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The Green Shift in Norway and the role of Research and Innovation

The Green Shift

For those of you who either haven't heard the term "the green shift" or suspect it is case of Norwenglish (a clumsy translation of a Norwegian concept to English language) I will enlighten you. *Det grønne skiftet* was nominated to be "the new word of the year" in 2015 by the Norwegian Language council.

The term is used to describe a societal transformation where growth and development takes place within the limits of nature. The term may also be used in specific sectors to describe a renewal of products and services that reduces the negative consequences for climate and environment. In many ways, this term corresponds to the German term "Energiewende", which I assume many of you are familiar with.

We are ambitious

The government's goal is that Norway shall be a driving force in the international climate work and we want to remain a pioneer country in renewable energy. Research, education and innovations are central in the work to achieve the climate goals.

Norway has many good academic environments in this area, and the government will maintain and strengthen the focus on research, education and innovation as a basis for the development of climate and energy technology.

Energy and civilization

In the book *Energy and Civilization: A History*, Vaclav Smil illuminates how innovations in our ability to turn energy into heat, light, and motion have been a driving force behind our cultural and economic progress over the past 10,000 years. Smil argues that the past 300 years have seen the most miraculous advances in the human condition—and just about all of those advances can be traced directly to the exploitation of new forms of energy.

But as we know: Our fossil fueled civilization, with all its marvelous features is in need of a green shift.

IPCC's 1.5 degrees report

A couple of weeks ago, October 8, The Intergovernmental Panel on Climate Change (IPCC) published its special report on *Global Warming of 1.5 °C*

One of the key messages that comes out very strongly from the report is that we are already seeing the consequences of 1°C of global warming through more extreme weather, rising sea levels and diminishing Arctic sea ice, among other changes.

The report finds that limiting global warming to 1.5°C is possible within the laws of chemistry and physics but it will require rapid, far reaching and unprecedented changes in all aspects of society.

We will do our part

Through the Paris agreement, Norway has undertaken to reduce emissions of greenhouse gases by at least 40% by 2030 compared with 1990 and we have a statutory goal of becoming a low-emissions society by 2050. Norway

is in dialogue with the EU on a common fulfillment of the emission target by 2030. Should we achieve these goals, there is a need for changes in all sectors of society - especially in transport, oil and gas extraction, industry and agriculture.

**The long-term plan for research and higher education (2019—2028):
Research, higher education and innovation have key roles in the
realization of the green shift**

On the same date that UN released the 1,5 degree report, the Norwegian government published a revised long-term plan for research and higher education. The first long-term plan was launched in 2015 (2015 - 2024)- a revised version is to be drafted every fourth year.

The plan sets out the primary objectives and priorities for how the Government will strengthen research and education in the period from 2019 to 2028.

The long-term plan has the following long-term priorities:

- Oceans
- Climate, environment and environmentally friendly energy
- Renewal in the public sector and better public services
- Disruptive and industrial technologies
- Social security and cohesion in a globalized world

What made first the first long-term plan a success was that it contained more than just fine words about the importance of research and higher education. It came with money, and concrete plans for how the grants were to be stepped up over time.

The revised long-term plan comes with a so called "escalation plan": 1.5 billion NOK to be spent over the next four years to step up activity in prioritized areas. Among other things the funds will be used to boost research on technology that contributes to the green shift.

In the long-term plan the government states that it will:

- intensify research efforts for conversion to the low-emission society
- prioritize the development of technology and solutions for the green shift
- strengthen research and higher education that contribute to better understanding of climate change and provide the basis for successful climate change
- strengthen research and higher education to further develop a comprehensive and knowledge-based management that takes care of environmental and climate considerations

Research and higher education institutions are key players

Universities and university colleges provide students with updated knowledge of climate and environmental developments and consequences globally and locally. They equip the students with skills and competences to make them able to find and implement solutions. There is a steady growth in study programs both new, and redesigned that take into account the UN sustainability goals.

The Horizon 2020 priorities and the goal that at least 60% of the overall program budget should be related to sustainable development is an important driver for the green shift in academia.

Higher education institutions should not only find solutions and teach them. They must apply them - in their own activities.

Research and higher education institutions have implemented a number of measures that contribute to the green shift and sustainable development. Throughout the whole span of activities from - zero-emission building policies to on campus waste handling, student canteens with "rescue food" to pollinator friendly flower beds. Several institutions have introduced P-fees for cars and established better facilities for bicycles. At the University of Tromsø they have even installed stands for skis at the entrance to Medicine and Health Sciences in order to promote environmentally friendly (and fun) winter transportation.

All of these measures do have an impact – the Zero –emission buildings, the flower beds and ski stands nudges - the staff, the students and the wider community in the direction of the green shift.

Collaboration between academia and industry is necessary in order to realize the green shift

In the government-run Prosess21 collaboration forum, representatives from the process industry, academia and working parties work together to develop a strategy for the industry's role in the green shift. The contribution from the processing industry goes beyond direct emissions reductions. It is also about technology and product development, expertise, efficient use of resources and sustainable business models. The development and spread of low-emission technology and solutions could contribute to emission reductions in the industry itself, but also in other sectors, both in Norway and internationally.

The importance of international collaboration

In Norway's input to the EU's ninth Framework Program for Research and Innovation, Horizon Europe, great emphasis is placed on promoting a green shift. Between others, to fulfill this ambition, strong ties between Germany and Norway would be very important. Therefore the Norwegian Government has launched a governmental strategy for the intensification of the bilateral cooperation between Germany and Norway. The strategy was formulated in 2016 and revised in 2018. The main rationale behind such a strategy is the following:

- Germany is one of Norway's most important partners in Europe
- Germany is responsive to Norwegian positions within the EU/EEA
- Norway and Germany are close allies within foreign and development policies, as well as within the area of defense
- Germany is one of Norway's most important trade partners
- Germany is the most comprehensive foreign market for the Norwegian tourism industry
- Germany is a very important market for Norwegian culture abroad
- Germany and Norway collaborate closely in research and education

Norwegian and German higher education institutions (further HEIs) cooperate closely not only with regard to student exchange, research and innovation, but also through institutional cooperation projects. Many HEIs are involved in institutional cooperation within the framework of Erasmus+ programs. Since the program start in 2014, three projects involving German and Norwegian institutions (in the same project) within Erasmus+ Joint Degrees have been completed; the statistics for Norwegian-German cooperation within Erasmus+ strategic partnerships is eight completed

projects. The statistics is not complete, as there are many on-going projects which will be registered in the Project Results Database ([link](#)) later, after completion. The search by now shows more than 600 projects on all levels of education/ all project types

Norway and Germany are also both collaborating in the Mission Innovation, an initiative launched during the Paris climate summit in 2015 to accelerate the development of clean energy technology. An important element is that all participating countries will seek to double their investments in the development of new environment and climate-friendly energy technology over a five-year period.

Both the UN Climate Panel and the International Energy Agency (IEA) state that CO₂ capture and storage is necessary to achieve the objectives of the Paris Agreement. ECCSEL ERIC coordinates European research infrastructure for CO₂ handling. The organization is located at NTNU in Trondheim and became operational in June 2017. It comprises about fifty laboratories in five European countries. Further research is needed to make the technology for CO₂ handling more efficient and cheaper. International cooperation is essential in order to accelerate the development of technology and ensure its use.

Thank you!