11 STRATEGIES FOR STRENGTHENED SKILLS FOR THE GREEN TRANSITION IN THE NORDICS

STOCKHOLM DECEMBER 2024

Haga Initiative
Business Climate Leaders

Nordic Council of Ministers

Skift Business Climate Leaders

CKC

Haga Initiative
Business Climate Leaders

TABLE OF CONTENTS

This report has been produced by the Haga Initiative within the vision project Climate Neutral Nordics. Climate Neutral Nordics consist of the Haga Initiative (SWE), Skift Business Climate Leaders (NOR), and Climate Leadership Coalition (FIN) and is financed by the Nordic Council of Ministers.

Produced by: Haga Initiative
In cooperation with: Skift, CLC
Part of a project funded by: Nordic Council of Ministers
Text by Philip Müller, Gabrielle Tillberg, Nina Ekelund
Layout by Jimmy Jelleryd, Daz Kleine

www.hagainitiativet.se
Published: December 2024

Executive Summary

The Nordic countries are global leaders in the green transition, leveraging their strong renewable energy capabilities and ambitious carbon neutrality goals. Despite their progress, these nations face significant challenges in meeting the growing demand for skilled workers in green industries. This report identifies key obstacles, including labor shortages, gender disparities, insufficient collaboration among Nordic countries, and gaps between industry needs and educational programs. The insights and strategies in this report are derived from workshops with industry representatives conducted between 2021 and 2023, The eleventh strategy on AI was added subsequently. The report outlines eleven strategic recommendations to address these challenges.

The 11 strategies presented can be grouped into three overarching themes.

1. **Enhanced Regional Collaboration:** Strengthen cooperation across Nordic countries to tackle shared challenges, avoid duplication, and effectively allocate resources and expertise where they are most needed. 2. **Academic and Educational Alignment:** Adapt academic institutions and training programs to better meet the demands of the green transition by fostering upskilling, reskilling, and closer collaboration with industries. 3. **Global Talent Attraction and Retention:** Create competitive and inclusive immigration policies to attract and retain international talent, ensuring the workforce is equipped to support sustainable growth and innovation.

THE 11 STRATEGIES:

1. More common platforms are needed, therefore cross-border collaboration needs to be strengthened
2. Map and coordinate shortages to reduce unnecessary bottlenecks
3. Expand knowledge sharing between Nordic countries
4. Incentives for workers to upskill, reskill, and pursue lifelong learning must be modernized and made consistent rather than sporadic
5. Build bridges between industry and academia to meet the needs of the transitio
6. Build a unified Nordic initiative for green education to effectively share competence resources
7. Attract more women to STEM education to unleash full potential in the workforce
8. Make it easy for international talent to work in the Nordics – A Nordic fast track for the green transition
9. Make the education system adaptable to rapid industrial needs
10. Each Nordic country to lead with their strengths to attract talent
11. Accelerating AI through green competence integration

Background

The Nordic countries are leading the way in the green transition, being recognized globally for their remarkable progress. The share of renewable energy in gross final energy consumption is among the highest in the world. While the EU average stands at 23 percent, the Nordic countries significantly surpass this benchmark: Iceland leads with 79 percent, followed by Norway at 75 percent, Sweden at 66 percent, Finland at 47 percent, and Denmark at 41 percent as of 2024.[1,2]

In many Nordic sectors, new groundbreaking industries are emerging, leading to both innovation as well as new challenges. Sweden is advancing in battery manufacturing with Northvolt and green steel production with Stegra. Norway is pioneering carbon capture and storage (CCS) technology with their project Longship, one of the world's first CCS project with a complete value chain for capture, transport and storage of carbon dioxide.[3] Denmark leads the way in offshore wind power, with wind energy accounting for 57 percent of its electricity mix.[4] Iceland stands out in geothermal energy, generating 25 percent of its electricity from geothermal sources.[5] Finland, aiming to become carbon neutral by 2035, is gearing up to accelerate the green transition by leveraging its unique position as the only European country with access to all minerals necessary for battery manufacturing.[6]

As these green industries evolve, the Nordic countries have a unique opportunity to lead many of these sectors globally. However, for these industries to reach their full potential, a green skilled workforce is essential to keep up the pace and make the Nordic competitive in the international arena. Currently, the output of green competencies in the Nordics remains too low, limiting the ability of multiple sectors to fully capitalize on sustainable growth opportunities.

The purpose of this report is to compile results from workshops held in 2021 to 2023 with industry stakeholders and present the result. From these workshops, 11 strategic recommendations are formulated for the Nordic countries to navigate the green transition together. By fostering cooperation, these strategies aim to streamline the necessary tools and incentives to develop, attract, and retain green skills.

The workshops are financed by The Nordic Council of Ministers and conducted by Haga Initiative (Sweden), Skift (Norway) and CLC (Finland). These workshops primarily focused on open-ended questions where attendees shared their thoughts on strategies to attract green skills to the Nordic region, methods for fostering such competencies, corporation opportunities and the challenges associated with these efforts.

The Nordic companies commitment to net-zero targets

Haga Initiative's Net Zero Report from 2024 displays a good overview of the climate ambition among the large Nordic companies. The Nordic companies are showing leadership in long-term climate commitments, though there is room to strengthen short-term targets. Currently, 50 percent of Nordic companies have set net-zero targets, but only 39 percent aim to halve emissions every decade. The leading sector is manufacturing, followed by the technology and financial sectors, displaying similar ambitions.[7]

[1] *Eurostat (2024), 'My country in a bubble'*
[2] *European Commission (2024), The future of European competitiveness: In-depth analysis and recommendations.*
[3] *CCSNorway (2024), The Longship CCS Project, Gasanova.* https://ccsnorway.com/the-project/ *(Accessed: 20 November 2024)*
[4] *IEA (2024, Denmark.* https://www.iea.org/countries/denmark *(Accessed: 20 November 2024)*
[5] *Government of Iceland (2024), Geothermal* https://www.government.is/topics/business-and-industry/energy/geothermal/ *(Accessed: 20 November 2024)*
[6] *Business Finland (2023), Finland Calls For Collaborative Action Ahead Of COP28 To Accelerate Green Transition.* https://www.businessfinland.fi/en/cop28/whats-new/news/finland-calls-for-collaborative-action-ahead-of-cop28 *(Accessed: 20 November 2024)*
[7] *Haga Initiative (2024), Nordic Countries Climate Target - Short And Long Term*

3. Skills - Where are we today?

Over half of large companies and small medium enterprises in Europe consider skill shortages one of their most pressing challenges for the future, a concern that is just as relevant in the Nordic region. Currently, green sectors account for 10 million people (5 percent) of the workforce in Europe, but this figure is expected to grow significantly as the transition to a green economy accelerates.[8] The Green Deal is projected to create 2.5 million new jobs (adding 1 percent employment growth) by 2030.[9] It's worth noting that a significant number of jobs across various sectors will transition to require green skills without a change in their job titles, a change driven particularly through upskilling and reskilling initiatives.[10]

The expected growth of green jobs is generally higher in the Nordics compared to the OECD average. While fewer than one-fifth of jobs in OECD countries are classified as green, in Sweden and Iceland, this share ranges between 22 percent and 27 percent. This number is anticipated to rise as these countries continue to invest in green industries. In Sweden, for instance, many polluting jobs in the North are expected to shift to green jobs as sustainable industries develop and expand (figure 1).[11]

Figure 1 shows green jobs (top) and polluting jobs (bottom).[12]

[8] *European Commission (2024), The future of European competitiveness: In-depth analysis and recommendations.*
[9] *Nordregio (2023), Embracing the just green transition on the Nordic labour market*
[10] *Cedefop (2021), The green employment and skills transformation.*
[11] *Nordregio (2023), Embracing the just green transition on the Nordic labour market*
[12] *Nordregio (2023), Embracing the just green transition on the Nordic labour market*

Sweden: Meeting the growing demand for skilled workers remains a challenge

In Sweden, there is currently a shortage of 100 000 skilled workers, and it is estimated that 8 000 technicians and engineers need to be recruited annually, with high chance of this number increasing over time.[13] Today, six out of ten companies estimate that they will face recruitment challenges in the future, which in turn is expected to hinder their green transition.[14]

Approximately 18 percent of examined engineers in Sweden believe they will return to a university for upskilling, corresponding to 12 000 engineers annually. This number is expected to quadruple if the trend of reskilling continues at the current pace. Comparing with today's figures, 6 000 to 7 000 engineers graduate annually. Engineers of Sweden estimates that universities currently lack the resources to meet this demand at the desired level to keep up with the skill gap.[16]

Norway: Key sectors have competence gaps with few companies seeking international talent

Næringslivets Hovedorganisasjon (NHO) estimates that two out of three businesses have an increased need for green skilled workers. According to a 2023 survey, two out of three companies were unable to recruit the necessary talent. The most significant recruitment challenges were found in the transport, construction and industrial sectors.

Approximately, 48 percent of companies have been unable to recruit a specific skill, leaving competence gaps. The strategy for the companies has reportedly been to upskill employed workers rather than looking for international talents, which only 35 percent of the companies reported as a strategy they use. [17]

Finland: Flexible academic solutions is key to minimize the skill gap

Finland faces an annual demand of 3 000 to 4 500 engineers to meet the needs of its green transition. This is in addition to the approximately 8 300 engineering graduates annually as of 2022, according to Engineers Finland.[18] The energy renovation wave in the construction industry is expected to drive the largest employment growth, followed closely by developments in the battery production and recycling ecosystem.[19]

Although Finland's educational programs generally produce engineers with the technical qualifications required for the green transition, there are concerns about their ability to adapt swiftly to changing industry demands. The agility of these programs to align with emerging workforce needs is a pressing challenge.[20]

Denmark: Reskilling and vocational training is key to bridge the large skill gap

Denmark is projected to face a shortage of 30 000 to 70 000 employees in green jobs by 2030, according to a report by Boston Consulting Group.[21] The challenge lies in both educating the domestic workforce and attracting international talent with the right qualifications.

Companies report difficulties in recruiting staff to develop and implement green products and services. By 2030, the green transition is expected to increase job demand from 20 000 jobs to 50 000 new jobs annually. Offshore wind projects are expected to create at least half of these new jobs, and the sector is expected to meet a skill gap of around 96 000 employees by 2030. The Danish labor markets rely on vocational training and reskilling as a key strategy to meet this rising demand.[22,23]

[13] *Energiföretagen (2022), Undersökning om kompetensbehov bland Energiföretagens medlemmar och branschers attraktivitet på arbetsmarknaden.*
[14] *LinkedIn (2022), Global Green Skills Report*
[15] *Sveriges Ingenjörer (2023), Goda framtidsutsikter för ingenjörer*
[16] *Svensk Verkstad (2022), Tusentals ingenjörer vill kompetensutveckla sig när nya omställningsstudiestödet införs*
[17] *Oslo Business Region (2023), New report highlights the lack of competent tech talent in Norway*
[18] *TEK (2022), Engineers Finland: Talent shortage threatens the green transition*
[19] *TEK (2022), Engineers Finland: Talent shortage threatens the green transition*
[20] *Ibid*
[21] *Boston Consulting Group (2021) Kompetence-mismatch i Danmark og den grønne omstilling frem mod 2030*
[22] *CONCITO (2022), Job til grøn omstilling Beskæftigelseseffekter ved en kommende CO2-afgift og nødvendige klimainvesteringer*
[23] *CONCITO (2022), Parat til et mere bæredygtigt samfund: Kompetencer til fremtidens grønne arbejdsmarked*

Iceland: The intellectual sector relies on foreign talent to bridge skill gaps

Approximately, 80 percent of the Icelandic companies lack staff to maintain their operations and an annual grow of around 1 800 experts is to be expected every year for the intellectual industry. To meet this increased demand, which will result in around 350 to 400 full-time positions, companies assume that half of the jobs need to be filled by foreign expertise.[24]

Building the green Nordic business landscape

The Nordic countries roadmaps toward carbon neutrality are among the most ambitious globally. Finland aims to reach this goal by 2035, Iceland by 2040, Sweden and Denmark target 2045 and Norway 2050. Across multiple sectors, these advanced plans showcase Nordic leadership, setting examples that others can follow. However, persistent shortages of skilled labor across multiple sectors threaten to slow progress and could eventually reach a critical point, jeopardizing the region's ability to meet its climate goals on time.

According to Mario Draghi's report on Europe's economic resilience, securing a self-sustaining economy requires strategic investments to build domestic production capacity, particularly in critical sectors like renewable energy and battery manufacturing. This vision aligns with the ambitions of projects like Northvolt, which aim to supply Europe's green energy needs while reducing dependencies on foreign resources. Yet, these large-scale initiatives often face financial hurdles, as the funding needed to support growth at this scale remains a significant obstacle. Alongside financial resources, a reliable and robust infrastructure is essential, ensuring that these projects have the energy, transport, and digital support required to operate sustainably and efficiently.[25]

Northvolt, Stegra and other ambitious green initiatives require a large and skilled workforce that currently exceeds the available talent pool. As these industries grow, they are heavily reliant on international talent.

[24] *SI (2022), NÍU ÞÚSUND SÉRFRÆÐINGA ÞARF TIL VAXTAR Í HUGVERKAIÐNAÐI*
[25] *European Commission (2024), The future of European competitiveness: In-depth analysis and recommendations.*

4. Obstacles for Nordic skills development today

Before delving into the specific strategies, it's important to acknowledge that while each Nordic country has unique strengths, challenges and priorities in the green transition, as mentioned above, they also face shared overarching challenges that require collective attention and cooperation.

Fishing in the same water

All Nordic countries face a significant need for additional labor, and in many cases, international workers will be essential to meet recruitment demands. This creates a considerable risk that the Nordic nations will find themselves competing for the same talent pool, effectively 'fishing in the same waters' both for talents amongst Nordic countries as well as internationally.

Such competition could strain regional collaboration and hinder efforts to address labor shortages effectively, emphasizing the need for coordinated strategies to attract and retain skilled workers across the Nordic region.

Lack of collaborations

The lack of collaboration between key Nordic stakeholders means several countries are duplicating efforts, performing the same tasks independently. This inefficiency adds to the competition for international talent and highlights the need for coordinated action to address shared challenges.

For example, Norway's plans to expand wind power can benefit from Denmark's expertise in the field. Similarly, Finland and Sweden's ambitions in battery manufacturing highlight the potential for shared innovation and knowledge exchange across the Nordic region. These examples are industry focused. It's also worth noting that highly skilled teachers are a limited resource that is key for each sector and should be strategically allocated to countries where their expertise is needed most, ensuring maximum impact across the Nordic region.

The gender gap

Europe as a whole is facing a gender gap problem, especially in high-tech employment and science, technology, engineering and mathematics (STEM) education. While progress is being made, the percentage of female employment is alarmingly low considering the challenges in skills supply that we already face (figure 2).[26]

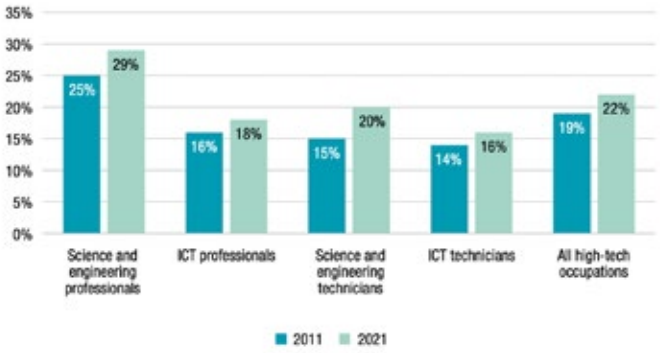


Figure 2. Progress of female employment in high-tech occupations in the EU.[27]

The Nordic countries are not an exception in regard to the gender gap in STEM roles. Only around one third of every green worker is a woman in the Nordic (figure 3). Missing out on talent from half the population is not only a social inequity but also a missed opportunity to fully leverage the potential for innovation and growth in the green transition. Addressing this gap is essential to building a more inclusive, bigger and effective labor supply.

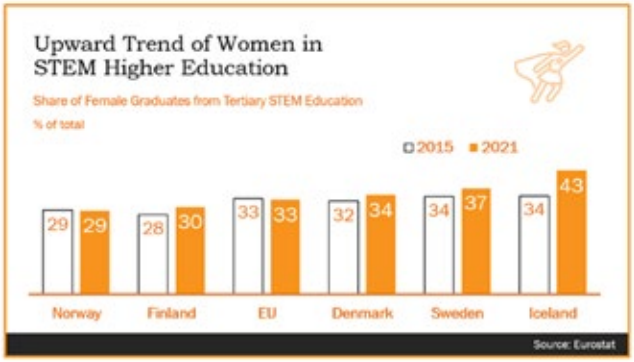


Figure 3. Showing the share (percent) of female graduates from STEM education in the Nordics.[29]

[26] *CEDEFOP (2023) Skills in transition: the way to 2035*
[27] *Ibid*
[28] *Nordic Council of Ministers, Why green jobs also need to be gender-equal*
[29] *Linkedin (2024), Nordic Insights 'Bridging the Gap (2/5): Iceland's Success in Closing the Gender Gap'* https://www.linkedin.com/pulse/bridging-gap-25-icelands-success-closing-gender-nordic-insights-zq4mf/ *(Accessed: 20 November 2024)*

5. 11 Strategies for building skills in the Nordics

1. More common platforms are needed, therefore cross-border collaboration needs to be strengthened

The Nordic countries share interconnected cultures, markets, and conditions, which should drive collaboration rather than competition. Lack of coordination may slow down the climate transition and raise costs. There are also challenges in harmonizing regulations. To overcome this, the Nordic region needs shared platforms for skill exchange, joint policies, harmonized educational programs, and a unified workforce approach. The Nordic countries could jointly investigate this to establish a Nordic platform, for example, the Nordic battery value chain could serve as a pilot project.

2. Map and coordinate shortages to reduce unnecessary bottlenecks

Annual mapping and coordinating labor shortages in the Nordics is essential to address industry mismatches, gender gaps as well as understanding how workers move across countries which can help fill critical jobs and prevent the 'fishing in the same water' -problem.

3. Expand knowledge sharing between Nordic countries

STEM education programs in one Nordic country are often applicable across the region, yet knowledge transfer between academic institutions and workplaces remains underutilized. By sharing expertise, such as Denmark's wind power know-how supporting Norway's wind power expansion efforts, the Nordic countries can accelerate their collective progress in key sectors.

4. Incentives for workers to upskill, reskill, and pursue lifelong learning must be modernized and made consistent rather than sporadic

The green transition demands a workforce skilled in sustainable practices now, yet many workers lack access to modular courses that align with their job. In the Nordic context, where industries and labor mobility are closely linked, upskilling and reskilling are critical to maintaining competitiveness and sustainability. While initiatives exist, they have mostly been sporadic.

As a successful example, Finland's adult learning system leads the EU, with 25.2 percent of adults aged 25 to 64 participating in training compared to the EU average of 11.9 percent. Finland's success is partly due to a positive attitude towards lifelong learning as well as welcoming of non-formal learning opportunities together with government funded programs that correlates to labor market needs.[30] The trade unions could play an important role in driving skills development through digital modules across the Nordic countries.

5. Build bridges between industry and academia to meet the needs of the transition

Opportunities for valuable collaboration between universities and green industries risk being missed without stronger connections. In the Nordic region, where cross-border initiatives could open wider job markets, aligning academic programs with industry needs is essential. Joint research, internships, and co-developed curricula can maximize these opportunities, preparing a workforce for sustainable growth across the Nordics.

An example of linking industry and education was implemented at the Royal Institute of Technology (KTH), where students in industrial education programs conducted study visits to industries during the first four weeks of their studies. This gave students a clear sense of direction in their education while enabling companies to communicate their specific competence needs to students directly.[31]

[30] *KTH (2024), Lyckat veckolångt studiebesök visar nära samarbete med industrin*
[31] *KTH (2024), Lyckat veckolångt studiebesök visar nära samarbete med industrin*

6. Build a unified Nordic initiative for green education to effectively share competence resources

The Nordics are leading the green transition and need qualified teachers from both the region and abroad to stay at the forefront. To meet a higher number of reskill demand there is a shortage of qualified teachers delivering effective education in green fields. Digital courses focusing on specialized skills could be an effective way to share competence resources among the Nordic countries. If each Nordic country seeks the same expertise independently, there is a risk of diluting the available knowledge. A more strategic approach would involve coordinating efforts to allocate experts to regions where their sector-specific expertise is nearby, allowing it to be effectively applied and put into practice.

7. Attract more women to STEM education to unleash full potential in the workforce

Today there is a big gender gap both in STEM related education as well as in green skilled jobs. To unlock the full potential of the workforce, efforts must be made to attract more women to these educational programs and industries. This includes promoting gender diversity in STEM education, creating inclusive work environments, and providing targeted support to encourage women to pursue and succeed in green sectors. Using mentors and role models can be an important tool to empower women to pursue engineering programs.

Today, sustainability is an attractive field of study, yet engineering programs struggle with recruitment. Since sustainability is a significant component of many engineering programs, this should be highlighted more effectively in their promotion. By doing so, we can harness diverse perspectives, broaden the labor supply and drive innovation in the green transition.

It is worth noting that a lack of space is not always the main obstacle. In countries like Sweden, instead, the issue lies in the fact that only half of engineering students complete their degrees. Efforts should therefore focus on supporting and assisting engineering students and meet their needs to succeed.[32]

8. Make it easy for international talent to work in the Nordics – A Nordic fast track for the green transition

Immigration policies, work permits, and visa regulations needs to be competitive and appealing to both attract and maintain competence we need. Restrictive measures, for example Sweden's newly introduction of a minimum salary threshold for labor migrants risk excluding skilled workers by hindering they or their family from a secure employment.[33] A more effective approach would be deregulation to enable a freely moving workforce within Nordic countries that can quickly adapt to labor market needs without restricting thresholds. A Nordic fast track for the green transition would secure both workforce and quality.

9. Make the education system adaptable to rapid industrial needs

The higher education system must be agile and responsive to the rapid changes brought by the green transition. As industries evolve at an unprecedented pace, educational institutions need to quickly adapt their curricula and training programs to meet emerging demands. Reskilling and upskilling programs will play a key role in making universities ready if industries changes.

An example of rapid adaptation can be seen in Skellefteå municipality in Sweden, where Northvolt established its first battery gigafactory. In response to Northvolt's demand for skilled workers, Skellefteå's campus quickly organized multiple industrial training programs to address the company's workforce needs effectively.[34]

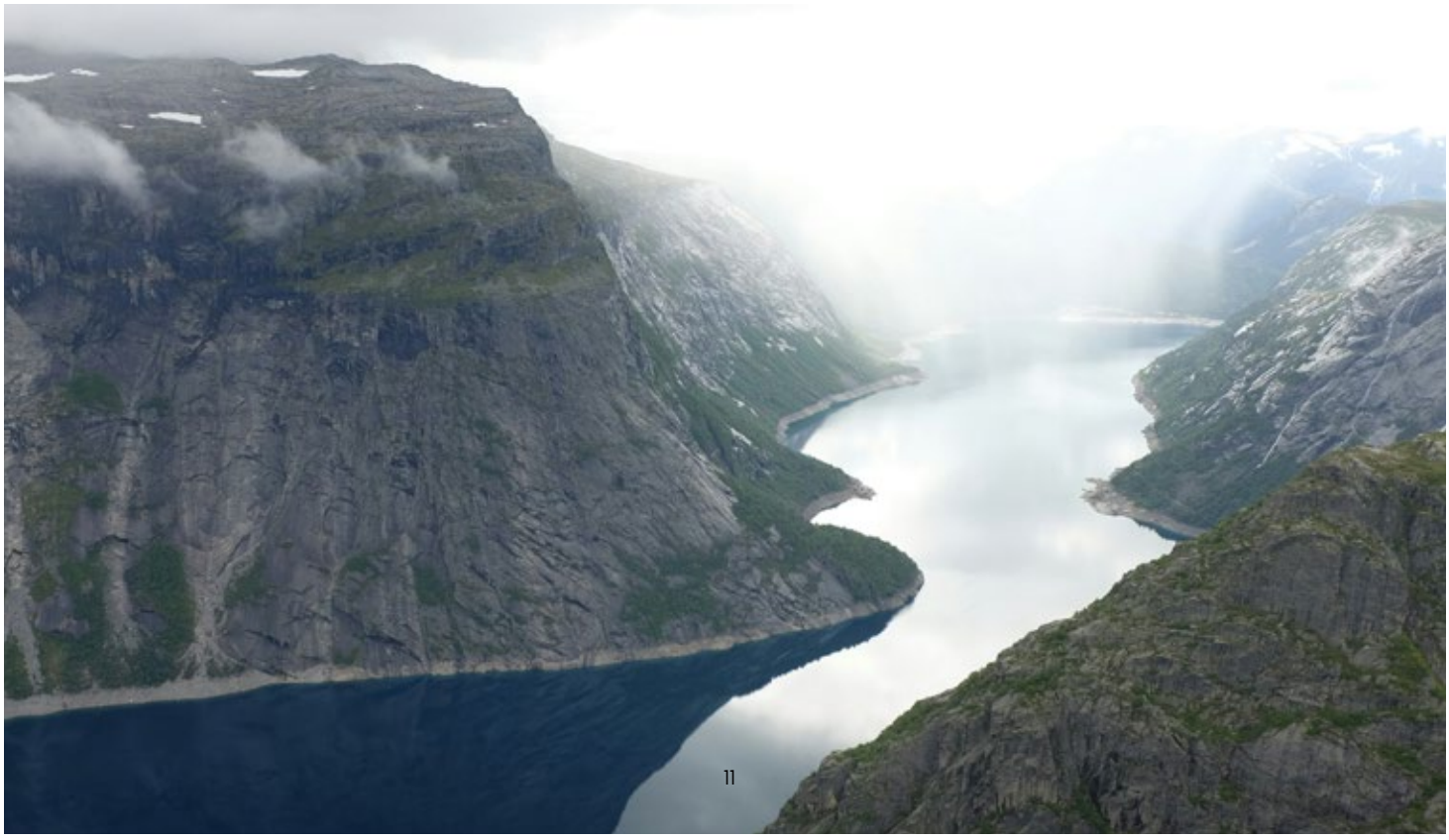
[32] *SVT (2023), Sveriges Ingenjörer: "Ungefär hälften av alla studenter hoppar av"*
[33] *Migrationsverket (2024), Increased maintenance requirement for work permits*
[34] *SVT (2024), På Campus i Skellefteå har hundratals utbildats för jobb på Northvolt – nu tvingas utbildningarna ställa om*

10. Each Nordic country to lead with their strengths to attract talent

Each Nordic country brings something unique to the climate transition arena. The Nordic should develop academic programs that reflect their unique areas of expertise, building concentrated knowledge and talent in key fields. This specialized expertise will attract international talent while fostering national talent and can then be shared across the Nordic region, strengthening collaboration and driving regional innovation and minimizing competitiveness between the Nordic.

11. Accelerating AI through green competence integration

The Nordic region already collaborates on AI, with public actors playing a key role. To support the green transition and workforce development, targeted investments are needed in both AI and green skills, ensuring they are more closely integrated. AI and sustainability must be incorporated into engineering programs to equip future professionals with the necessary expertise. Broader initiatives, such as public education, teacher training, and workforce development, are crucial to ease labor market transitions.



Concluding remarks

The four biggest obstacles to the industry's climate transition, according to Fossil Free Sweden, an initiative by the Swedish Government to accelerate the pace of the climate transition, are:

1. **Slow and unpredictable permitting processes.**
2. **Uncertainty regarding the future availability of fossil-free electricity at the right time, in the right place, and at a low cost.**
3. **A lack of competence in sufficient quality and quantity.**
4. **The absence of risk-sharing models with long-term and stable conditions.**

The lack of competence in sufficient quality and quantity is highlighted as a critical obstacle to the industry's climate transition.[35]

We also want to highlight another perspective: It's urgent. Johan Rockström, professor of Earth system science at the University of Potsdam, Germany, and director of the Potsdam Institute for Climate Impact Research (PIK), wrote in DN Debatt: "We are on a path leading to 3.1 degrees of global warming in 75 years. This corresponds to more than 5 degrees in Sweden and is nothing short of a path toward catastrophe."[36] The pace must increase, and collaboration in the Nordics must ramp up.

[35] *Fossilfritt Sverige (2024), De fyra största hindren för industrins klimatomställning*
[36] *Dagens Nyheter (2024), Sveriges ohållbara politik skadar inte bara planeten*

11 STRATEGIES FOR STRENGTHENED SKILLS FOR THE GREEN TRANSITION IN THE NORDICS

STOCKHOLM DECEMBER 2024

Haga Initiative
Business Climate Leaders