is/um-okkur/english

FINLAND

Finnish VET Institutions Unite for a Sustainable Future



In Finland, 61 vocational schools are collaborating to promote sustainability in vocational education through the VASKI project. This initiative is a cross-institutional effort focused on integrating sustainable practices into educational programs. This case illustrates how national collaboration can contribute to developing vocational education in a greener direction across all Nordic countries.

The VASKI project, funded by the Finnish Ministry of Education and Culture, addresses not only ecological sustainability but also social, cultural, and economic aspects of sustainability. The goal is to create lasting changes that support the Agenda 2030 goals within vocational education.

A key objective is to make vocational education CO2-neutral by 2035, which necessitates the full integration of sustainable and green methods. The project has developed a detailed sustainability roadmap that is publicly available and can serve as a resource for other institutions. This roadmap is the result of collaboration among the participating vocational schools and outlines the necessary steps toward sustainability, acting as a guide for future initiatives.

The VASKI project involves over half of Finland's vocational education providers. Many stakeholders from various sectors have contributed to the development of the interactive sustainability roadmap. A steering committee has been established to oversee the project, provide feedback, and ensure it progresses as planned.

A unique aspect of the VASKI project was the delegation of different parts of the roadmap during the development phase. This approach allowed various schools to take the lead on different sections of the roadmap, fostering new ideas and suggestions. This not only made the plan more comprehensive but also ensured that the roadmap reflects the collaborative efforts of all involved parties. The result is a roadmap that demonstrates a strong commitment to sustainable development in Finnish vocational education.

The sustainability roadmap for vocational education in Finland identifies five key pathways essential for promoting sustainability:

1. **Leadership and Operational Culture:** Cultivating a leadership approach and operational culture that prioritizes sustainability.
2. **Educational Solutions and Learning Environments**: Developing teaching methods and learning environments that support sustainable practices.
3. **Instructor Competence and Professional Identity:** Enhancing the skills and professional identities of instructors to align with sustainability goals.
4. **Partnerships:** Building and leveraging partnerships to promote sustainability initiatives.
5. **CO2 Neutrality:** Striving for CO2 neutrality in all aspects of vocational education.

In this case description, we will examine the pathway of "Instructor Competence and Professional Identity" and how the Optima vocational school addresses this area in relation to green transition and sustainability.

Optima's Journey: Transforming Vocational Education for a Sustainable Future
In a rapidly changing educational landscape, a Finnish school has been working on equipping teachers to keep pace with developments in the green sector. At Optima, a vocational school in Finland, the importance of integrating sustainability into their teaching has become clear—something that was not part of the teachers' initial education.

To become a teacher at a vocational school in Finland, a minimum of a bachelor's degree in the relevant field, 3-5 years of work experience, and specific pedagogical training directed toward vocational education is required. This pathway means that teachers' professional identities are more closely tied to their original industry rather than their pedagogical practice.

This strong connection to their original profession poses the following challenge: How can teachers be encouraged to include sustainability when it is not part of their core identity? Optima has discovered that changing teaching begins with transforming the teachers themselves.

Many instructors at Optima felt uncertain about teaching sustainability topics, especially when students, often from younger generations, were more knowledgeable about these subjects. Previously, teaching on green transition and sustainability was treated as an ancillary topic. However, as part of the VASKI project, Optima is working to make sustainability a central part of their curriculum, preparing both instructors and students for a greener future.

Optima's specific challenge was: How can instructors effectively teach topics they are not passionate about? For instance, a mechanic who loves cars but is indifferent to sustainability may struggle to find motivation to teach it. To address this, Optima has implemented a new strategy to develop instructors' competencies:

1. **Mapping Sustainability Competencies:** Optima conducted a comprehensive survey to assess teachers' sustainability competencies using the UN Sustainable Development Goals as a framework. This survey identified areas requiring further development of instructors' skills.

2. **Mandatory Engagement:** In 2023, it became mandatory for all staff to upgrade their skills or participate in sustainability activities as part of their professional development plan. This initiative ensured that every employee, regardless of their original interest or expertise, would engage with sustainability topics.

3. **Personal Development Plans:** Each employee was required to select a course or project related to sustainability as part of their development plan for the coming year. Both the school and the employee committed to supporting this development. For example, the school supported a teacher's project on composting kitchen waste by purchasing 1,000-liter containers. Another teacher was allowed to participate in a webinar on sustainability.

4. **Inclusive Learning Environment:** Optima's approach ensured that all instructors improved their skills, not just the most passionate ones. By making sustainability a common goal, the school created an environment where each teacher felt responsible for contributing to the green transition.

Optima's development department has worked to compile experiences from the above four points into the interactive roadmap. This roadmap is available in Finnish, Swedish, and English and serves as a valuable resource for other schools in Finland and potentially throughout the Nordic region. It includes case studies, practical examples, and step-by-step guides for integrating sustainability into vocational education. Additionally, it features testimonials from teachers and students, providing a realistic picture of the impact of these changes.

Optima's comprehensive approach to integrating sustainability into vocational education demonstrates a deep commitment to preparing the workforce for future challenges. By first transforming the instructors, Optima ensures that vocational education remains relevant and dynamic, capable of meeting the demands of a rapidly changing world. This effort equips teachers with the necessary skills and knowledge to instill these values in their students, thereby contributing to a more sustainable and resilient society.//

For more information and to access the online roadmap, visit: https://vaski.info/

FAROE ISLANDS

Small Steps Make a Big Difference

Klaksvík Technical School (KTS) stands as a model for green development. Through targeted initiatives, the school has integrated sustainability into its culinary program, utilizing energy-efficient induction cookers and teaching traditional cooking methods. KTS demonstrates how small steps can lead to significant changes, and the school now aims to become even greener with the ambition of offering sustainable apprenticeship programs. This example illustrates how education can drive sustainable development and inspire other regions.

In the Faroe Islands, the political agenda increasingly focuses on green transition and sustainability, recognizing the unique challenges and opportunities of the archipelago. While the needs of the Faroe Islands may differ from those of larger countries, their commitment to the green transition is no less important. Key areas prioritized in this agenda include renewable energy, sustainable fishing, waste management, sustainable transportation, and the conservation of natural resources.

The Faroe Islands are undergoing a significant shift toward renewable energy, driven by the need to reduce dependence on imported fossil fuels and limit CO2 emissions. With abundant wind and hydro resources, the islands are actively investing in these sustainable technologies to enhance energy security while meeting global climate goals.

Alongside their renewable energy initiatives, the Faroe Islands prioritize sustainable practices in their fishing industry, striving to protect fish stocks and minimize environmental impact. Furthermore, waste management efforts focus on recycling, reducing landfill waste, and promoting material reuse to foster a circular economy. To address transportation challenges and reduce CO2 emissions, the islands promote electric vehicles and improve public transport infrastructure. Central to these efforts is the preservation of the islands' natural landscapes and biodiversity, with an emphasis on sustainable land use practices and ecosystem conservation.

Klaksvík Technical School: Leading the Green Transition
Klaksvík Technical School (KTS) is at the forefront of the Faroe Islands' green transition, particularly through its culinary program. Over the past three years, the school has worked diligently to align its curriculum with political sustainability goals. The ambition is to establish a culinary program that is firmly rooted in sustainable practices and reflects broader goals for the green transition.

Key Initiatives and Focus Areas
Among the various initiatives, a focus on waste management and resource conservation is paramount. The culinary program utilizes many resources in its production processes. KTS has taken steps to reduce waste, promote recycling, and integrate sustainable practices into daily teaching.

Teachers and students are encouraged to identify workflows and materials that can be optimized with sustainability in mind. Inspired by the Copenhagen Hospitality College, KTS plans to strengthen collaboration with this Danish school and potentially introduce exchange programs to share experiences and promote green transition.

Funding and Resource Management
Interestingly, the shift toward greater sustainability has not required additional funding. Instead, increased awareness of resource usage and recycling has allowed the program to continue operating on a sound financial basis. The primary costs associated with the transition have been investments in new induction cookers and a waste sorting system, which have proven to be valuable investments. Concrete Actions and Activities

Concrete Actions and Activities
Several key initiatives have contributed to the green transition in the culinary program.

First, the transition from gas to more energy-efficient induction cookers marks a significant step toward sustainability. The establishment of a waste sorting facility not only promotes sustainable waste management practices but also serves as a practical learning tool for students.

Second, a review of the curriculum to integrate sustainability into both practical and theoretical subjects reinforces this commitment. Embracing locally grown, seasonal ingredients further reduces CO2 emissions associated with transportation, in line with the school's environmentally friendly ethos.

Last but not least, teaching traditional Faroese cooking methods such as salting and fermenting not only enriches students' culinary repertoire but also instills an appreciation for proven sustainable practices, equipping them with valuable skills for a sustainable life.

Challenges and Success Stories
Changes in the culinary program, like many transformation processes, have faced challenges. Initially, instructors found it difficult to teach students new habits, particularly regarding waste sorting. However, over time, these challenges have diminished, and students have become more engaged in sustainability efforts.

The school describes the initiative as a significant success. By adhering to the philosophy that "small steps make a big difference," KTS has transformed its culinary program. Sustainability and green transition are now integral parts of the curriculum from day one. Instructors have the freedom to experiment with what makes sense locally, creating more attractive and meaningful educational experiences for students.

Future Outlook
The vision for the future is to build on these successes and explore new sustainability opportunities that have yet to be tapped. The long-term goal is to make the program so green that it will be possible to conduct sustainable apprenticeship examinations.

Klaksvík Technical School's efforts exemplify how educational institutions can play a crucial role in driving the green transition. By integrating sustainability into vocational training for chefs, KTS is preparing a new generation of skilled workers to face future environmental challenges. Through collaboration, innovation, and a commitment to continuous improvement, the school sets a standard for sustainability in education - not only in the Faroe Islands but potentially as a model for other regions as well.//

DENMARK

Collaboration Between Researchers and Vocational Education

Denmark is taking a step toward a greener construction industry with the VIGOT project, which brings together researchers and vocational schools to integrate sustainable building materials into the carpentry curriculum. The project aims to equip future carpenters with the knowledge and skills needed to work with bio-based materials such as seaweed, hemp, and wood fibers, which can significantly reduce the construction industry's carbon footprint. Through hands-on learning and close collaboration between educators and researchers, the project bridges the gap between theory and practice.

To contribute effectively to the green transition, the construction industry must develop sustainable materials and methods. Traditional building materials and methods account for 10-15% of global CO2 emissions. Researchers from the University of Copenhagen propose that using bio-based materials like seaweed, hemp, straw, and wood fibers can serve as alternatives to current climate-damaging materials. However, to utilize this knowledge effectively, professionals must become familiar with these materials and learn how to construct with them.

The extensive knowledge and experience of researchers in sustainable building materials and methods are brought closer to future construction sites and craftsmen in Denmark through the VIGOT project-Vidensbaseret Grøn Omstilling af Tømreruddannelsen (ENG: Knowledge-Based Green Transition of the Carpentry Program).

Carpentry is one of the largest vocational programs in Denmark and represents a significant group of skilled workers. Therefore, the daily work of carpenters plays a critical role in the green transition. Their expertise in sustainable materials can influence the pace at which the green transition is implemented in Denmark's construction sector. The project supports the requirement for new buildings in Denmark to comply with climate standards.

Development and Upskilling Through Professional Collaboration
The expertise of researchers is leveraged and brought even closer to future craftsmen and construction sites through the project. Researchers and educators have partnered to equip future carpenters with the skills to work with sustainable materials. The goal is for the project to help apprentices develop the competencies necessary to understand the properties of bio-based materials and make informed decisions regarding their use. Additionally, they will be trained to build with these bio-based materials.

To achieve this ambition, a central element of the project is the collaboration between vocational school-teachers and researchers to develop teaching modules that enable carpentry apprentices to work with bio-based building materials, focusing on moisture management in these materials. These teaching modules are continuously tested and refined.

Furthermore, vocational school-teachers receive pedagogical and didactic guidance and feedback from experts in vocational education at the University College Copenhagen. These experts contribute to the ongoing development of the teaching modules and conduct regular interviews with students to ensure that the intended knowledge from university researchers is effectively communicated to the apprentices. This approach provides teachers with both technical and pedagogical training to work toward green transition qualifications.

Bridging Theory and Practice: Practical Learning with Bio-based Materials
Apprentices participating in the project are taught about bio-based materials and moisture management. They are required to construct various wall assemblies using four different types of bio-based insulation materials: straw, hemp, seaweed, and wood fibers. During this process, students experiment with the materials by testing their applications under different weather conditions. They conduct calculations to understand how moisture moves through walls at different times of the year and identify the advantages and disadvantages of various insulation types. Additionally, students calculate the CO2 footprint of the materials' life cycles - from production to disposal - to assess their environmental impact and potential for recycling, often referred to as the "cradle-to-cradle" concept.

Some of the completed wall elements produced by students are transported to the Technical University of Denmark and assembled into four small structures known as "HotBoxes." Each of these structures is insulated with one of the four materials - hemp, seaweed, straw, and wood fibers—and is oriented differently to observe the sun's effects. Moisture sensors are embedded in the wall elements, allowing students to monitor the moisture content and levels in the insulation material behind the vapor barrier online from their vocational schools.

The hope is that some of the wall constructions will demonstrate moisture-regulating properties by the end of the project, making them suitable for inclusion in what is known as "technical commons." This means that if these wall constructions meet the necessary requirements, including fire safety standards, they could become available to consumers at construction supply stores. Technical commons refer to a certification process where materials or constructions are approved for public use based on their compliance with technical standards and safety regulations.

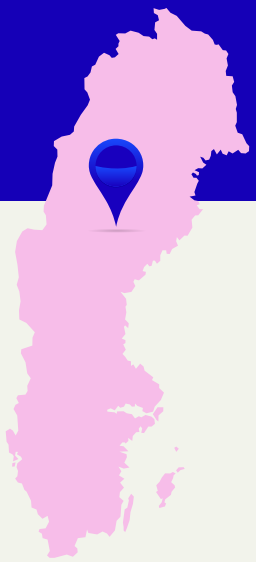
The VIGOT project aims to bridge the gap between research on bio-based materials and future craftsmen in Danish carpentry education. Through collaboration between researchers and educators, teaching modules focused on bio-based building materials are developed to equip apprentices and students with essential skills. Additionally, apprentices gain practical experience by constructing wall structures using various bio-based insulation materials and monitoring their performance.

This project illustrates that upskilling for the green transition can occur through collaborations between researchers and practitioners. Such partnerships have the potential to advance sustainable building practices within Denmark's construction industry.//

For more information about the VIGOT project, visit: https://vigot.dk

SWEDEN

Leading the Way to Sustainability



Sweden is at the forefront of environmental protection and sustainable development, with ambitious goals to achieve climate neutrality by 2045. The country is undergoing a comprehensive transition to renewable energy and is promoting a green transition through initiatives such as the "Competence Boost for Green Industry," aimed at upgrading skills in the metal industry in Norrbotten and Västerbotten. This project is supported by the EU's Just Transition Fund and involves multiple partners to ensure sustainability and global leadership.

Sweden has long been a pioneer in environmental protection and sustainable development. The nation's political agenda for green transition is highly ambitious and multifaceted, with the aim of positioning Sweden as a global leader in sustainability. Key elements of this agenda include climate neutrality, a shift to renewable energy, a circular economy, sustainable transportation, biodiversity protection, green financing, international collaboration, and public engagement.

With an ambitious goal of achieving climate neutrality by 2045, Sweden is committed to reaching net-zero greenhouse gas emissions. This commitment entails stringent reductions in emissions across sectors, combined with efforts to enhance carbon sequestration through both natural and technological means. By demonstrating leadership in global climate efforts, Sweden's dedication to fulfilling the goals of the Paris Agreement is evident.

At the forefront of Sweden's sustainability agenda is a comprehensive transition to renewable energy sources. By 2040, the nation aims to source 100% of its electricity from renewable energy, including wind, solar, and hydroelectric power. This transition not only reduces carbon emissions but also strengthens energy security and promotes economic growth through the adoption of green technologies.

Green Transition Through Skill Development in the Metal Industry
The "Competence Boost for Green Industry" project aims to support the green transition and embed a sustainability mindset within the metal industry in northern Sweden. This initiative seeks to engage small and medium-sized enterprises (SMEs) in the region, focusing on assessing employee skills and organizing training initiatives to enhance their capabilities in implementing sustainable practices.

The project is led by IUC North, a professional training firm responsible for hiring consultants to carry out skills validation and training planning. Participants include small and medium-sized enterprises in the steel and metal industries of Norrbotten and Västerbotten. The vocational school T2 is also involved, with plans to engage more vocational education institutions.

The "Competence Boost for Green Industry" project is primarily funded by the EU's Just Transition Fund, with additional financial support from project partners and Sparbanken

Nord. The strong coalition of employer and employee organizations, along with regional partners, lends legitimacy and capacity to achieve significant results. Companies can also become members of IUC North and pay for their membership, contributing to the project's financial sustainability.

A Range of Skill-Enhancing Activities
The project includes several key activities aimed at improving skills within the metal industry. Skill-enhancing initiatives are being implemented in 50 companies, involving a total of 500 individuals in Norrbotten and Västerbotten. These initiatives aim to provide knowledge and tools to employers to better organize and lead strategic skill development, while also advancing employees' skills in areas critical for addressing the green transition and maintaining competitiveness. Additionally, employees are encouraged to take personal responsibility for their own skill development.

To facilitate the transfer of skills to a sustainable industry, the project aims to create a structure of educational and promotional actors, making skill transfer easier and more efficient. This includes mapping and analyzing skill needs, providing access to industry validation, training, and skill development, as well as developing education that better meets the needs of companies and fits the workforce in the industry. The project also seeks to identify strengths within the existing actor system and address gaps or missing activities.

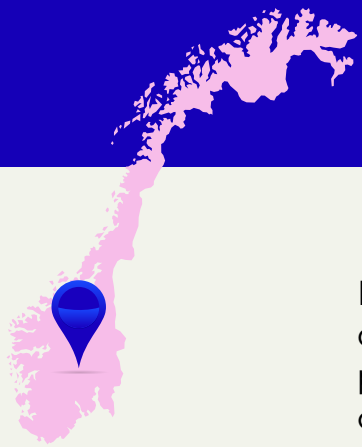
Implementing such a comprehensive green transition initiative presents challenges. Ensuring that all stakeholders are aligned and maintain momentum can be difficult. However, the project's collaborative approach and robust funding provide a strong foundation for success. The long-term vision encompasses not only the transformation of the metal industry in northern Sweden but also setting a benchmark for other regions to follow, further cementing Sweden's role as a leader in global sustainability. Through this collective effort, Sweden continues to demonstrate its strong commitment to environmental protection and sustainable development, setting an example for the world.

Despite the challenges, the project has achieved several positive outcomes. Previous studies in industrial skill development have been analyzed and revealed a lack of clearly defined educational needs for the green transition. Moreover, work has begun to define critical functions for sustainable steel and metal production. These findings have provided valuable insights and experiences that IUC North will carry forward into future projects and initiatives.//

For more information about the project, visit: https://kompetenslyftgronindustri.se

NORWAY

Development through decentral collaboration



In Norway, Viken College has been a driving force behind the development of a new modular education program in battery production. Through groundbreaking decentralized collaboration among five educational institutions and labor market partners, this program has been established to ensure the necessary skills development for skilled workers. By focusing on both the green transition and the needs of students, the college introduces innovative pedagogical measures that enable learners to succeed in their further education.

Norway boasts diverse energy sources, many of which are both green and renewable. Resources such as water, air, and sunlight are abundantly available across the Nordic region, and utilizing these energy sources can contribute to the green transition. On days of strong wind or sunlight, there is a need to store energy for periods of low wind and sunlight. This challenge is well-known in Norway, leading to a concerted effort to develop energy storage solutions as part of the green transition, with batteries emerging as a viable option.

Viken College has played a central role in establishing a modular education program aimed at equipping skilled workers with competencies in battery production. The program covers a wide range of topics, including production, logistics, technology, and maintenance related to battery production and distribution. Viken College offers continuing education at EQF levels 5 and 6. The Battery School, where the program is situated, has been realized through close collaboration between the labor market partners and the Norwegian government, with the modular structure being developed jointly by five different educational institutions.

New Challenges Require New Forms of Collaboration
To meet the demand for a qualified workforce in battery production, it was essential to quickly offer the education without compromising quality. Consequently, the five schools collaborated to develop one module of the program each.

The development of the modules occurred simultaneously and in ongoing dialogue with the labour market partners. The schools took on the task of developing modules based on their existing expertise. This meant that their core competencies were utilized to create specific professional content and courses. Working closely with the local industry, which the schools engage with on a daily basis, they were able to develop and tailor the modules for which they were responsible. For instance, one school had experience in training for mass production with a particular focus on quality assurance, making it responsible for developing modules in this area of expertise. As a result, the schools contributed their qualifications to the professional development while distributing the development burden among themselves.

This decentralized approach to educational development marks a breakthrough in the Norwegian context. However, it has not been without its initial challenges. The primary difficulties have related to the extensive coordination work required for success. Additionally, students at the Battery School have experienced different working methods depending on which school developed and offered the specific module. On the positive side, this collaboration has facilitated the rapid recruitment and training of skilled workers for jobs in battery production.

New Approaches to Engage Non-Academic Participants
Students at the Battery School all come from vocational backgrounds and often pursue their education part-time, balancing it with employment. In establishing the Battery School, Viken College has been particularly mindful of ensuring a smooth transition for these vocationally trained individuals from being employees to students.

A representative from Viken College explains that those with a vocational education background have often feared returning to school. Many have had negative experiences in education and feel unable to participate in the "right" way, which is a common sentiment among those wishing to enroll in the Battery School.

To address this uncertainty among students, Viken College has implemented two key pedagogical initiatives. The first initiative allows students to choose whether or not to take an exam for the specific module. In other words, there is no requirement to participate in the exam. At the end of the modules, students can decide whether they want to take the exam. This approach enables the school and teachers to provide students with mastery experiences in the subject before expecting performance. If a student opts not to take the exam, they will receive a course certificate as documentation of participation, but not academic credits or ECTS points, which are awarded if students choose to take the exam.

The second pedagogical initiative consists of preparatory courses for students beginning at the Battery School. These courses cover three themes: communication, practical mathematics, and basic logic, which serves as a foundation for programming. During the communication theme, participants are required to make a presentation and are also introduced to study techniques. In the other two themes, participants have the opportunity to explore some of the subject content of the program. The aim of this gentle introduction is to provide participants with mastery experiences in a school context, giving them the courage and motivation to begin and complete their education at the Battery School.

To tackle the challenges of the green transition, the Battery School has integrated the latest expertise available from similar institutions across Norway. Through close collaboration among schools, labor market partners, and the government, it has been possible to develop, offer, implement, and adapt an education that upskills a group less familiar with academic settings compared to other students at Viken College, thereby contributing to an industry capable of driving the green transition in Norway and the Nordic region.//

For more information about the Battery School, visit: https://fagskolen-viken.no/studier/elektro/batteriproduksjon

DENMARK

Cultivating Sustainability: Challenges and Initiatives in Agricultural Education

Denmark has set ambitious targets for its green transition, with the agricultural sector playing a central role in this development. Through the project "The Farmer of the Future," 11 Danish agricultural schools are collaborating to integrate sustainability into the training of future farmers. The initiative aims to equip the next generation of farmers with the skills necessary to balance environmental responsibility with economic sustainability.

Denmark's political agenda for green transition and sustainability is ambitious, aiming to reduce CO2 emissions, promote renewable energy, and ensure sustainable development.

Key objectives include achieving carbon neutrality by 2050 and reducing CO2 emissions by 70% by 2030 compared to 1990 levels. This requires significant investments in green technology and changes across various sectors, including transport, energy, and agriculture.

Agricultural policies are crucial to Denmark's efforts for a green transition. Initiatives focus on making farming practices greener by reducing emissions through support for organic agriculture and the development of technological solutions that lower methane and nitrogen emissions. Sustainable food production is a high priority, emphasizing the promotion of plant-based foods and reducing food waste.

Denmark's commitment to a circular economy further supports these efforts by encouraging recycling, waste reduction, and producer responsibility for product life cycles.

The Farmer of the Future
To meet the future green skills needs in agriculture, Danish agricultural schools conducted an analysis and launched the project "The Farmer of the Future." This initiative aims to support the green transition and sustainability in agriculture by integrating sustainable goals into farmers' education.

The 11 participating agricultural schools have come together for a comprehensive development project focused on education and mutual learning. Nearly two years into this action-learning initiative, these schools are collaborating to equip future farmers with the necessary skills and knowledge for sustainable farming practices. The project is anchored in "Danske Landbrugsskoler," an umbrella organization for Danish agricultural schools, which provides a framework and advisory support to ensure that experiences and results are disseminated across the 11 participating schools. Each school is working on specific projects tailored to their unique needs and traditions.

Tailored Projects in Agricultural Education
The primary goal of the project is to develop the professional competencies required for sustainable agriculture, both now and in the future, to promote the green transition.

This includes sustainable production methods, the introduction of new crops, the use of advanced green technologies for data management, and better utilization of biomass and resources.

In addition to professional knowledge, it is essential for agricultural students to understand that sustainability and business can go hand in hand. The project aims to demonstrate practical pathways to achieve this balance. An effective approach is through positive identification by engaging with role models who have successfully implemented sustainable practices. These role models serve as tangible examples that participants can relate to and draw inspiration from.

As part of the action-learning project, students have visited several leading examples of sustainable farming, including experiments with legumes and grass protein at the Foulum Research Center, OrganicPlantProtein, and Skive GreenLab, all pioneers in green innovation.

Integrating Sustainability into Agricultural Education: Challenges and Strategies
While sustainability is high on the public agenda, integrating it into agricultural education poses challenges, primarily because it is not a top priority for future farmers. A study on why students enroll in agricultural programs shows that sustainability is the least preferred option among them. Therefore, it is crucial to integrate sustainability into the core curriculum to clearly demonstrate how students can contribute to the green transition through their work with plants, animals, and machinery.

Another significant challenge is finding time to introduce new subjects into already crowded curricula. Before their internships, students must take exams in subjects like biology and natural sciences. This means that introducing sustainability cannot happen without discussion about whether other subjects should be removed or if curricula should be expanded to allow for greater focus on sustainability.

A third challenge is the lack of access to teaching materials. As agricultural programs cater to a relatively small number of students, few new teaching materials are developed. Financial constraints contribute to this inertia, making it difficult to introduce new subjects. Although teachers are eager to include sustainability in their curricula, they often have to develop their own teaching materials, which is time-consuming and increases their workload.

By addressing these issues as part of the "Farmer of the Future" project, agricultural education can better prepare students for a future where sustainability is integrated into their professional roles.

Promising Initiatives and Insights from Agricultural Schools
Agricultural schools have seen promising results through student-led projects aimed at improving biodiversity, enhancing soil health, and reducing food waste and energy consumption. These initiatives provide students with practical experience and the opportunity to witness the positive impact of their actions. Living on campus further engages students in these changes, integrating sustainability into their daily lives.

From the outset, the "Farmer of the Future" project has emphasized the importance of student involvement in idea development. When students see their proposed solutions taken seriously, it reinforces the value of their professional skills. This dual focus on listening to students and enhancing their professional competencies is crucial for addressing complex agricultural challenges in the future. To realize this, it is essential for teachers to stay updated with the latest technology and research.

In addition to professional knowledge and understanding of business sustainability, the project aims to equip future farmers with tools to handle resistance. The climate and sustainability debate is complex and often heated. By preparing students to engage in constructive dialogue with critics, the project seeks to foster a generation of farmers capable of navigating and contributing positively to this important conversation.//

For more information about "The Farmer of the Future": https://danskelandbrugsskoler.dk/analyser

METHODOLOGICAL APPROACH

This section outlines the process for data collection and case selection for the case magazine. The National Centre for Vocational Education (NCE) has gathered cases from various Nordic countries and autonomous regions through collaboration with relevant stakeholders.

NCE utilized the European network, ReferNet, under Cedefop to connect with partners working in vocational education across the Nordic countries. These partners, who possess insights into initiatives and projects related to the green transition, contributed cases from Sweden, Norway, Iceland, and Finland. Since Greenland, the Faroe Islands, and Åland are not members of ReferNet, cases from these areas were collected through local vocational education departments.

The selection of cases followed a systematic approach based on well-defined criteria, including relevance to the green transition, innovation, representation of diversity, and geographical distribution. These criteria were employed to identify, screen, and select the most suitable cases for the magazine, ensuring a diverse and representative collection.

Following the selection, representatives from the chosen cases were invited to participate in semi-structured interviews conducted online. These interviews, guided by a developed interview framework, allowed for an exploration of specific topics and provided a deeper understanding of each case. Analyses of the interviews and supplementary documentation ensured a comprehensive understanding and support for the results and experiences presented in the case magazine.//

FUTUREPROOFING
VET IN THE NORDICS

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